General introduction on ESCO

1.   Aim of "General introduction on ESCO"

The aim of the "General introduction on ESCO" paper is to provide an overview of ESCO's three pillar approach and the state of play of ESCO's development. Three papers, each dealing with one ESCO pillar, are provided along with this document and elaborate further on the scope, structure and further development of each pillar.

2.   What is ESCO?

The European Commission is coordinating the management of ESCO – European Skills/Competences, qualifications and Occupations – a multilingual classification, in collaboration with stakeholders.

ESCO is based on the classification of occupations and skills/competences currently used on EURES, the European Job Mobility Portal, which has been developed by the Swedish Public Employment Service (Arbetsförmedlingen). Similar to the EURES classification, the structure of ESCO's occupations pillar builds on ISCO, the International Standard Classification of Occupations, which is managed by the ILO (International Labour Organization).

ESCO is the only European multilingual classification linking skills and competences and qualifications to occupations and will be available free of charge to all labour market, education institutions and other stakeholders.

ESCO will be linked to relevant international classifications and standards, such as NACE[1] and EQF[2]. It may also complement existing national, regional or sectoral occupational and educational classifications and enable the exchange of information between them.

Since the efficiency and accuracy of online (skills) based job matching depends on the quality and reliability of the exchanged information, semantic interoperability[3] is essential. Semantic interoperability can be obtained by mapping various international, national, regional and sectoral classifications with ESCO.

ESCO is still in the early development phase. It's a long-term project that can only be achieved gradually and that requires a pragmatic, step-by-step approach. All interested parties are encouraged to actively contribute throughout the development and the continuous revision process of ESCO.

3. Main buildings blocks of ESCO

3.1. Three pillars[4]

The final structure for ESCO, based on the decisions approved by the Board, will exist of three pillars: i) occupations; ii) skills/competences; and iii) qualifications.

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[1] NACE stands for "Nomenclature statistique des activités économiques dans la Communauté européenne", http://epp.eurostat.ec.europa.eu/portal/page/portal/nace_rev2/introduction

[2] EQF stands for "European Qualification Framework", http://ec.europa.eu/eqf/home_en.htm.

[3] Semantic Interoperability refers to the ability of two or more computer systems to automatically interpret any information exchanged meaningfully and accurately. To achieve semantic interoperability, both sides must use a common standard for information exchanged.

[4] More concrete and in depth information on the development of the three ESCO pillars and its semantic structure will be provided in the individual pillar papers.

ESCO

OCCUPATIONS **SKILLS & COMPETENCES** **QUALIFICATIONS**

Legend:
- ● ESCO Occupation
- ● ESCO Skill/Competence
- ● ESCO Qualification
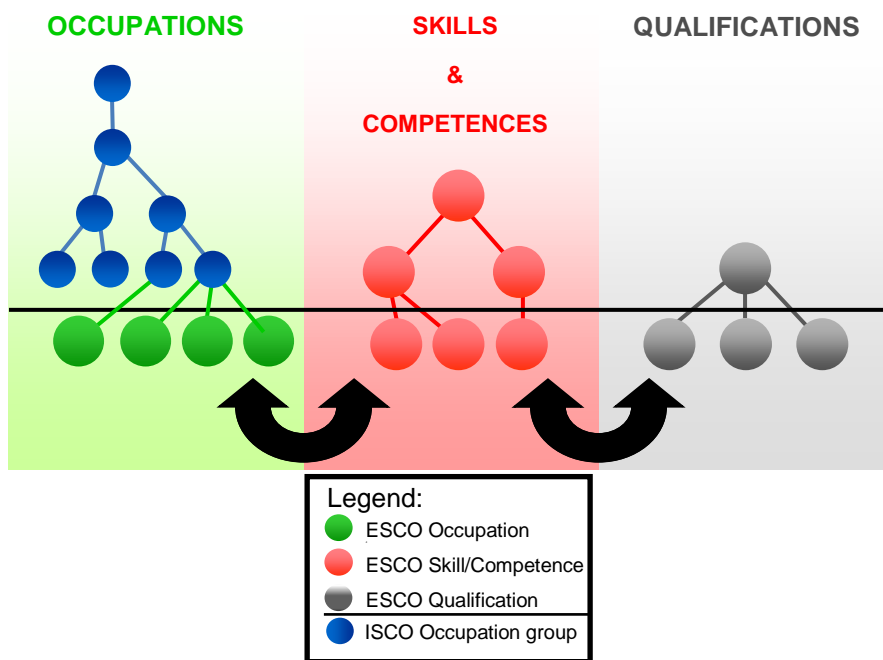- ● ISCO Occupation group

Diagram 1: ESCO: the three pillar approach

Each pillar will have its own semantic structure. While for the occupations pillar, the hierarchical structure already exists in the form of ISCO and is visible in blue in diagram 1, the main challenge will be to develop tailor-made and relevant structures for the skills/competences pillar and qualifications pillar.

3.1.1. Occupations

The occupations pillar of ESCO currently includes around 5 000 occupations, that are organised under the 390 unit groups of the ISCO classification. Since a repository of terms and a semantic structure already existed in the EURES classification it is the pillar of ESCO that is developed the furthest.

3.1.2. Skills/competences

The skills/competences pillar will contain two large groups of skills/competences: Job specific skills/competences and transversal skills/competences which are by nature cross-occupational. At this moment the skills/competences pillar only contains job specific skills/competences, the transversal skills/competences still have to be added/created in ESCO. The ESCO board approved

the importing of transversal skills/competences from DISCO[5], the Dictionary of Skills and Competences as a starting point for further development.

For the job specific skills/competences, the ESCO Board approved the use of the 22 ISCED education fields[6], which are also used as a structuring element in DISCO. The semantic structure for the transversal skills/competences is currently being developed by the Cross Sector Reference Group using the available structure in DISCO as a starting point.

3.1.3. Qualifications

Pre-ESCO v0 does not yet contain a separate qualifications pillar. However the current skills and competences pillar contains approximately 860 qualifications-related concepts. These are addressed through a variety of synonyms, the most common being diploma, degree, certificate, licence and authorization. Apart from being grouped by ISCO unit group, these concepts are not structured according to any particular logic. While it can be considered to further use these concepts, the current list is not a solid basis for developing the qualifications pillar of ESCO.

The following types and categories of qualifications will be included into the ESCO qualifications pillar:

- National qualifications (indirectly via the EQF portal);

- Qualifications awarded at national level but regulated at European level (directly);

- (International) qualifications, certificates and licences linked to tasks, technologies (directly);

- (International) qualifications and certificates linked to occupations and sectors (directly).

The expansion of ESCO with these qualifications will be accompanied by a reflection on the nature of links to be established with the other ESCO pillars.

National, official qualifications need to be considered with particular care as ESCO will need to build on the work already carried out under the European Qualifications Framework Recommendation, in particular through the development of national qualifications frameworks.

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[5] http://www.skills-translator.net/

[6] For example: Arts, Humanities, Journalism and information, Life sciences, Law. For a complete overview: http://www.unesco.org/education/information/nfsunesco/doc/isced_1997.htm, Chapter 2.

3.2.   Linking the ESCO pillars

An additional point of future development is the aim to link the three ESCO pillars in a way that shows the relationships between occupations, skills/competences and qualifications and provides an indication of their importance. At this stage, the relationships between the three ESCO pillars have not yet been defined. The ESCO Board will take a closer look at the matter on the mid to long term.

4.   Versions of ESCO

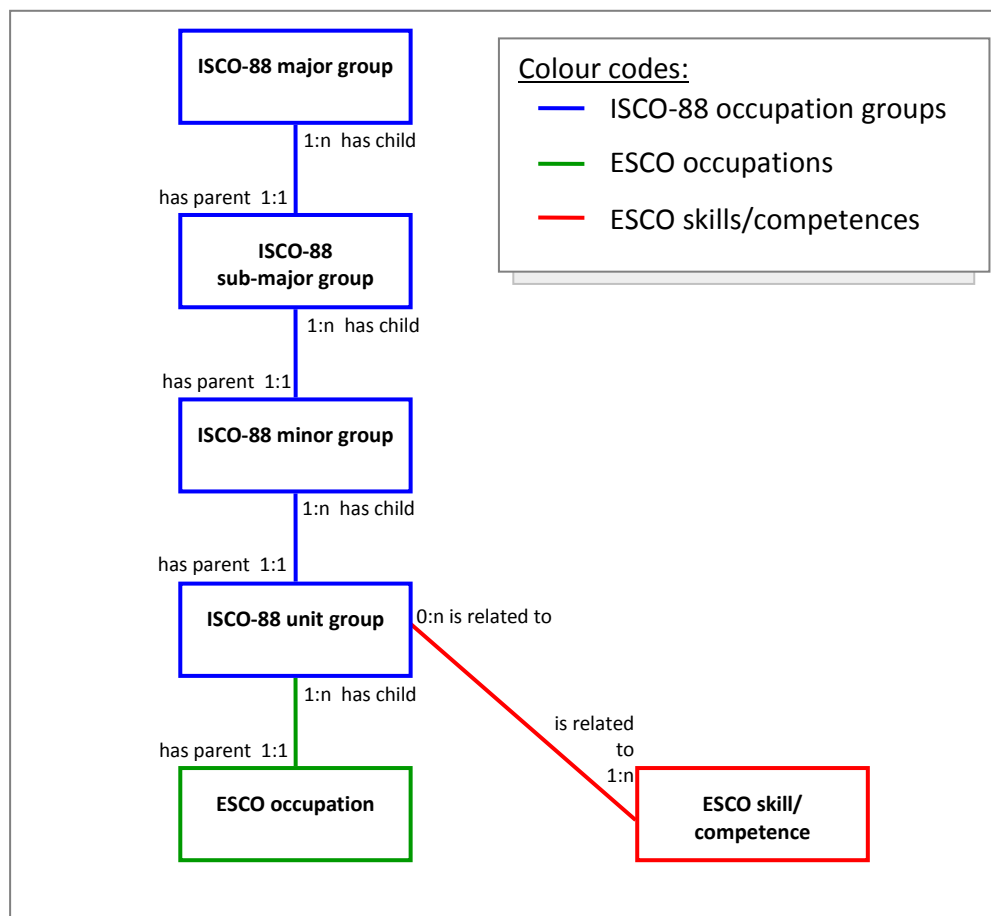## 4.1.   Pre-ESCO v0

The current state of ESCO, pre-ESCO V0:

Diagram 2: Datamodel pre-ESCO v0

In its current version (pre-ESCO v0) the classification contains about 5 800 skill/competence concepts and about 5 000 occupations. Pre-ESCO v0 already covers 22 languages of the European Union. For each concept there is one term per language.

In pre-ESCO v0, occupations have a hierarchic relation with the unit group level of ISCO. Skills/competences have an associative relation with the unit group level of ISCO. Occupations and skills/competences are therefore indirectly related with each other via the unit group level of ISCO. In pre-ESCO v0, the hierarchic structure of the occupations pillar is formed by ISCO 88.

Pre-ESCO v0 does not yet contain a separate pillar for qualifications, but about 860 qualifications are currently included in the skills/competences pillar.

Actions taken to evolve from the EURES taxonomy to pre-ESCO v0:

1. Missing or imprecise translations:

    a. The EURES taxonomy contains several Swedish terms which have not yet been translated in some or all of the languages. The ESCO secretariat identified the terms which still need to be translated, arriving at a total of around 1500 missing translations.

    b. The EURES taxonomy contains a number of translation errors which have been listed to be reviewed by DG Translation.

2. Cleanout of typically Swedish concepts in two steps:

    a. The ESCO secretariat identified and listed obvious typically Swedish concepts.

    b. The ESCO secretariat deleted the identified concepts via the taxonomy management system (TMS). 294 concepts have been deleted: 9 occupations and 285 skills/competences.
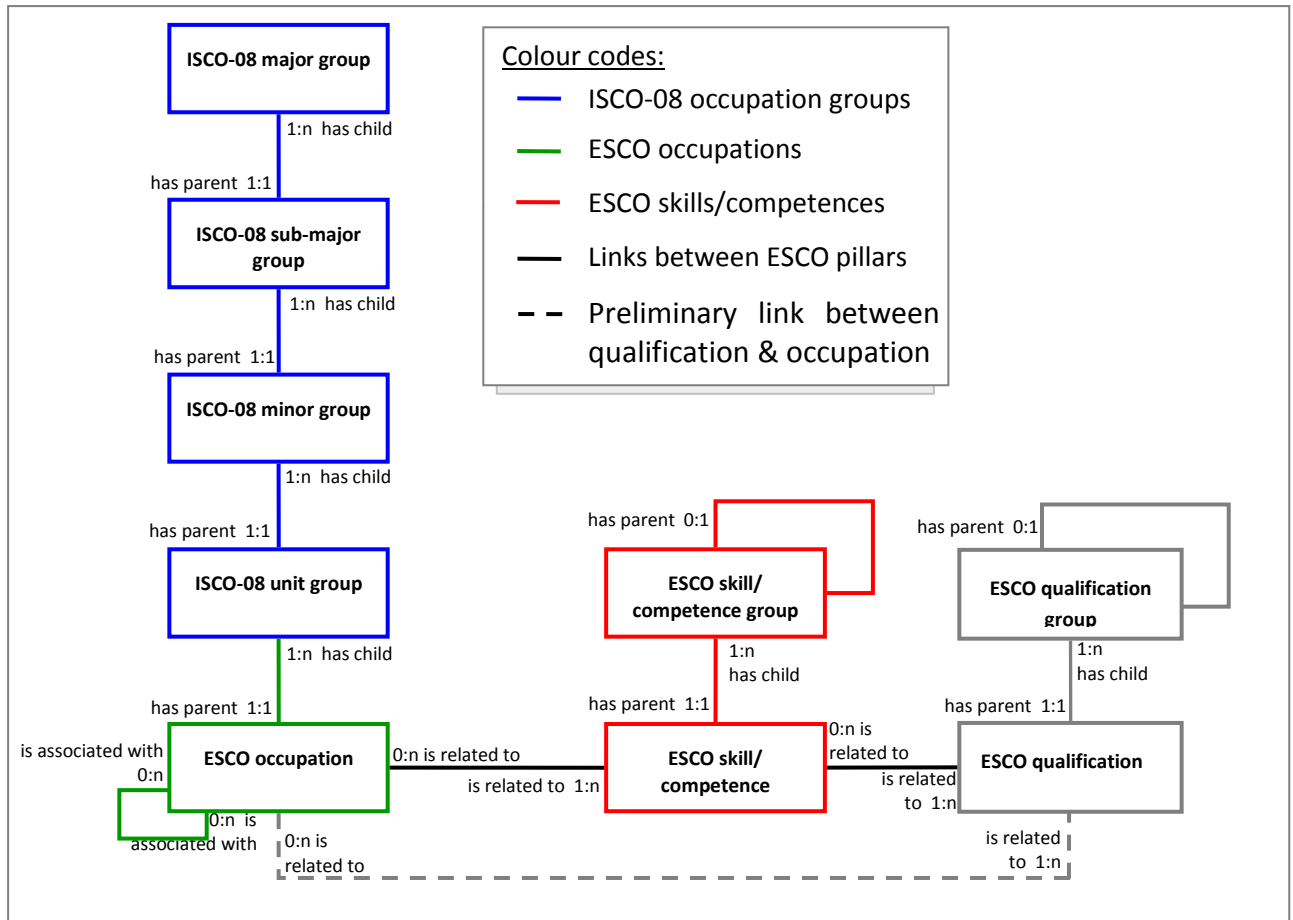
4.2. ESCO v0

Diagram 3: Datamodel ESCO v0

The data model displays the presence of the three distinct pillars, the occupations pillar, skills/competences pillar and qualifications pillar. For the occupations and skills/competences pillar, decisions have already been made with regards to their semantic structure.

In ESCO v0, occupations have a hierarchic relation with the ISCO unit group level.

Skills/competences have an associative relation with occupations and qualifications.

Qualifications have an associative relation with skills/competences.

The relationship between qualifications and occupations is still in a draft phase and still to be finalised. The ESCO Board agreed that information on the legal character of that relationship is important and to be included.

In ESCO v0, the hierarchic structure of the occupations pillar will be formed by ISCO 08.

The data model of the occupations and skills/competences pillar is finalised. The data model of the qualifications pillar is still in development.

Actions to be taken to evolve from pre-ESCO v0 to ESCO v0:

1. DG Translation performs a quality check on the translated terms of ESCO:

Since the EURES taxonomy has Swedish as a core language, which in ESCO shifted to English, a quality check will be performed on the terms which have been translated over time. DG Translation will review over 230.000 terms and perform the quality check in three steps:

   a. Check the terms in the context of the classification;

   b. Mark incorrect or imprecisely translated terms;

   c. Suggest a better translation where necessary and possible.

It is foreseen that DG Translation will be able to start the with the quality check in the course of Q3 2012.

2. The original ISCO 08 labels in English, Spanish and French delivered by the International Labour Organisation will be "Europeanised". Mainly American English and American Spanish labels will be adapted towards European Spanish and UK English.

3. Upgrade to ISCO 08[7]:

The upgrade from ISCO 88 to ISCO 08 will take place in 2 steps: an automated upgrade followed by a manual upgrade.

   a. The automated upgrade:

Based on the correspondence table for the upgrade from ISCO 88 to ISCO 08 provided by the ILO, a tool is being developed to not only automatically redraw the relations between occupations and the unit group level of ISCO 08, but also to automatically link all skills/competences with all occupations within one ISCO 08 unit group. This tool will be delivered in the summer of 2012. As soon as this tool is delivered, the ESCO secretariat will start with the automated upgrade to ISCO 08.

   b. The manual upgrade:

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[7] On the topic of the ISCO upgrade, more elaborated information can be found in chapter three the Occupations paper.

In the manual upgrade, at first the ESCO secretariat reviews the relevance of the newly created relations between occupations and the new ISCO 08 unit group and removes the relation where it is obviously not relevant. Secondly, the ESCO secretariat reviews the relevance of the newly created relations between skills/competences and occupations and removes the relation where it is obviously not relevant.

4. As approved by the ESCO Board, the ESCO secretariat imports transversal skills/competences from DISCO into the skills/competences pillar. For all transversal skills/competences and other ambiguous terms in ESCO, the ESCO Secretariat will create a definition in English.

5. Datamodel and import of qualifications into ESCO v0:

The data model of the qualifications pillar has made a lot of progress in the first half of 2012. After finalisation of the data model, the international and European qualifications will be part of ESCO.

4.3.   Developing the final data model for ESCO

The final data model of ESCO, based on the decisions already taken by the ESCO Board at this stage, is displayed below.

The data model displays equally to the ESCO v0 data model the presence of the three distinct pillars, the occupations pillar, skills/competences pillar and qualifications pillar. For the occupations and skills/competences pillar, decisions have already been made with regards to their semantic structure.

Additional word lists on for example tools and action verbs, will be added to ESCO to enhance the usability of the classification.

With regards to the relationships between the three pillars:

1. The ESCO Board confirmed that occupations will be related to skills/competences. Which dimensions will be reflected in that relationship is still unclear. The ESCO Maintenance Committee is currently evaluating the impact and feasibility of the implementation of the following three dimensions: frequency, importance and level. After this evaluation, the ESCO Maintenance Committee will formulate an advice for the ESCO Board on that matter.

2. Establishing a relationship between qualifications and skills/competences will be challenging. The ESCO Board decided it needs more data/information to be able to make a decision on the nature of the relationship between qualifications and skills/competences. Therefore, the ESCO

Secretariat will carry out an analysis of certificate and diploma supplements as well as the descriptions of learning outcomes they include.

3. The ESCO Board acknowledges that in some cases the relationship between occupations and qualifications is stronger (e.g. in case of legal requirements), than in others. The board agreed that information legal nature of the relationship between qualifications and occupations is important and needs to be included in ESCO. The ESCO Board will take a final decision on this matter in December 2012.
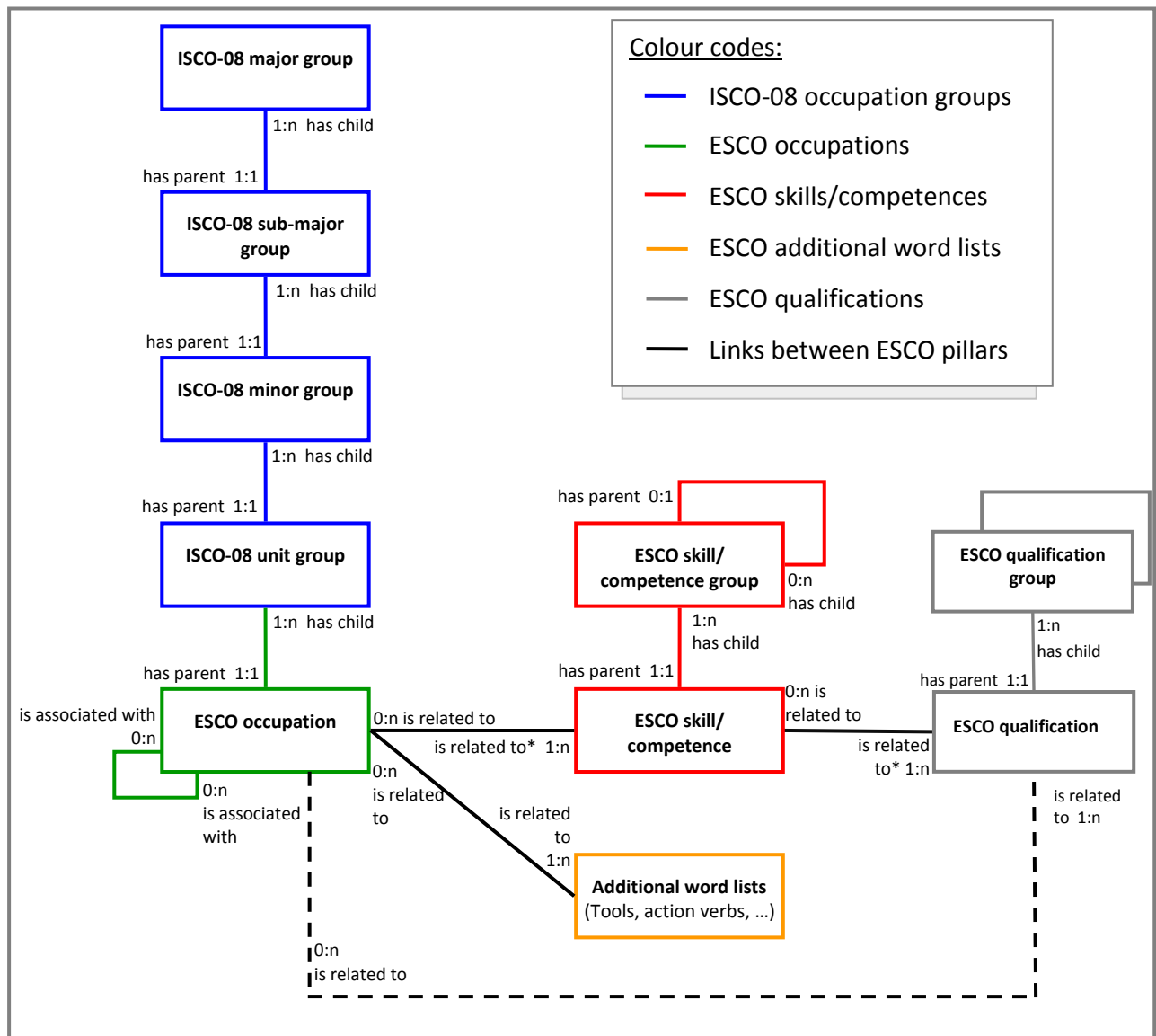

Diagram 4: Final goal data model ESCO as defined by the ESCO Board's decisions at this stage

5. Technical infrastructure

ESCO is disseminated using state-of-the-art technology. Cutting Edge technologies, such as RDF[8], SKOS[9] and LOD[10], guarantee that ESCO will be easily acceded, and that the potential of the Semantic Web[11] can be fully exploited by all interested parties.

The European Commission has started the development of the technical infrastructure to manage, publish and share ESCO:

1. The taxonomy management system (TMS) ITM, which will provide a management environment for ESCO taxonomy.

2. The ESCO portal, a website with advanced browse and search facilities on which ESCO will be published as LOD. ESCO will be downloadable from the ESCO portal in Excel, XML and SKOS format. The ESCO Portal will for now contain two parts: a public part containing background information on ESCO and a restricted part, only open to stakeholders directly involved in the development of ESCO, giving access to the actual classification.

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[8] RDF (Resource Description Framework) is a method to describe or model the format of information available as resources on the Web.

[9] SKOS (Simple Knowledge Organisation System) is a standard format for building 'controlled vocabularies', such as taxonomies, and making them available as RDF. SKOS guarantees exchangeability and interoperability with other taxonomies.

[10] LOD (Linked Open Data) is a method of exposing, sharing and connecting data on the Web.

[11] The Semantic Web is a development of the World Wide Web into a 'web o data' where information can be automatically interpreted and 'understood', exchanged and distributed. REDF, SKOS and LOD are important components of the Semantic Web.