Intellectual Output 1

INNOVATIVE PROFESSIONAL PROFILES AND COMPETENCES-SKILLS MATRIX FOR SMART SPECIALISATION IN THE AUTOMOTIVE SECTOR

UPenAUTO

Co-funded by the Erasmus+ Programme of the European Union

PROJECT:

UPenAUTO - Upskilled Engineering Profiles for the Automotive Sector and Uptake of Dual Alternate Scheme in Europe´s Higher Education

www.upenauto.com

INNOVATIVE PROFESSIONAL PROFILES AND COMPETENCES-SKILLS MATRIX FOR SMART SPECIALISATION IN THE AUTOMOTIVE SECTOR

This document provides an overview and the detailed description of the most demanded profiles taking as a baseline the report of the European Automotive Sector Skills Council going further and specifying the detailed skills and competences demanded by at least 3 new professional profiles for smart specialization and innovation in the automotive sector: (i) Product engineer, (ii) Process engineer, (iii) Research and development engineer.

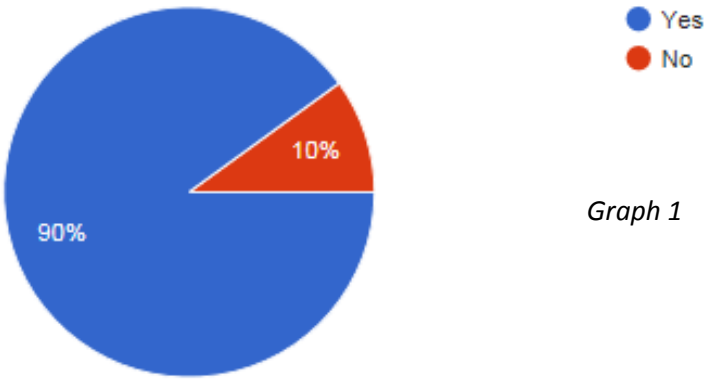
For carrying out this document and the competencies matrix for the smart specializations in the automotive sector the project partners created a survey focused on technical and manufacturing areas of automotive sector companies. These surveys have been distributed via the internet using Google Forms among key stakeholders previously identified and especially through the partners' networks which ensures a significant critical mass.

The main aim of the survey was to identify specific technical needs of the automotive sector in line with the specialization and needs of the industry; however, as we will see in the following lines, the survey has also revealed that the stakeholders give a big importance to other transversal skills too.

1. SURVEYS' RESULTS:

In the following lines we are going to analyze the main results derived from the different questions from the survey.

First of all, the consortium thought that it was essential to know if the stakeholder believed that the automotive sector needed a renovation, and if they believed that new occupations were going to arise in the near future. As it can be seen in the graphic (Graph 1), almost every person who answered the survey believes that the automotive sector and the occupations related to it need a modernization.



Graph 1

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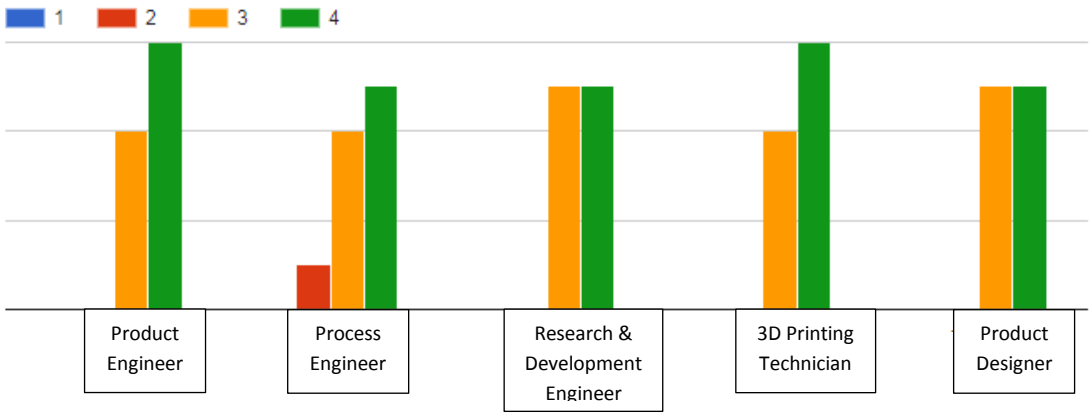
When asked which occupations or professions were going to be the ones required in the automotive sector in the near future, the responses varied a little bit from one individual to other. Here is a list of some of the new professions mentioned by the stakeholders who answered the survey:

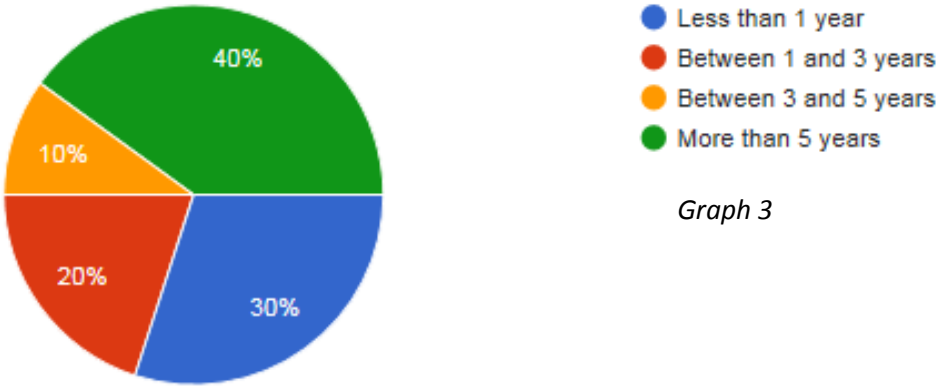
- 3D Printing technicians
- Bio-mechanical engineers
- Electric engineers
- Leader engineers
- Product designers
- Entrepreneurs
- …

On the other hand, when asked to rate from 1 to 4 how demanded some of the occupations might be in the future (1 Not demanded; 2 Low demanded; 3 Regular demanded; 4 High demanded); these are the answers of the participants (Graph 2):

Graph 2



Regarding the immediacy of these new occupations or professions from the automotive sector, most of the persons asked believe that they will be needed in a short time of period, as can be seen in the following graphic (Graph 3).



Graph 3

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Summing up, it can be seen that there is a variety of new occupations that the stakeholders that have taken the survey believe are needed for the modernization of the automotive sector. Among all these new occupations mentioned and rated by the experts of different European countries we must underline the three new professions this project is focused on ((i) Product engineer, (ii) Process engineer, (iii) Research and development engineer).

In addition, it is clear that more than the 50% of the respondents indicate that the modernization of the automotive sector's occupations should be done in a short period of time, being this an indicator that reinforces the existence of the UPenAUTO Project and the different deliverables the consortium is working on to develop.

2. COMPETENCIES MATRIX

As mentioned above, the UPenAUTO Project is focused on specifying the detailed skills and competences demanded by at least 3 new professional profiles for smart specialization and innovation in the automotive sector: (i) Product engineer, (ii) Process engineer, (iii) Research and development engineer.

Regarding these occupations the project is focused one, here we present a competencies matrix carried out with the results of the survey carried out by automotive sector's expert stakeholder from different European countries.

The matrix table is presented with three different columns representing each of the occupations the project is focused on ((i) Product engineer, (ii) Process engineer, (iii) Research and development engineer), and each of them has been allocated with different competencies and skills noting how relevant each of them would be for the future workers of these three occupations.

As it can be seen on the matrix, some of the competencies are technical while others are transversal or soft skills. The transversal skills are acquiring a big importance in all the technical sectors in the last years. The ideal future worker, apart from having the needed technical skills, has also developed different soft skills such as communication, decision making capacity, ability to work in different teams, etc…

Taking into account all the information gathered from the surveys and captured in the matrix table, the Project partners will use the different competencies and skills shown in the matrix to develop the second intellectual output (Modular Training Itineraries and Methodology) and the third intellectual output (Courseware Design of the Practical Training Scheme based in Real Automotive Sector Processes).

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	PRODUCT ENGINEER	PROCESS ENGINEER	R&D ENGINEER
Non- relevant	- Knowledge of regulation and related aspects - Problem solving and project management skills	- Knowledge and experience in mechatronics - Knowledge of design and simulation tools such as Catia, Unigraphics, Autoform etc.	
Relevant	- Knowledge of design and simulation tools such as Catia, Unigraphics, etc. - Ability to communicate	- Ability to work in multidisciplinary and international teams	- Entrepreneurial Competencies - Knowledge of design and simulation tools such as Catia, Unigraphics, Ls-dyna, Abaqus. - Understanding of technological applications for advanced material and in advanced manufacturing - Understanding of technological applications for advanced material and in advanced manufacturing
Very relevant	- Knowledge of materials and multi- material design - Ability to work in multidisciplinary and international teams	- Knowledge of new materials and related processes - Ability to communicate - Problem solving and project management skills	- Basic understanding of the manufacturing process and supply chains - Ability to communicate effectively

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2.1. Skills related to Industry 4.0

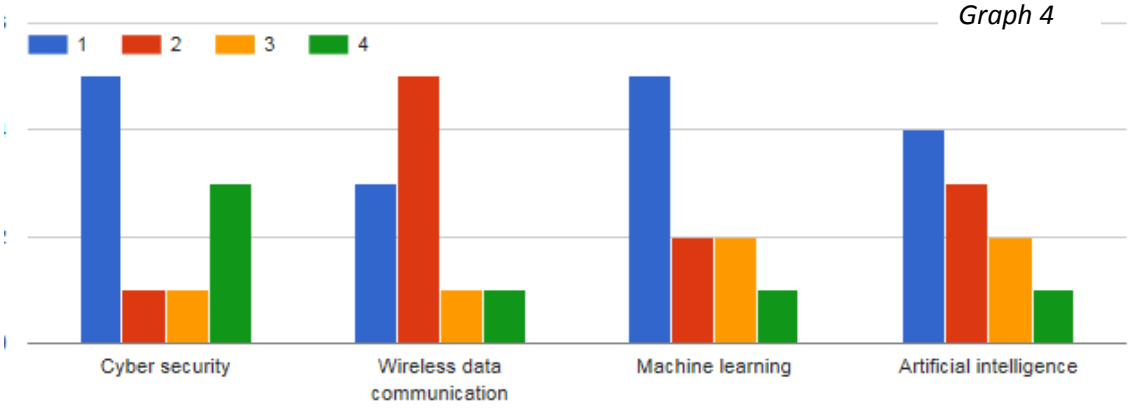
Apart from the competencies listed above, the consortium also believed that it was important to ask the stakeholders about other kind of competencies that may be also important for the development of the future workers in those three different occupations. When asked if future employees in these positions in the automotive industry should have skills related to industry 4.0, these are some of the most remarkable answers from the respondents:

- *"To improve the quality of work and efficiencies"*

- *"Yes. Industry 4.0 will be a core trend in the transformation of our industry in the coming years, to be able to steer efficiently our actions to improve our manufacturing, delivery and ultimately company results. At least a basic knowledge of Industry 4.0 should be mandatory for anyone working in the industry or product definition."*

Taking into account that most of the experts who took the survey stated the importance of the acquisition of Industry 4.0 related skills by the future workers, we asked them to list from most important (1) to least important (4) some skills related to Industry 4.0that they thought would be necessary in the future for the automotive sector's employees. You can see the results in the following graphic (Graph 4):

Graph 4



Regarding the information appearing in the graphic, the stakeholders give more importance to the Cyber-Security and Machine Learning skills, followed by the Wireless Data Communication skill. The Artificial Intelligence skill seems to be less important for the new occupations of the automotive sector for the experts who have taken the survey.

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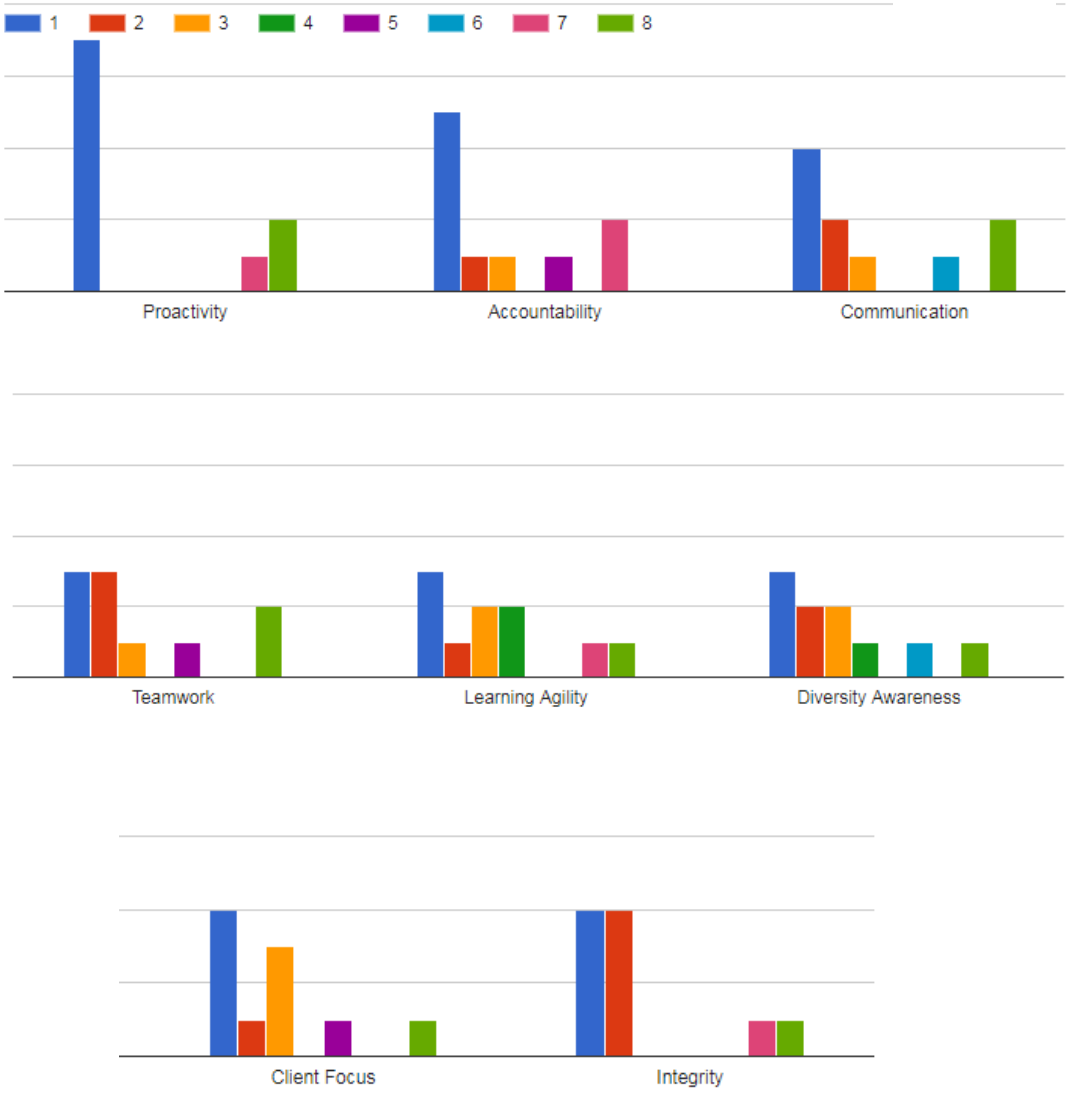
2.1. Personal efficiency skills

Even if in the technical skills matrix some transversal skills are already present, the consortium thought that it was important to add a question to the survey in which the stakeholders had to choose among different personal efficiency skills which they thought were the most needed by the future professionals of the automotive sector.

As mentioned previously, the so-called “360 degree candidate” is the most wanted profile by companies right now. This “perfect” candidate, apart from having the specific knowledge of his/her recruitment area, has also acquired different transversal skills that would make him/her able to face different and changing scenarios on its work environment. The project consortium asked the experts to rate a list of 8 personal efficiency skills from the most important (1) to the least important (8). In the following chart (Graph 5) we can see what the experts answered:

Graph 5



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As it can be seen, the experts believe that it is very important for the future workers of the automotive sector's new occupations, mainly for Product engineers, Process engineers and Research and development engineers, to have proactivity and accountability skills. In addition, as it has been stated in the matrix, the communication skill is also one of the most important soft skills that the employers are demanding in their future workers. The client-focus skill and the integrity are also very important for all the experts who have taken the survey.

Besides, in order to get as much information as possible about the transversal skills the companies are looking for in their future workers, we asked the experts to list any other skill that was not appearing in the list we asked them to rate and they believed would be essential. Here we list some of the skills they mentioned:

- Financial acumen
- Business mid-term vision
- Sustainability
- Flexibility
- Determination
- Problem-solving
- Self-motivated
- …

3. CONCLUSIONS

After analyzing all the data derived from the surveys, which has derived into a competencies matrix, here we list the main conclusions derived from it:

- The automotive sector urges a renovation and modernization to get adapted to the new technological advances and the new industrial revolution (Industry 4.0).
- On the other hand, almost three quarters of the experts who have taken the survey believe that this makeover should take place as soon as possible, underlining the necessity of creating new occupations and training their workers to face the changes the industry is already suffering. Among those new occupations mentioned, it must be underlined that the professions in which this project is focused ((i) Product engineer, (ii) Process engineer, (iii) Research and development engineer), are confirmed to be essential in this renovation process.
- Apart from the technical skills for each of those 3 new occupations, the transversal skills have also appeared to be essential for the training of the future workers. The companies are not looking just for technically prepared employees, but for 360 degree candidates.
- Other skills such as those related to the Industry 4.0 have also appeared to be important for the training that the future automotive sector workers should receive.

Finally, all these conclusions and all the data derived from the surveys will be the basis for the creation of the following project deliverables of this project, aiming to give an answer to the training needs of the automotive sector's actual and future workers.

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