REPORT ON QUALIFICATIONS IN AIR TRANSPORT

KAAT
Knowledge Alliance In Air Transport

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

This project has been funded with support from the European Commission. This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein. Project Nº.: 588060-EPP-1-2017-1-RO-EPPKA2-KA

Elaborated by:

Sorin Eugen Zaharia, Dan Potolea, Steliana Toma, Mariana Mocanu, Ștefan Popescu, Cosmina Mironov, Adina Pavel, Casandra Pietreanu, Puiu Constantinescu, Andreea Radu-Antimia, Eugenia Malevanciuc, Andreea Rada, Anca Ghita

University POLITEHNICA of Bucharest

CONTENT

1. Introduction
2. Aviation overview: From past to future – smart air transport
3. Value of Aviation: Economic and Social Benefits
4. Societal responsibility
5. Labour market, education and training in air transport
6. Smart qualifications for smart occupations
7. Regulatory Framework
8. Competences and qualifications mismatch impact on accidents and incidents in air transport
9. Politics in air transport qualifications
10. Sectorial Qualifications Framework for Air Transport (SQFAT) Methodology
11. Qualification presentation grids for therein qualifications
12. Comparison between qualifications frameworks
13. Conclusions
14. References

KAAT
Knowledge Alliance In Air Transport

MAIN OBJECTIVES

→ **to identify**:

- new occupations in air transport
- new qualifications and learning outcomes to be provided by study programmes

→ **better university-industry cooperation** to ensure

- the match between occupations and qualifications;
- coherent career and educational pathways programmes for these occupations.

The REPORT

Analyze

- 30 qualifications from air transport industry

Clarify

- Match between occupations, skills/competences and qualifications.

State of the art

- State of the art of air transport industry

KAAT
Knowledge Alliance In Air Transport

RESEARCH METHOD

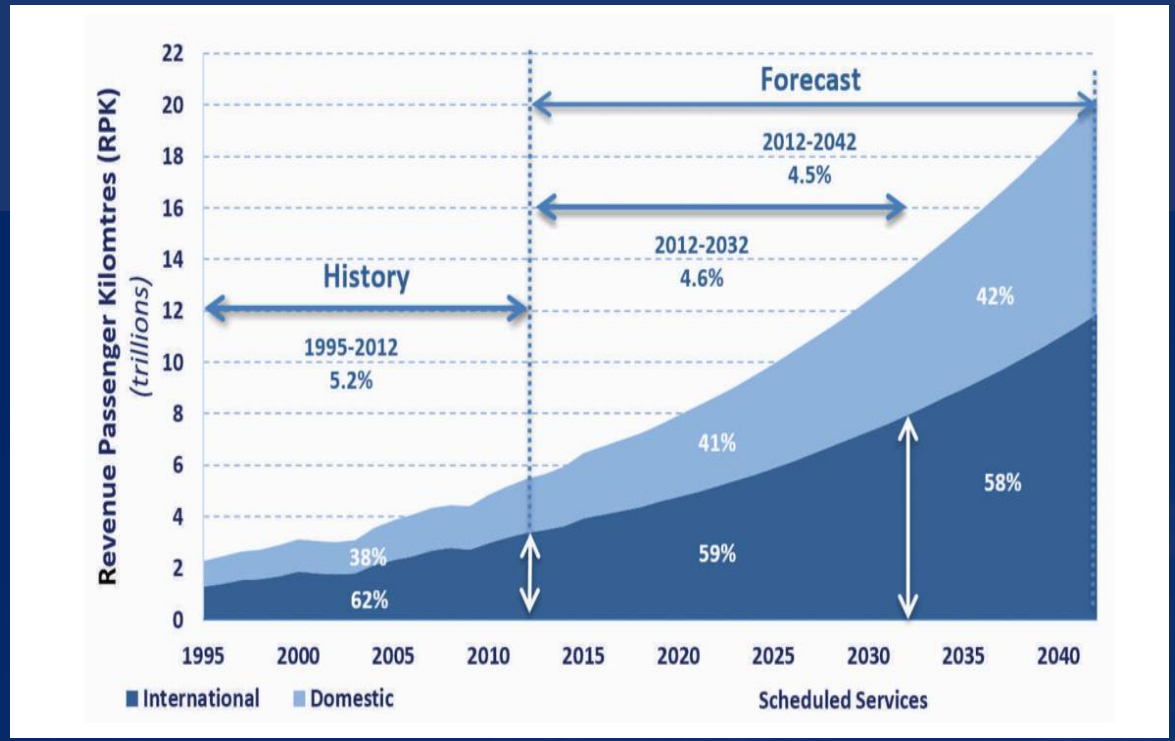
Analysis of EC and EASA regulations, EUA, CEDEFOP and ICAO reports on QFs and occupations in air transport

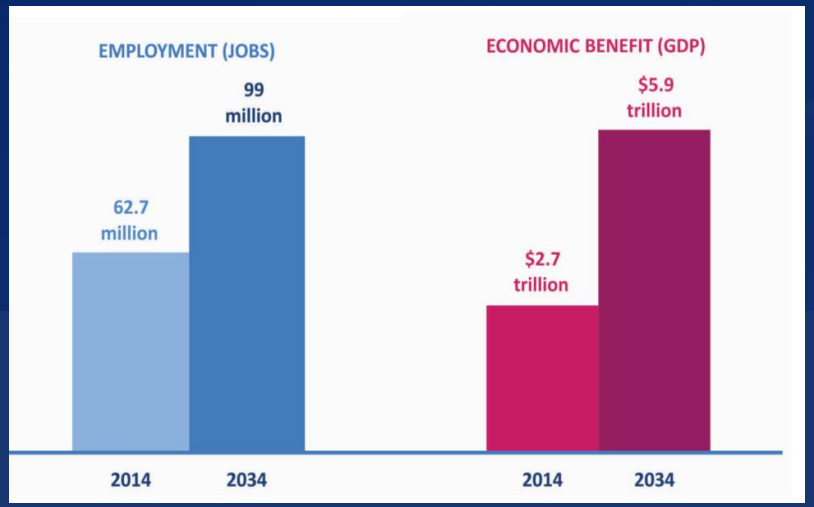
The analyse of air transport development forecast

Interviews with stakeholders and a survey on airports needs in terms of occupations, employee qualifications and skills for the future airport for the next 10 years

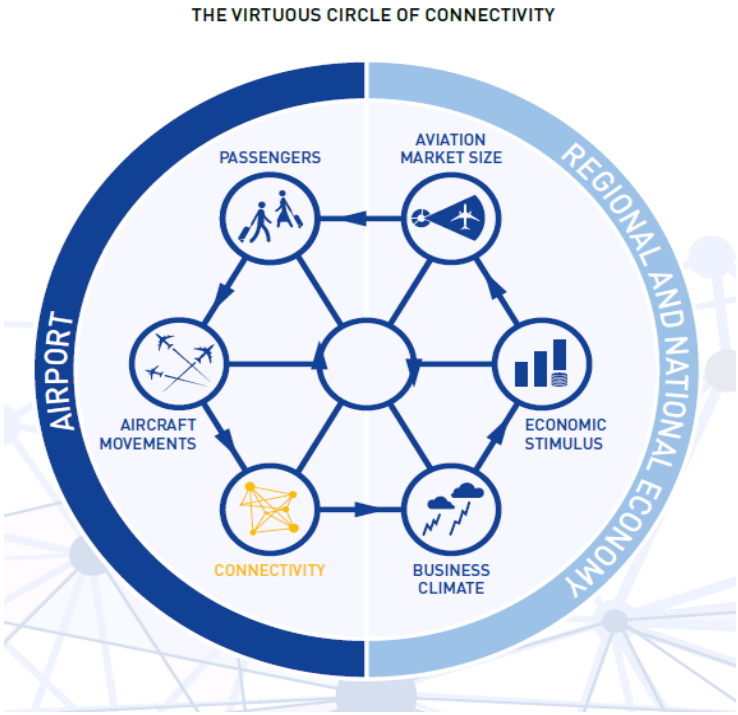
KAAT
Knowledge Alliance In Air Transport

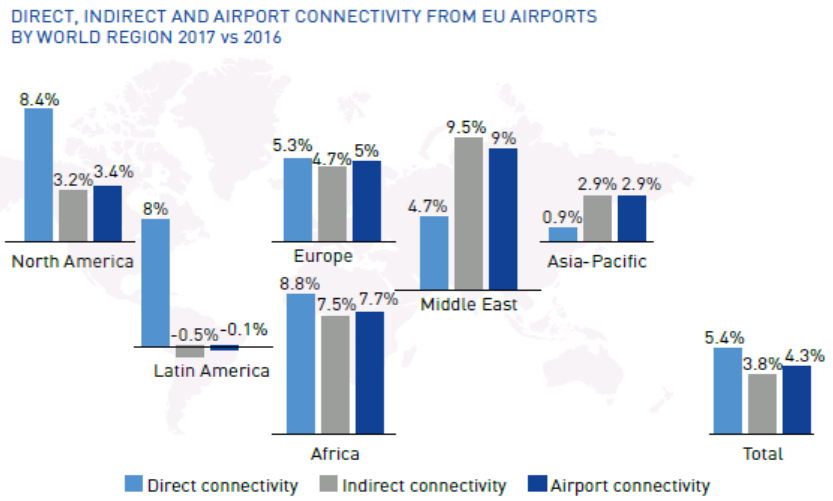
Exponential Growth of Air Traffic





Growth of Airport Connectivity





Source: ACI EUROPE Airport Industry Connectivity Report 2017

The future checkpoint

Top Transformational Shifts Expected to Shape Airports

The drive for more efficient operations and an enhanced passenger experience will stimulate innovation and new business models.

Bigger, Bolder, Better
New airports, larger terminals, more runways, and increased comfort

Automation
Booking, check-in, bag drop-off, and boarding

Connected Travellers
Devices, internal navigation systems (beacons), and augmented reality to increase passenger experience

Airport Cities
Become a reality

Intelligent Airports
Energy efficiency and operational performance goals to drive the creation of intelligent airport infrastructure

Retail, a New Business Paradigm
New sources of revenue to support airport development

Big Data and Analytics
The transformation to the Internet of Things to change the ways stakeholders cooperate leading to new business models

Integrated Security
More efficient security at the check points combined with cyber and physical security all to be control from a command centre

Source: Frost & Sullivan

KAAT
Knowledge Alliance In Air Transport

Trends in airport development

Top Transformational Shifts Expected to Shape Airports

The drive for more efficient operations and an enhanced passenger experience will stimulate innovation and new business models.

Bigger, Bolder, Better
New airports, larger terminals, more runways, and increased comfort

Automation
Booking, check-in, bag drop-off, and boarding

Connected Travellers
Devices, internal navigation systems (beacons), and augmented reality to increase passenger experience

Airport Cities
Become a reality

Intelligent Airports
Energy efficiency and operational performance goals to drive the creation of intelligent airport infrastructure

Retail, a New Business Paradigm
New sources of revenue to support airport development

Big Data and Analytics
The transformation to the Internet of Things to change the ways stakeholders cooperate leading to new business models

Integrated Security
More efficient security at the check points combined with cyber and physical security all to be control from a command centre

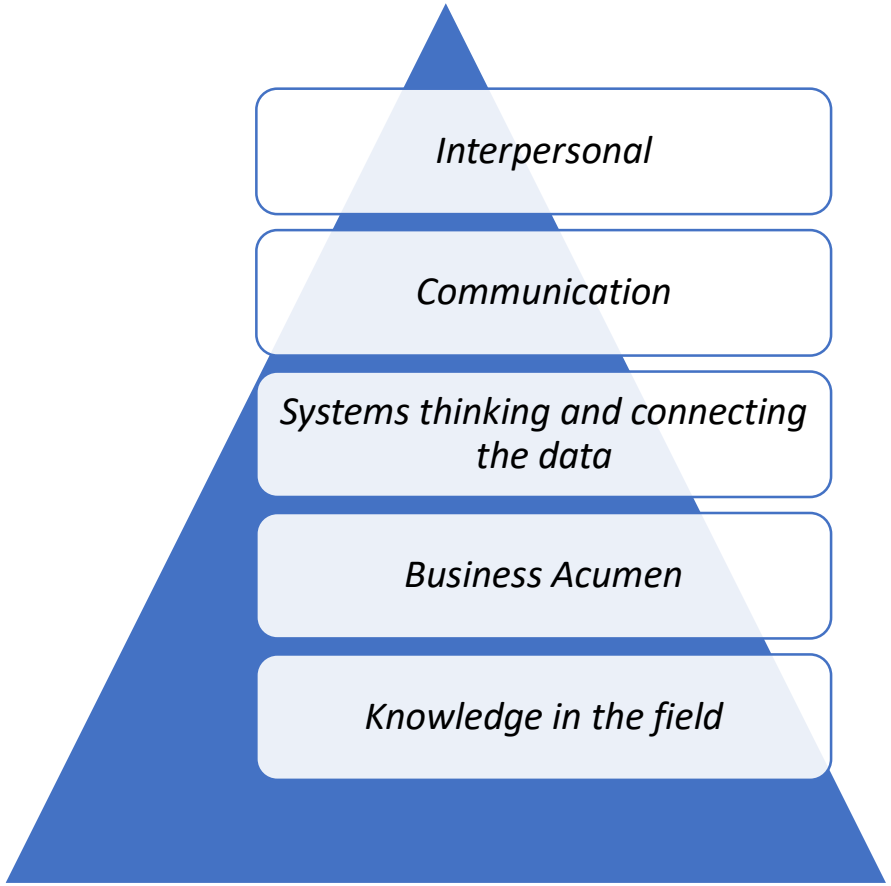
Source: Frost & Sullivan

SOCIETAL RESPONSIBILITY

Source: www.klm.com

What jobs and what qualifications ?

Key skills and competencies for persons which will prepare and implement societal responsibility actions:



Education and training in air transport

Pathways for education and training in air transport

Dialog and coherence of trainings

EQF, NQF, SQF

University pathway

Bachelor
- EQF Level 6

Master
- EQF Level 7

PhD
- EQF Level 8

Recognition

ESCO

EASA, ICAO regulations

Vocational pathways

Training provided by companies or by other training bodies

Different Trainings Modules

Continuing education

better employability and a **better insertion** of graduates on the aviation labour market

KAAT
Knowledge Alliance In Air Transport

METHODOLOGY
for Sectorial Qualifications Framework in Air Transport

Sectorial Qualification Framework Methodology

First part

SQF for aviation

Considering:

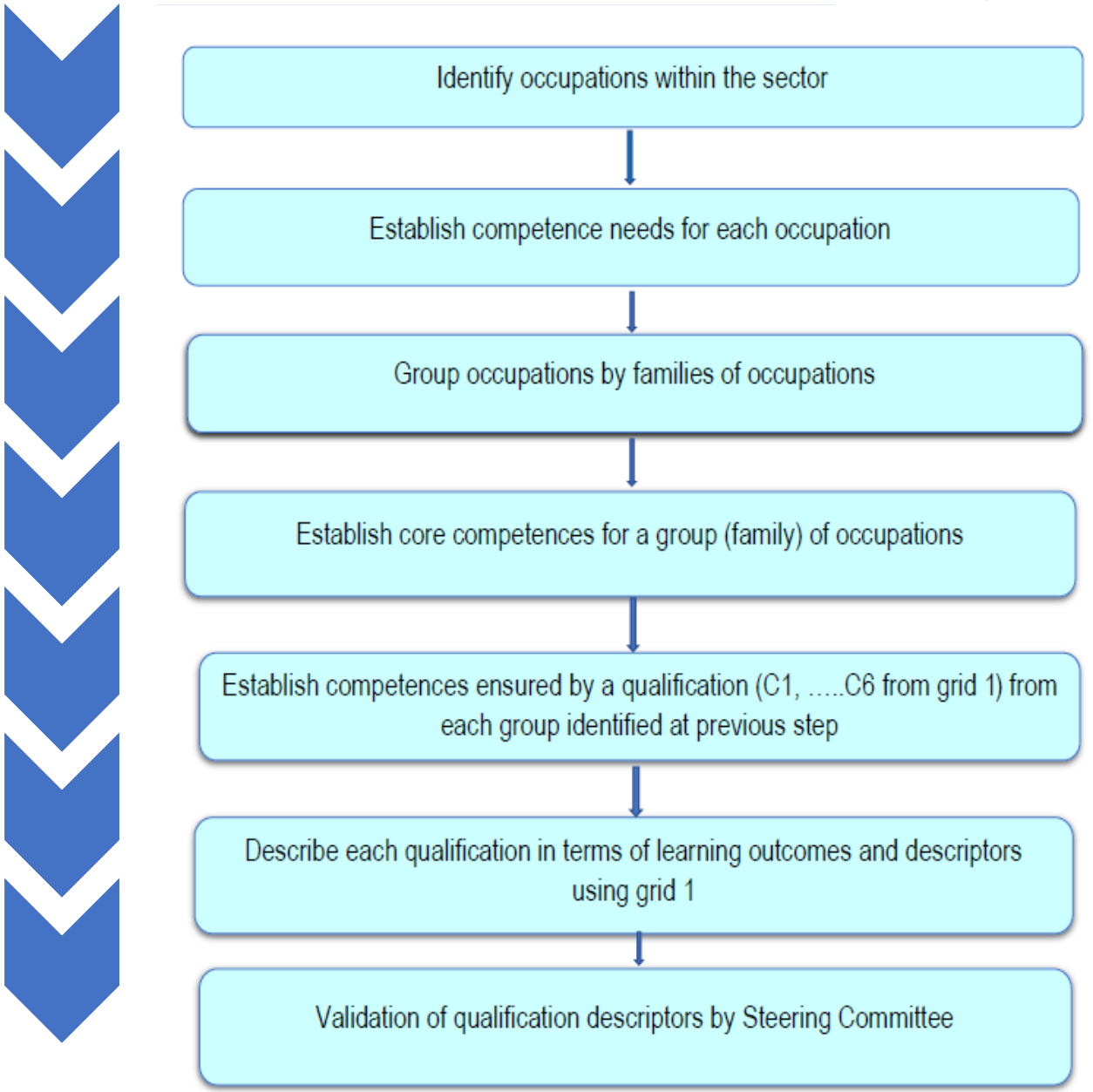
- **EC recommendations**
- competence based learning practices used in aviation
- The **aviation regulations**.

Second part

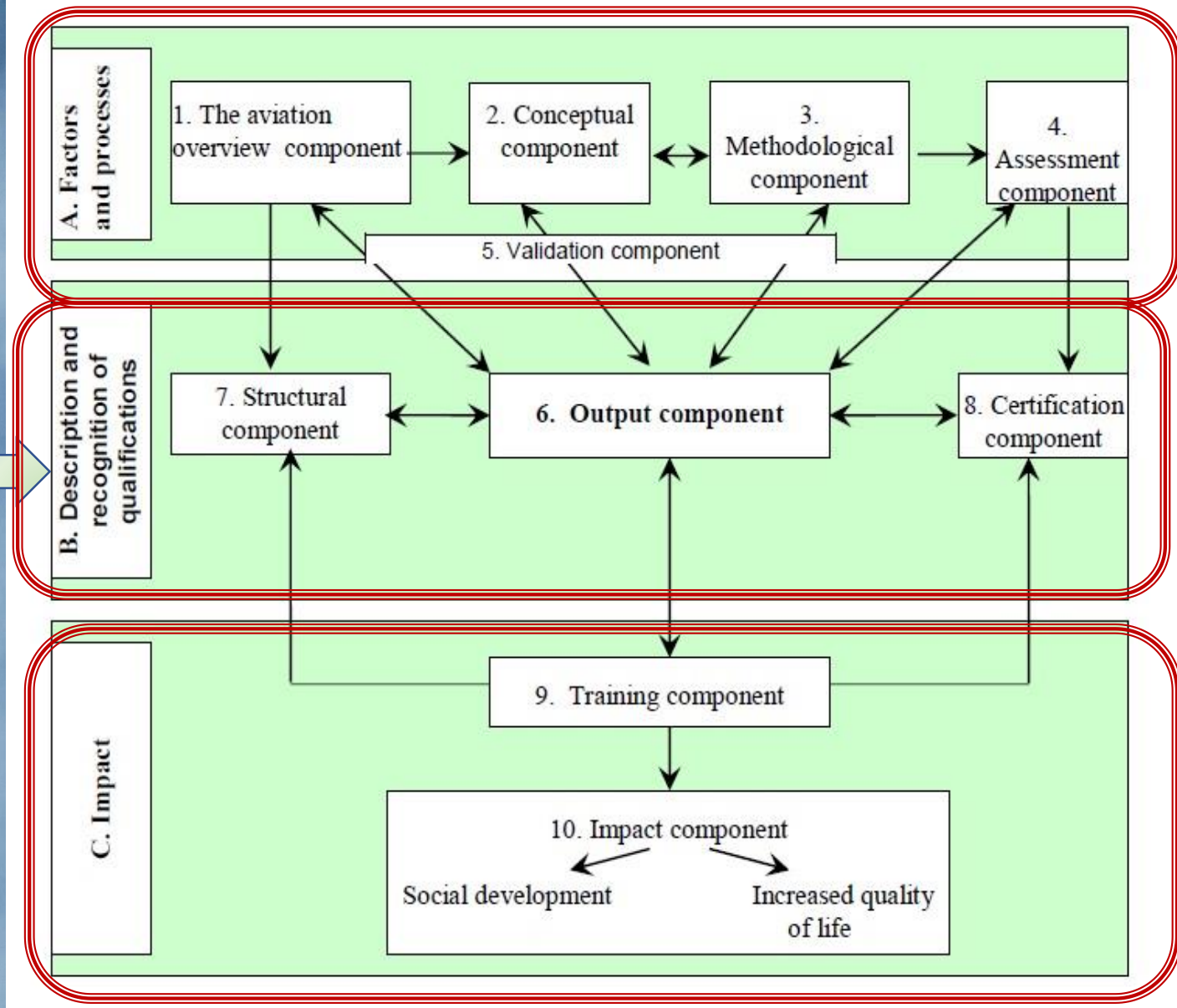
Criteria for recognition of prior learning and work experience

- for a **better coherence** of professional and training pathways;
- it will be established the **conditions and procedures** for passing from a non-regulated to a regulated qualification.

Steps in qualification description by learning outcomes and descriptors

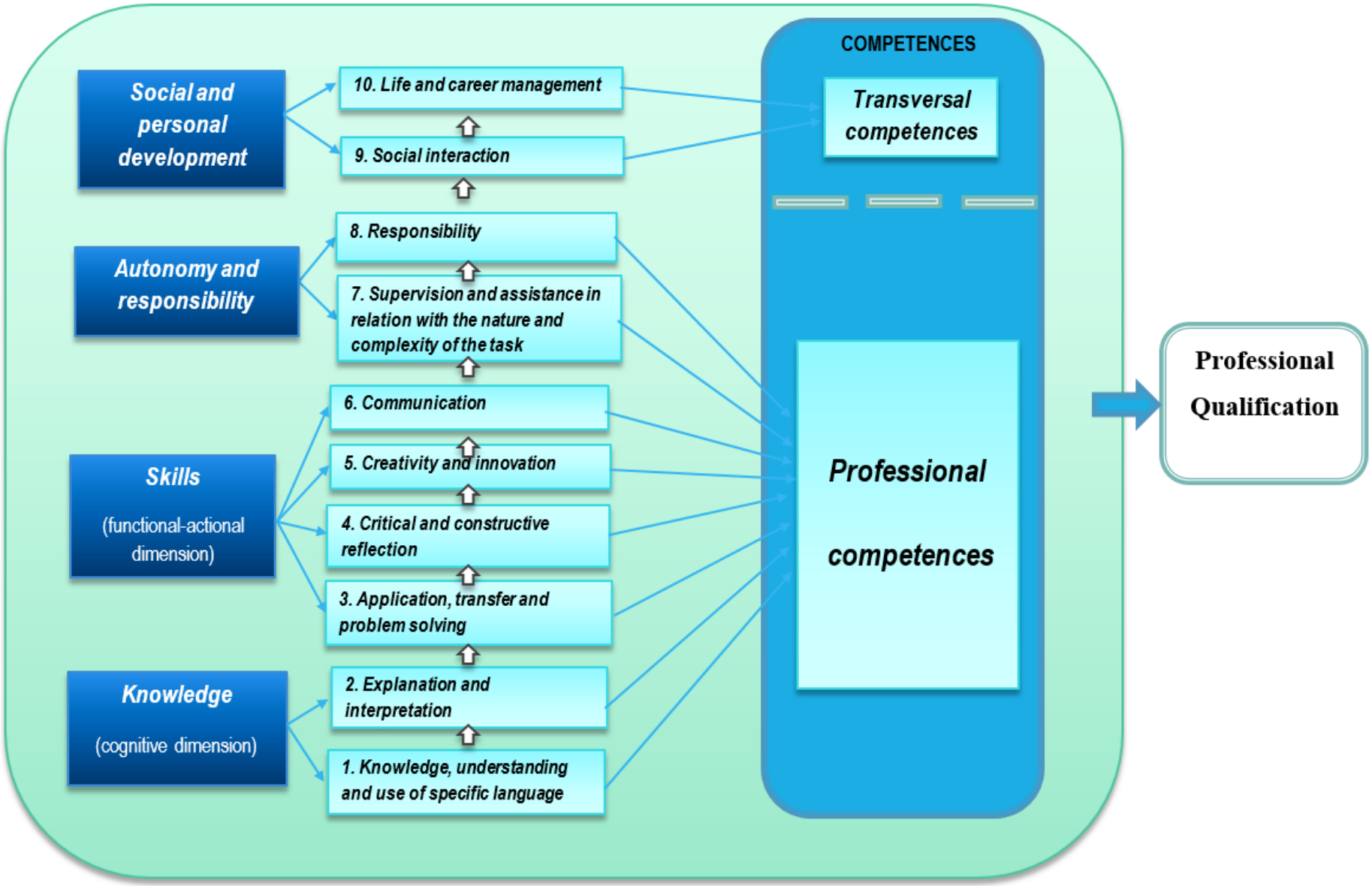


The 10 components of the SQFAT and their interlinkages



Source: Selfcertification Report, Bucharest, 2011, p.35

Learning outcomes and descriptors for a qualification



Sectorial Qualifications Framework for Air Transport **Matrix**

			LEVEL 5	BACHELOR	MASTER'S	DOCTORATE
Transversal competences	Social and personal development	10. Life and career management	Assuming a personal and professional development long-term plan and affirmation of the spirit of initiative and entrepreneurship in personal development and career management	Self-control of the learning process, diagnosis of training needs, reflective analysis on own professional activity.	Take responsibility for contributing to professional knowledge and practice and/or for reviewing the strategic performance of teams	Development of creativity-centred projects as the basis for self-accomplishment
		9. Social interaction	Familiarisation with the teamwork-specific roles, group activities and with task allocation for subordinated levels of a specialized field of work	Familiarisation with the teamwork-specific roles, group activities and with task allocation for subordinated levels.	Interaction within professional groups or institutions	Capacity to organise and lead the activities of professional groups, research groups or institutions.
Professional competences	Autonomy and responsibility	8. Responsibility	Assumption of the full responsibility for the nature and quality of outputs in a specialized field of work or study	Take responsibility for decision-making in predictable, unpredictable work or study context	Assuming responsability to manage and transform work or study context that are complex, predictible, unpredictible and require new strategic approaches.	Assuming responsibility and sustained commitment to the development of new ideas or processes at the forefront of work or study contexts, including research.
		7. Supervision and assistance in relation with the nature and task complexity	Exercise management and supervision in contexts of work or study activities where there is predictable work, assuming responsibility to the quality of processes and procedures	Supervision and assistance in managing complex technical or professional activities or projects	Undertaking complex and unpredictible professional tasks under autonomy and professional independence conditions.	Demonstrate substantial authority, autonomy scholarly and professional integrity in complex and unpredictibile research, education and professional context.
	Skills (functional-actional dimension)	6. Communication	Communication in different contexts / environments, including foreign languages and ICT-mediated, communication adapted to various public	Communication in different contexts / environments, including foreign languages and ICT-mediated, communication adapted to various public	Communication in different contexts / environments, including foreign languages and ICT-mediated, communication adapted to various public	Communication in different contexts / environments, including foreign languages and ICT-mediated, communication adapted to various public
		5. Creativity and innovation	Solving problems of work or study in a specialized field, possibly developing creative approaches, preparing technical documents and progress reports.	Development of professional and/or research projects using well known principles, methods and software within the field	Development of professional and/ or research projects integrating a wide range of methods in different fields in an innovative means.	Design and undertake original research, based on advanced methods leading to the development of scientific and technological knowledge and/or of the research methodologies
		4. Critical and constructive reflection	Prompt notification of failure to use equipment, measuring and control devices and regulations specific to a specialized field of work or study.	Adequate use of standard assessment criteria and methods to appraise the quality, merits and limitations of processes, programmes, projects, concepts, methods and theories	Pertinent and appropriate use of qualitative and quantitative assessment criteria and methods to formulate judgements and fundament constructive decisions	Critical/constructive assessment of projects and scientific research results, appraisal of the stage of theoretical and methodological knowledge; identification of knowledge and applicative priorities within the field
		3. Application, transfer and problem solving	Execution of complex tasks within a specialized field of work or study, using technical documentation and tools for measuring / monitoring technological processes in normal new or changing conditions.	Application of advanced principles and methods to solve complex and unpredictable problems/situations that are typical to the field of work /study.	Integrated use of the conceptual and methodological apparatus in situation of with incomplete information in order to solve new theoretical and practical problems	Select and use advanced principles, theories and methods of knowledge, transfer of methods from one field to another, interdisciplinary approaches to solve new and complex theoretical and practical problems
	Knowledge (cognitive dimension)	2. Explanation and interpretation	Use adequate documentation, catalogs and standards for description and integration of the principles, norms, processes in a specialized field of work / study.	Use of advanced knowledge to explain and interpret various types of concepts, situations, processes, projects etc. related to the field	Use of highly specialized knowledge in order to explain and interpret new situations in wider contexts associated to the respective field	Use advanced principles and methods to explain and interpret, from multiple perspectives, new and complex theoretical and practical problems that are specific to the respective field
		1. Knowledge, understanding and use of specific language	Use of the concepts, principles, processes and standards / regulations particular to a specialized field of work or study.	Knowledge and understanding of advanced concepts, theories and methods in the field and the specialization area;	In-depth knowledge of a specialization area and, within it, of the programme specific theoretical, methodological and practical developments;	Systematic, advanced knowledge of concepts, research methods, controversies, new hypothesis specific to the field; communication with specialists from related fields
Learning outcomes		Generic descriptors	Level descriptors			

Grid for SQFAT - Level 5

Study Field ..... **Study Programme/ Training programme** .....

Grid 1 – Description of study programme/training by means of learning outcomes and descriptors

Qualification Title ..... **Qualification Level:** 5	Existing and possible occupations

DESCRIPTORS / COMPETENCES	C1	C2	C3	C4	C5	C6
KNOWLEDGE						
1. Use of the concepts, principles, processes and standards / regulations particular to a specialized field of work or study.	C1.1	C2.1	C3.1	C4.1	C5.1	C6.1
2. Use adequate documentation, catalogs and standards for description and integration of the principles, norms, processes in a specialized field of work / study.	C1.2	C2.2	C3.2	C4.1	C5.2	C6.2
SKILLS						
3. Execution of complex tasks within a specialized field of work or study, using technical documentation and tools for measuring / monitoring technological processes in normal new or changing conditions.	C1.3	C2.3	C3.3	C4.3	C5.3	C6.3
4. Prompt notification of failure to use equipment, measuring and control devices and regulations specific to a specialized field of work or study.	C1.4	C2.4	C3.4	C4.4	C5.4	C6.4
5. Solving problems of work or study in a specialized field, possibly developing creative approaches, preparing technical documents and progress reports.	C1.5	C2.5	C3.5	C4.5	C5.5	C6.5
6. Communication in different contexts / environments, including foreign languages and ICT-mediated, communication adapted to various public	C1.6					
AUTONOMY AND RESPONSIBILITY						
7. Exercise management and supervision in contexts of work or study activities where there is predictable work, assuming responsibility to the quality of processes and procedures						
8. Assumption of the full responsability for the nature and quality of outputs in a specialized field of work or study						
SOCIAL AND PERSONAL DEVELOPMENT						
9. Familiarisation with the teamwork-specific roles, group activities and with task allocation for subordinated levels of a specialized field of work						
10. Assuming a personal and professional development long-term plan and affirmation of the spirit of initiative and entrepreneurship in personal development and career management.						
Minimum performance standards for competence assessment:	C1	C2	C3	C4	C5	C6

Sectorial Qualifications Framework for Air Transport Matrix

			LEVEL 5	BACHELOR	MASTER'S	DOCTORATE
Transversal competences	Social and personal development	10. Life and career management	Assuming a personal and professional development long-term plan and affirmation of the spirit of initiative and entrepreneurship in personal development and career management	Self-control of the learning process, diagnosis of training needs, reflective analysis on own professional activity.	Take responsibility for contributing to professional knowledge and practice and/or for reviewing the strategic performance of teams	Development of creativity-centred projects as the basis for self-accomplishment
		9. Social interaction	Familiarisation with specific roles, group allocation for sub field of wo			
Professional competences	Autonomy and responsibility	8. Responsibility	f th fu the specializ			
		7. Supervision and assistance in relation with the nature and task complexity	Exercise management contexts of work or st there is predictable responsibility to the and procedures			
	Skills (functional-actional dimension)	6. Communication	Communication in environments, in languages and communication adapte			
		5. Creativity and innovation	Solving problems of specialized field, p creative approaches, documents and progre			
		4. Critical and constructive reflection	Prompt notification equipment, measuring and regulations speci field of work or study.			
		3. Application, transfer and problem solving	Execution of compl specialized field of w technical documentat measuring / monito processes in normal conditions.			
	Knowledge (cognitive dimension)	2. Explanation and interpretation	Use adequate docume standards for descript of the principles, no specialized field of wo			
		1. Knowledge, understanding and use of specific language	Use of the concepts, p and standards / regula specialized field of wo			
Learning outcomes		Generic descriptors				

Grid 1

Grid for SQFAT - Level 6 Bachelor

Study Field ..... Study Programme/ Training programme .....

Grid 1 – *Description of study programme by means of learning outcomes and descriptors*

Qualification Title..... Qualification Level: 6 - BACHELOR	Existing and possible occupations

DESCRIPTORS \ COMPETENCES	C1	C2	C3	C4	C5	C6
KNOWLEDGE						
1. Knowledge and understanding of advanced concepts, theories and methods in the field and the specialization area	C1.1	C2.1	C3.1	C4.1	C5.1	C6.1
2 Use of advanced knowledge to explain and interpret various types of concepts, situations, processes, projects etc. related to the field	C1.2	C2.2	C3.2	C4.1	C5.2	C6.2
SKILLS						
3. Application of advanced principles and methods to solve complex and unpredictable problems/situations that are typical to the field of work /study.	C1.3	C2.3	C3.3	C4.3	C5.3	C6.3
4 Adequate use of standard assessment criteria and methods to appraise the quality, merits and limitations of processes, programmes, projects, concepts, methods and theories	C1.4	C2.4	C3.4	C4.4	C5.4	C6.4
5. Development of professional and/or research projects using well known principles, methods and software within the field	C1.5	C2.5	C3.5	C4.5	C5.5	C6.5
6. Communication in different contexts / environments, including foreign languages and ICT-mediated, communication adapted to various public	C1.6					
AUTONOMY AND RESPONSABILITY						
7. Supervision and assistance in managing complex technical or professional activities or projects						
8. Take responsibility for decision-making in predictable, unpredictable work or study context						
SOCIAL AND PERSONAL DEVELOPMENT						
9. Familiarisation with the teamwork-specific roles, group activities and with task allocation for subordinated levels.						
10. Self-control of the learning process, diagnosis of training needs, reflective analysis on own professional activity.						
Minimum performance standards for integrated learning outcomes assessment:	C1	C2	C3	C4	C5	C6

Grid for SQFAT - Level 6 Bachelor

Study Field ..... **Study Programme/ Training programme** .....

Grid 1 – *Description of study programme by means of learning outcomes and descriptors*

Qualification Title..... Qualification Level: **6 - BACHELOR**	Existing and possible occupations

DESCRIPTORS / COMPETENCES	C1	C2	C3	C4	C5	C6
KNOWLEDGE						
1. Knowledge and understanding of advanced concepts, theories and methods in the field and the specialization area	C1.1	C2.1	C3.1	C4.1	C5.1	C6.1
2 Use of advanced knowledge to explain and interpret various types of concepts, situations, processes, projects etc. related to the field	C1.2	C2.2	C3.2	C4.1	C5.2	C6.2
SKILLS						
3. Application of advanced principles and methods to solve complex and unpredictable problems/situations that are typical to the field of work /study.	C1.3	C2.3	C3.3	C4.3	C5.3	C6.3
4 Adequate use of standard assessment criteria and methods to appraise the quality, merits and limitations of processes, programmes, projects, concepts, methods and theories	C1.4	C2.4	C3.4	C4.4	C5.4	C6.4
5. Development of professional and/or research projects using well known principles, methods and software within the field	C1.5	C2.5	C3.5	C4.5	C5.5	C6.5
6. Communication in different contexts / environments, including foreign languages and ICT-mediated, communication adapted to various public	C1.6					
AUTONOMY AND RESPONSABILITY						
7. Supervision and assistance in managing complex technical or professional activities or projects						
8. Take responsibility for decision-making in predictable, unpredictable work or study context						
SOCIAL AND PERSONAL DEVELOPMENT						
9. Familiarisation with the teamwork-specific roles, group activities and with task allocation for subordinated levels.						
10. Self-control of the learning process, diagnosis of training needs, reflective analysis on own professional activity.						
Minimum performance standards for integrated learning outcomes assessment:	**C1**	**C2**	**C3**	**C4**	**C5**	**C6**

Grid for SQFAT - Level 7 Master

Study Field ..... **Study Programme/ Training programme** .....

Grid 1 – *Description of study programme by means of learning outcomes and descriptors*

Qualification Title ..... **Qualification Level: 7 - MASTER**	Existing and possible occupations

DESCRIPTORS \ COMPETENCES	C1	C2	C3	C4	C5	C6
KNOWLEDGE						
1. In-depth knowledge of a specialization area and, within it, of the programme specific theoretical, methodological and practical developments;	C1.1	C2.1	C3.1	C4.1	C5.1	C6.1
2 Use of highly specialized knowledge in order to explain and interpret new situations in wider contexts associated to the respective field	C1.2					
SKILLS						
3. Integrated use of the conceptual and methodological apparatus in situation of with incomplete information in order to solve new theoretical and practical problems	C1.3					
4. Pertinent and appropriate use of qualitative and quantitative assessment criteria and methods to formulate judgements and fundament constructive decisions	C1.4					
5. Development of professional and/ or research projects integrating a wide range of methods in different fields in an innovative means.	C1.5					
6. Communication in different contexts / environments, including foreign languages and ICT-mediated, communication adapted to various public	C1.6					
AUTONOMY AND RESPONSABILITY						
7. Undertaking complex and unpredictable professional tasks under autonomy and professional independence conditions.						
8. Assuming responsability to manage and transform work or study context that are complex, predictible, unpredictible and require new strategic approaches.						
SOCIAL AND PERSONAL DEVELOPMENT						
9. Interaction within professional groups or institutions						
10. Take responsibility for contributing to professional knowledge and practice and/or for reviewing the strategic performance of teams						
Minimum performance standards for integrated learning outcomes assessment:	**C1**	**C2**	**C3**	**C4**	**C5**	**C6**

Qualifications on level 5

Level 5

- Pilot Private Licence (PPL)
- Commercial Pilot Licence (CPL) Blue Air
- Aircraft Maintenance Technician - CAT A (Zagreb)
- Aircraft Maintenance Technician - CAT B
- Aircraft Maintenance Technician - CAT C
- Air Traffic Controller – basic training Cro Control
- Air Traffic Controller – AREA CONTROL PROCEDURAL RATING (ACP)
- Traffic Controller – AREA CONTROL SURVEILLANCE RATING (ACS)
- Air Traffic Controller – aerodrome control instrument rating for tower ADI
- Air Traffic Controller – Aerodrome Control Visual Rating (ADV)
- Air Traffic Controller – APPROACH CONTROL PROCEDURAL RATING (APP)
- Ground Handling Traffic Technician
- Approach control surveillance

Qualifications on level 6

Level 6

- **Airline Transport Pilot Licence** (ATPL) Zilina
- Aerospace engineer – airframes Lisbon
- Aerospace engineer - aviation equipment and installations Lisbon
- Aerospace engineer – power systems Zagreb
- Aerospace engineer - Aeronautic Management
- Aircraft and aviation engines Zagreb
- Air traffic controller cro Control
- Civil pilot Zilina
- Military pilot zagreb

Qualifications on level 7

Level 7

- Avionics and Aerospace Navigation Zagreb U
- Aerospace Engineering and Management U Lisbon
- Aerospace Propulsion, Phonic and Chemical Pollution
- Aerospace Structures U Lisbon
- E-Governance Strasbourg
- Advanced software services Mines
- Aeronautical management U Lisbon
- Aerospace Engineering Zagreb
- Mechanical Engineering UPB

KAAT
Knowledge Alliance in Air Transport

CONCLUSIONS

The general context of employment:
a strong growth in recruitment needs and a lack of competent profiles

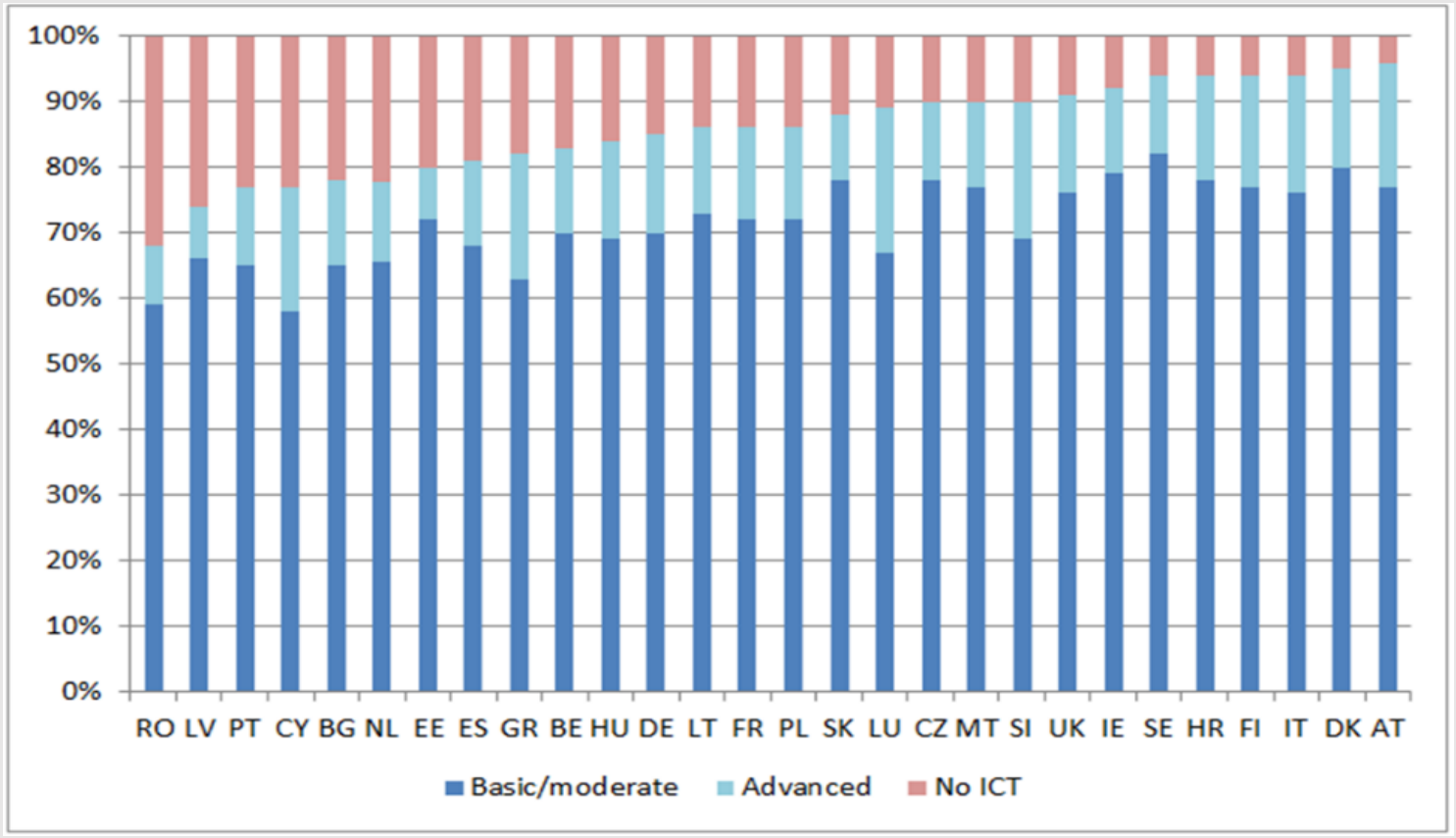
→ The confirmation of increasing recruitment needs, and this on all the functions

→ Skills shortages

→ Recruitment levels on most occupations tend to change

→ An age pyramid that could in future greatly increase recruitment tensions

New skills for new occupations



71% EU employees need some fundamental level (basic or moderate) of digital skills to perform their jobs

Source: Cedefop

Improvement of aviation sectors

where the high and interdisciplinary qualifications of employers are essential

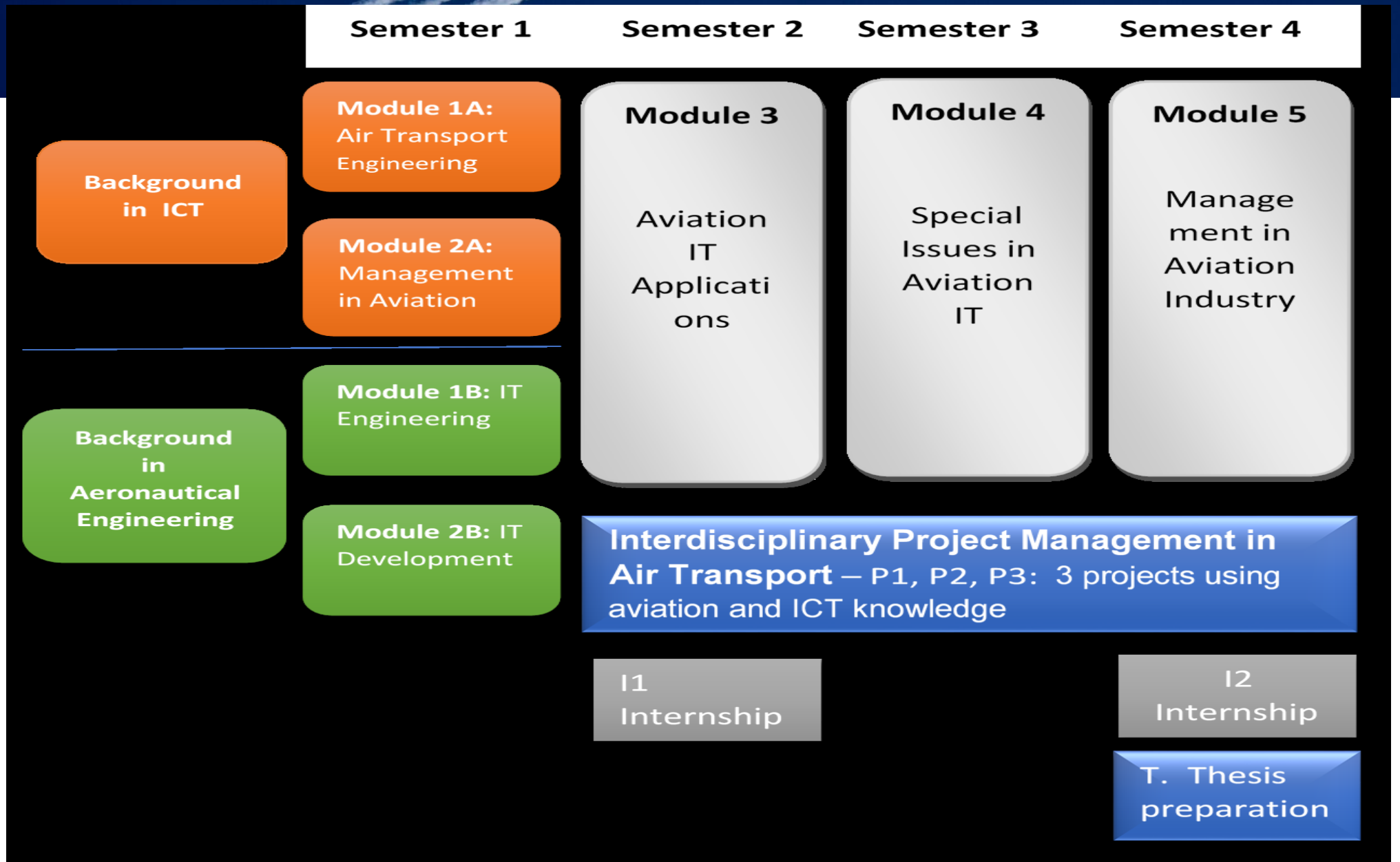
- **Economic Development Planning**
- **Air Transport Regulatory Framework**
- **Aviation Infrastructure**
- **Resource Mobilization**
- **Safety and Security**
- **Environmental Protection**

The **digitalisation** is a **cross sectorial action** which supposes advanced skills and competences in ICT and in aviation simultaneously.

Interdisciplinary master
“ICT applied in aviation”

- The purpose of this advanced Master’s programme is to provide students with a broad range and depth of interdisciplinary knowledge;
- Will be organized by **modules, function of background of graduates;**
- Will use **new modes of delivery**:
  - **distance,** through new forms of personalized learning,
  - strategic use of **open educational resources, virtual mobility,**
  - **European internships** in the main air transport employers.

STUDY PROGRAMME STRUCTURE



Thank you for you attention!

facebook.com/KAATPROJECT

linkedin.com/company/kaat-project

@Kaatproject

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

This project has been funded with support from the European Commission. This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information ontained therein. Project Nº.: 588060-EPP-1-2017-1-RO-EPPKA2-KA