

Methods and instruments  
for enhancing the “knowledge triangle”  
communication for academic qualifications





<b>Project Acronym</b>	FRAMELOG
<b>Project Full Title</b>	European framework for 'Knowledge Triangle' in the logistics sector
<b>Output Title</b>	European Framework for 'Knowledge Triangle' in HEIs in logistics sector (FRAMELOG)
<b>Activity</b>	O2 – A2 - Provide methods and instruments for enhancing the 'knowledge triangle' communication for academic qualifications.
<b>Status &amp; version (draft or final)</b>	Final version
<b>Responsible Partner</b>	Università di Pisa
<b>Author(s) (in contribution order)</b>	Scipioni Sara, main author Giannini Marco - Coordinator

*Cover image from Freepik*



## Summary

1. Introduction .....	3
2. Structure .....	4
3. Methods and Instruments.....	5
I. Plan.....	5
II. Do .....	6
III. Check.....	7
4. Next steps .....	7
Attachment I.....	8
Bibliography.....	18

## 1. Introduction

The professional profiles in the field of Logistics, as well as the concept and the architecture of Logistics itself, have been changing throughout the years. The role of Logistics is nowadays more complex and strategic in every kind of organizations, as it connects physical, information and financial flows in one common value chain. New big challenges must be faced in every strategy that involves the logistic activities and need to be seriously addressed. Just think - as a mere example - in the era of the Internet of Things and of Industry 4.0 to the threat of cyber-piracy or to the opportunity of “big data” that are increasing affecting also logistic processes. Increasing E and M-commerce trends, city mobility needs or 3D printing opportunities are just few examples of other emerging socio-economic trends to be ungently considered in the academic qualification, in order to offer a quality training to students and professionals and reduce the shortage of competent staff in companies.

Consequently, the competences required by the professionals are continuously changing and need to be continuously updated. Technical and managerial skills are taught all over Europe inside the organizations and the different training activities require always more detailed planning and offer. For this reason, the presence of a qualification system of professionals in Logistics has to be evaluated and highlighted.

One of the main challenge for obtaining a sustainable competitive advantage at national or European level in this new context of Logistics is to compare the hard and soft competences required to professionals to effectively work in this sector and the “core competences” that academic courses offer to students.

Also, contents and methods for students’ education should be designed to make students ready to face the workplaces and to develop both specialized and horizontal competences. Specialized competences refer primarily to hard and technical skills, including with juridical, managerial, marketing, organizational ones. Transversal competences or “soft skills” are a set of intangible personal qualities, traits, attributes, habits and attitudes that can be used in different types of jobs. As they are broadly applicable they are also seen as partially (depending from the contexts) transferable skills. Examples of soft skills include: leadership, self-management, motivation, flexibility, sociability, time management and decision making, and other related to teamwork, problem-solving and networking.

The quality and the continuous updating of academic programs in the sector, the engagement of the stakeholders, the transparent communication on the concrete roles are - for their nature - key elements for facilitating the concrete and efficient implementation of the “Knowledge Triangle” approach. As a matter of



fact, the investment on these three “leverage” areas – Education, Research and Industry - can activate a productive circle or spiral of “knowledge circulation”, that can invest and create benefit in the logistic activities, and consequently also in the industrial sector, at European level.

Within this context, this report provides an organic and systemic framework of methods, instruments and actions that can structurally and permanently reinforce the “knowledge triangle” in the logistics field, in order to improve academic qualifications. The present framework is directly connected and introduces methodologically and structurally, the subsequent output of the project related to the *Stakeholder engagement plan*. Within the proposed framework, a set of methods and instruments will also be highlighted in order to facilitate communication between the knowledge triangle key actors, with a view on the contribution to the continuous updating and improvement of academic qualifications in the field of the logistic.

## 2. Structure

Moving from the indicators and the whole Assessment tool previously implemented (O2 A1), also this analysis used the so called “PDCA” (Plan, Do, Check, Act) method to guide the development of the most suitable “Methods and Instruments” for the efficient communication of the Knowledge Triangle for academic qualifications. This approach underlines the need of continuous improvement and learning in a functional, product or process oriented perspective.

In this context, the PDCA method has been used here as framework for the identification, design, development and assessment of “logistic centered” academic didactic offer carried out by a Higher Educational Institution. Also, the results of the Compendium of Good Practices have been considered to orient methods and instruments aligned to the benchmark realities in this sector.

In particular, the “**Plan**” phase includes the core planning activities of an academic course, meaning a variety of activities that goes from the selection of contents of the course, through the choice of the most effective educational method, to the identification of the knowledge and of the core competences that will be gained by the students and to the planning of the support structure of the activities. It is the first point of the cycle as it regards also the periodical revision, evaluation and development of the educational course and methods and instruments should be aligned to the most innovative ones developed in the good practices.

As the “**Do**” phase summarizes the core of the HEI’s activity, the methods and instruments presented in the next paragraphs of this document should help the decision makers to reach an effective combination of tools to meet those professional needs and requirements in terms of skills and knowledge set up in the previous phase. For example, a series of possible dissemination and research activities which can enhance the connection between the three actors of the Knowledge Triangle is presented.

In the “**Check**” phase, the focus is moved to the result’controls of the previous phases: methods and instruments, in this section, are presented to support this process in finding potential gaps to be filled up and/or to evaluate if the level of the activities has really met the standards set upstream. This represents a crucial point in the improvement process since it reveals the real demands in terms of quality and effectiveness.

The “**Act**” phase will be developed in the O2A4 “Guidelines”, as they will show in detail the steps to enhance the collaboration between the three points of the Knowledge Triangle, therefore representing the possible improvements to be foreseen before restarting the PDCA Cycle.



### 3. Methods and Instruments

This section presents a proposal of a systemic framework of useful methods and instruments, as to implement 'knowledge triangle' approach against the criteria and indicators set up within this project (see O2 A1), with the main scope of enhancing the 'knowledge triangle' communication for academic qualifications. Some actions will be also illustrated, in order to methodologically connect this Project's output with the following Stakeholder engagement plan (O2 A3).

The framework for the identification of these methods, instruments and actions has been created moving from the Good practices of HEIs in Logistics and doing some brainstorming sessions between authors and contributors to the document. All the methods and instruments are arranged in sections that recall the previously explained phases of the PDCA Cycle.

A table, offering a systemic framework of the methods and instruments proposed enhance the communication of the Knowledge triangle for academic qualifications is attached under "I".

The table is composed of seven columns. The first three columns are directly connected to the assessment tool structure: the first one "Phase" presents the analysed stage of the PDCA Cycle, the second one "Sub Topic" displays the sub-areas in which the previous mentioned phase has been structured; the "Risk" column clarifies the potential risk connected to each sub-area of the analysed phase.

<b>Phase</b>	<b>Sub Topic</b>	<b>Risk</b>
--------------	------------------	-------------

Table 1\_First three columns of Attachment "I"

The fourth and fifth columns summarize the activity of the assessment tool. Indeed, the first one "Assessment tool analysed aspect" presents the aspects assessed related to the previously presented risk and the other one, "Assessment tool possible result", the results that could be detected in the tool.

<b>Aspect analysed in the Assessment tool</b>	<b>Assessment tool possible result</b>
---	--

Table 2\_Fourth and fifth columns of Attachment "I"

The last two columns report the synthesis of those "Methods", "Instruments and actions" that have been identified to fill the possible gaps between the actual situation of the respondent and the best practice, detailed per single risk.

<b>Methods</b>	<b>Instruments and actions</b>
----------------	--------------------------------

Table 3\_Last two columns of Attachment "I"

#### I. Plan

The methods and Instruments presented in the "Plan" part of "Annex I" listed under points 1.1 "Offer" and 1.2 "Structure" could be considered mainly as general indications. They concern the development of internal academic courses and structures that may vary in different entities, while in the other sections they must be considered as possible solutions for enhancing the level of cooperation of the three actors of the Knowledge Triangle.



The core planning methods and instruments are presented on point 1.3: the planning of academic contents, programmes and educational methods in a collaborative way between the three actors of the Knowledge Triangle are fundamental to align the academic offers to the industry' needs. In particular, the provision of meetings in which business and academic experts can debate about the most relevant contents on Logistics or the most effective educational methods (e.g. interactive games, industry software experiencing) to be used for students is considered as necessary for the effective implementation of the Knowledge Triangle.

The key method, once the basic ones have been developed, is the **accreditation** of the academic course, seen as a concrete instrument for enhancing the academic qualifications throughout the European countries. In the “Annex I” at point **1.3** an analysis of the mentioned instruments is presented. Another useful instrument is an innovative tool based on the ‘EntreComp’, the Entrepreneurship Competences Framework structure and logics, the most important competences related to the Logistics field could be identified, including both hard and soft skills. This “**competences tracking tool**” is here named “**LogiComp**”. Moreover, the mapped skills are based on both the Framework of Competences developed by ELA which mainly identifies the technical skills (Core Management Skills, Project and Change Management, Process Management, Demand, Production and Distribution Requirements Planning, Warehousing, Transportation, Sourcing, Customer service) and the findings of the World Bank study which identified a lack of soft - personal, communication, decision-making & problem-solving, leadership - skills in qualified administrative staff, supervisors and managers. As other instrument, A **self-assessment tool** could be developed for universities in order to identify the gaps in their curricula compared to the ELA standards and the LogiComp. The universities would receive at the end a diagram of modules/standards/skills where they would need to improve and/or adjust their curricula. Also, a **template** for the description of **relevant case studies** in Logistics that could also be adopted by Universities and implemented into curriculum design.

At the end of this area, in **1.4** are listed some indications regarding the “Collaboration in the Governance”, which is an important way to introduce opportunities to the management of an HEI, since governance oversees all the strategic decisions of the entity. The development of a **Strategic Committee** comprised of academic Directors and representatives of the key players of the territory in which the HEI is located and the national authorities, with consultancy powers only, would help in the development of new courses or collaborations between the three actors. A final focus on instruments for developing research activities with the cooperation of HEIs, Research Institutions and Companies is reported in **1.5** “Innovation”.

## II. Do

Moving to the “Do” phase, several instruments can be provided to enhance the effective collaboration between the three actors of the Knowledge Triangle. Talking about the **2.1** “Conjoint activities”, the development of research projects and intellectual outputs as the provision of seminars and dissemination activities will create contact points between the actors and improve the opportunity of collaborations. A similar analysis will be found in **2.2** “Dissemination activities”.

In this section, the main interest is on **2.3** and **2.4**, for their regard on “Internship” and “Thesis”: for the planning of this kind of activities in collaboration with the three actors of the Knowledge Triangle is essential to create the opportunity for students to connect to the market. Some instruments for the involvement of Partners, management of activities and review of results are presented. Related to this perspective, point **2.5** focuses on the necessity of real contacts between students and the three actors, with the suggestion of organizing visits to business and research venues.

Points **2.6** and **2.7** regard “Partnership” and “Funding” which are essential to be overseen to enable the opportunity of developing common activities and projects and therefore the collaboration. For example, the funding of bourses, PhDs and fellowships are considered as a preparatory step of students’ employment, then



for Companies should be strategic to provide HEIs with specific funds to train potential future workforces for their own entities.

### III. Check

This part focuses on suggestions for improving the collaboration in stage of the activities, which is the most strategic stage in the PDCA Cycle for it normally raises weaknesses and gaps between the expected results and the real ones. Here, the cooperation of the three actors of the Knowledge Triangle has to be considered as essential to face and solve those deficiencies in the most efficient way for the market and the implementation of the Knowledge Triangle itself.

As in the “Plan” phase, also in the “Check” one the presence of business experts and researcher will give an useful external view in reviewing the educational requirements to adapt them to the current trends, as presented in 3.1 “Check of educational requirements”. The main focus, however, is presented at point 3.2, “Employment” where the collaboration is necessary to help orienting the HEIs’ activities for enhancing the students’ possibility of employment. That would be possible debating about the most effective scheme of collaboration between the actors, such as internships schemes in which employment is guaranteed (e.g. Budapest Metropolitan University scheme or the NOVUS scheme in Huddersfield). This aspect is strictly related to the last section of methods and instruments, 3.3 “Production”: also here, the connection between the three actors of the Knowledge Triangle should lead to the creation of a positive environment that could enable the production of intellectual outputs, such as papers and patents focused on the Logistics areas.

## 4. Next steps

In this document, the framework of the most relevant ways in which the Knowledge Triangle focused on Logistics has been developed, by bringing together the contents collected in the Compendium of Good Practices developed in the O1 and the experience of experts from the different actors of the Triangle considered.

Following this document, in O2A3 an Engagement Plan for the presented instruments and related activities will be introduced and will clarify the figures to be responsible for them. For an in-depth analysis of the suggested procedure to enhance the implementation of an effective Knowledge Triangle, the O2A4 will present the Guidelines that will orient the stakeholders’ activities and lead to the best practices on the collaboration framework on Logistics.



## Attachment I

Systemic summary of the main methods and instruments to enhance the communication of the triangle for academic qualifications

Phase	Sub Topic	Risk	Aspect analysed in the Assessment tool	Assessment tool possible result	Methods	Instruments and possible actions
1 – PLAN	1.1 - Offer	Lack of educational offer specific on Logistics	Presence of courses or exams on Logistics	No courses	Development of specific courses or at several levels (Bachelor, Master, professional) focused on Logistics, based on the needs and potentialities of the entity	Analysis of specific needs of the territory in terms of Logistics courses/exam and analysis of the potentialities of creation of courses/exams <b>Proposal</b> of courses focused on Logistics during official meetings for the periodical (usually annual or biennial) course planning. <b>Proposal</b> to local/ national key players on Logistics (e.g. Port/Airport Authorities) or Trade Associations of co-financing of courses on Logistics. <b>Creation of a “Strategic Committee”</b> comprised of the above-mentioned figures, with consultative powers.
				Some courses (just Bachelor or Master or professionals)	Development of specific courses or exams at the missing level	<b>Proposal</b> of courses focused on Logistics during official meetings for the periodical (annual...) course planning
				Yes, all levels	Analysis of the contents and educational methods used	See sub topic 3
	1.2 - Structure	Lack of dedicated structure	Presence of dedicated staff for collaboration on didactic activities on logistic topics	No	Identification of a reference person in the most suitable administrative office who will be in charge to take care of active collaborations with external partners about didactic activities on logistic topics	Analysis of the staff chart and selection of a unit and a position where the role/responsibility for didactic activities in the logistic field can be assigned. The diplomacy and organizational competence will be considered as fundamental requirements.



Phase	Sub Topic	Risk	Aspect analysed in the Assessment tool	Assessment tool possible result	Methods	Instruments and possible actions
				Yes	Analysis of the existing staff and of their functions	Analysis of the most efficient profile in terms of management of collaboration with external partners from <b>good practices</b> and <b>self-assessment</b>
			Presence of Research centers on Logistics	No	Evaluation of the opportunity to create a research center (1) or the activation of a collaboration with an existing one (2)	<ol style="list-style-type: none"> <li>Start of the process of <b>creation of a Research Center</b>: search of possible Partners for financial and scientific support with a proposal of governance and activities inspired to the best practices               <ol style="list-style-type: none"> <li>Proposal to local/ national key players on Logistics (e.g. Port/Airport Authorities) or Trade Associations of co-financing of the research center on Logistics.</li> </ol> </li> <li><b>Activation of collaborations</b>: Search of possible Partners for activating a first a temporary collaboration, with the perspective of an enduring one.</li> </ol>
				Yes	Analysis of the activities offered/ planned in the Center – analysis of the organizational structure – analysis of the active collaborations	Using the <b>Good practices</b> , analyse the alignment of the activities of the Center in terms of innovation, effectiveness, diffusion of the results. <b>Assessment of the governance</b> : the Center should be participated by different actors to reach completeness. <b>Evaluation of active collaborations</b> : consider the profile of Partners and the ones presented in the best practice to evaluate an enlargement
	1.3 - Collaboration in Designing Courses	Contents/ Methods not aligned with company's needs	Presence of external contacts for selecting educational contents	No	Plan to include experts from the industry, Research institutes and (when absent) lecturers of different fields (e.g. Engineering, Economy, Informatic, Law) in the meetings in which the courses are designed	<p>In respect of the national standards required, <b>selection of contents</b> using:</p> <ul style="list-style-type: none"> <li>topics considered essential by the industry</li> <li>the last innovative results achieved by ad-hoc research institutions</li> </ul> <p>The <b>Good practice</b> will also help in guiding the balance of the different needs.</p>



Phase	Sub Topic	Risk	Aspect analysed in the Assessment tool	Assessment tool possible result	Methods	Instruments and possible actions
				Yes	Review of the contents (1), evaluation of alignment of programmes and requirements of the accreditation process (2)	If the collaboration is already active, consider (1) the <b>review of contents</b> based on the best practices' ones and (2) starting the <b>accreditation process</b> for the course with the alignment of the required elements.
			Presence of external contacts for defining educational programmes	No	Plan to include experts from the industry, Research institutes and (when absent) lecturers of different fields (e.g. Engineering, Economy, Informatic, Law) in the meetings in which the programmes are designed	At the official meetings of Didactic Councils, <b>proposal</b> of participation of experts from the Logistics area and researchers to debate about the proposed programme of courses/exams on Logistics. <b>Guidelines to lecturers</b> to guide the definition of programmes: contents needed are mostly the currently required topics from Companies, the last trends and findings of Research centers and the <b>LogiComp</b> , the "competences tracking tool" that identified the most important competences related to the Logistic field.
				Yes	Review of the programmes (1), evaluation of alignment of programmes and requirements of the accreditation process (2)	If the collaboration is already active, consider (1) the review of programmes based on the best practices' ones and (2) starting the accreditation process for the course with the alignment of the required elements.
			Presence of external contacts for choosing lecturers	No	Plan to include experts from the industry, researchers from Research institutes and lecturers of different fields (e.g. Engineering, Economy, Informatic, Law) as lecturers	Lectures should be mixed as presented: <ul style="list-style-type: none"> <li>- Internal and guest professors (national/international)</li> <li>- Guest experts from Business (national/international)</li> <li>- Partners/ Alumni (in research/ business topics)</li> </ul>
				Yes	Review of the selected lecturers (1), evaluation of alignment of programmes and requirements of the accreditation process (2)	If the collaboration is already active, consider (1) the review of the selected lectures based on the best practices' ones and (2) starting the accreditation process for the course with the alignment of the required elements.
			Presence of external contacts for selecting	No	Plan to include experts from the industry, researchers from Research institutes and lecturers of different fields (e.g.	The most efficient methods, to be used, from the <b>analysed good practices for methods</b> are the following:



Phase	Sub Topic	Risk	Aspect analysed in the Assessment tool	Assessment tool possible result	Methods	Instruments and possible actions
			educational methods		Engineering, Economy, Informatic, Law) in the meetings in which the methods are selected	<ul style="list-style-type: none"> <li>- Innovative teaching methods: case studies, projects, industry specific software experiencing, simulations, interactive games</li> <li>- Intensive Alumni interactions</li> </ul>
				Yes	Review of the methods (1), evaluation of alignment of programmes and requirements of the accreditation process (2)	If the collaboration is already active, consider (1) the review of methods based on the best practices' ones and (2) starting the accreditation process for the course with the alignment of the required elements.
	1.4 - Collaboration in The Governance	Lack of contacts with other stakeholder for relevant decision about the core activity	Presence of external contacts for the governance on Logistics	No	Inclusion of business experts and researchers in the governance body	Creation of ad-hoc <b>Strategic Committee</b> with key players on Logistics to advise and consult about opportunities of collaborations, courses, exams. In respect of the institution structure, the powers assigned to the Committee could be different.
				Yes	Check of the structure adopted (see above)	Check of the structure adopted (see above)
	1.5 - Innovation	Lack of use of innovative topics/ results/ trends	Presence of research activities/ topics in Logistics	No	Develop of research activities on Logistics	Prevision of development of research projects on Logistics inside the course, using a <b>compendium of last research achievements and trends</b> in parallel to the course contents
				Yes	Check of the methods (see above)	Check of the instruments (see above)
2 - DO	2.1 -Conjoint Activities	Lack of activities carried out with other stakeholders	Presence of conjoint research projects, consultancies on Logistics	No	Develop of conjoint activities with business and research entities, such as: <ul style="list-style-type: none"> <li>- Research projects with students</li> <li>- Production of intellectual outputs (papers, articles, patents)</li> <li>- Seminars</li> </ul>	<ul style="list-style-type: none"> <li>- <b>Guidelines</b> for development of Research projects with students/ Production of intellectual outputs (papers, articles): selection of companies for the development of specific projects on Logistics based on their field of activity and/or selection of Research Institutions; contract with the chosen Partner and selection of graduates/students to assign to the project; tutoring and review of the production from academic lecturers; dissemination of results.</li> </ul>



Phase	Sub Topic	Risk	Aspect analysed in the Assessment tool	Assessment tool possible result	Methods	Instruments and possible actions
						<ul style="list-style-type: none"> <li>- <b>Guidelines</b> for development of seminars: selection of business and/or research representative for specific seminars on Logistic topics presented during courses and innovative trends in the market; event management (finding of budget, selection of possible dates/ venues/ duration, booking and marketing)</li> </ul>
				Yes	Check of the activities carried out (see above)	Assessment of the effectiveness of the activities carried out in terms of diffusion of contents, employment of students, innovation reached. Consider extending and/or selecting activities
	2.2 - Dissemination Activities	Lack of dissemination activity	Presence of events on Logistics	No	Organization of events to disseminate results on Logistics, from both internal and external projects	<b>Guidelines</b> for selection of business and/or research representative for specific seminars on Logistic topics presented during courses and innovative trends in the market; event management (finding of budget, selection of possible dates/ venues/ duration, booking and marketing).
				Yes	Check of the activities carried out (see above)	Assess of the effectiveness of the activities carried out in terms of diffusion of contents, number and kind of participants, frequency. Consider extending and/or selecting activities
	2.3 - Internship	Lack of connection between education institutions and workplace in terms of internship	Presence of coordination, offer of internships on Logistics	No	Coordination and/or offer of internships focused on Logistics	<ul style="list-style-type: none"> <li>- <b>Guidelines</b> for Coordination: involvement of external Partners (from business/research), promotion towards students of the possibility of internships on Logistics topics at the Partner's premises, administrative arrangements, providing of tutoring before/during/after internship, monitoring of results of the activity (employment, intellectual outputs)</li> <li>- <b>Guidelines</b> for Offer: promotion towards students of the possibility of internships on</li> </ul>



Phase	Sub Topic	Risk	Aspect analysed in the Assessment tool	Assessment tool possible result	Methods	Instruments and possible actions
						Logistics topics in the HEI's facilities (Research centres, e.g.), administrative arrangements, providing of tutoring before/during/after internship, monitoring of results of the activity (employment, intellectual outputs)
				Yes	Check of the internships organized (see above)	Assess of the effectiveness of the activities carried out in terms of intellectual output produces, employment/collaborations developed
	2.4 - Thesis	Lack of connection between education institutions and workplace in terms of production	Presence of coordination, offer of thesis developed on Logistics	No	Coordination and/or offer of Thesis focused on Logistics	<ul style="list-style-type: none"> <li>- <b>Guidelines</b> for collaboration: involvement of external Partners (from business/research), promotion towards students of the possibility of thesis on Logistics topics with the selected Partners, administrative arrangements, providing of tutoring, monitoring of results of the activity (innovative contents, effectiveness of solutions proposed)</li> <li>- <b>Guidelines</b> for Offer: promotion towards students of the possibility of thesis on Logistics topics, administrative arrangements, providing of tutoring before/during thesis, monitoring of results of the activity (innovative contents, effectiveness of solutions proposed)</li> </ul>
				Yes	Check the quality of thesis developed by the HEI's graduates	<p>Assess the quality of the already developed thesis in term of:</p> <ul style="list-style-type: none"> <li>- innovation of contents (in case of research thesis)</li> <li>- effectiveness of solutions proposed (if developed with /for a company)</li> </ul> <p>Consider orienting the future thesis on the most innovative trends on Logistics and to the development of innovative solutions for companies.</p>



Phase	Sub Topic	Risk	Aspect analysed in the Assessment tool	Assessment tool possible result	Methods	Instruments and possible actions
	2.5 – Visit	Lack of physical connection between education institutions and workplace	Presence of visits organized into facilities related to Logistics topics	No	Development of periodic visits to companies and research centres for analysing Logistics facilities/ equipment/ software	<b>Guidelines</b> for collaboration: involvement of external Partners (from business/research), promotion towards students of the possibility of visits for analysing Logistics facilities/ equipment/ software; administrative arrangements; event management (finding of budget, selection of possible dates, logistics); dissemination activity of the event.
				Yes	Check of the quality of visits organized	Assess of the effectiveness of the visits carried out in terms of number of participants, frequency, spin-offs (development of thesis, collaborations, internships). Consider extending and/or selecting visits.
	2.6 Partnership -	Lack of collaborations on Logistics	Presence of temporary and/or permanent partnerships on Logistics	No	Develop temporary and permanent collaborations on Logistics	<b>Guidelines</b> for collaboration: selection of external Partners (from business/research), proposal of projects to be developed together to give value to the collaboration, discussion on the expected results of collaboration, administrative management. Consider developing: <ul style="list-style-type: none"> <li>- temporary collaboration as first step</li> <li>- permanent collaboration after the good outcome of the first one or with already known Partners</li> </ul>
				Yes, but only temporary or permanent	Check of the quality of Partners with active collaborations on Logistics and consider developing new ones	See above for the development of the missing one
				Yes	Check of the quality of Partners with active collaborations on Logistics	Assess of the effectiveness of the active collaborations carried out in terms of number of projects, frequency, spin-offs (development of thesis, internships, student employments). Consider extending and/or selecting collaborations.
	2.7 Funding -	Lack of sponsorships, funding on Logistics topics	Presence of PhDs, bourses, fellowships, professorial chairs	No	Develop a framework of sponsorships and funding for Logistics area	Consider developing the following sponsorships, to enhance the collaboration of the Triangle: <ul style="list-style-type: none"> <li>- PhD</li> <li>- Bourses</li> </ul>



Phase	Sub Topic	Risk	Aspect analysed in the Assessment tool	Assessment tool possible result	Methods	Instruments and possible actions
			on Logistics topics			<ul style="list-style-type: none"> <li>- Fellowships</li> <li>- Professional chairs</li> </ul>
				Yes, but only some kind of sponsorship/funding	Check of the quality of actual sponsorships and funding on Logistics and consider developing new ones	See above for the development of the missing one/s
				Yes, all of them	Check of the quality of actual sponsorships and funding on Logistics	Assess of the effectiveness of the active sponsorships and funding in terms of number of students reached, frequency, spin-offs (development of thesis, internships, student employments). Consider extending and/or selecting collaborations.
3 CHECK	3.1 – Check of educational requirements	Lack of effective collaboration between education and companies in terms of controls of educational requirements	Presence of controls on the alignment of the set of courses requirements with external partners on Logistics, at the end of the course	No	Develop of controls on the alignment of course results respectful of the initial requirements with the co-presence of experts from business and research	Implement a double check of initial requirements and final results of the course/exam about: <ul style="list-style-type: none"> <li>- Course/exam contents, in terms of completeness and research material;</li> <li>- Educational method used, in terms of effectiveness;</li> <li>- Programmes developed, in terms of workload and usefulness.</li> </ul> Consider developing a survey for students about the evaluation of the previously mentioned aspects.
				Yes	Review of the selected controls (1), evaluation of alignment of programmes and requirements of the accreditation process (2)	If the collaboration is already active, consider (1) the review of the controls activated based on the best practices' ones and (2) starting the accreditation process for the course with the alignment of the required elements.
	3.2 – Employment	Lack of effective collaboration between education and companies in	Presence of employments consequent to internships/projects on Logistics	No	Promote employment to Companies in the Logistics areas	Develop of a framework of activities which will enable a higher number of internships in the Logistics areas, using the <b>Compendium of Good practices</b> . Here some examples: <ul style="list-style-type: none"> <li>- Agreement with Companies for developing dual programs (university courses with elements of</li> </ul>



Phase	Sub Topic	Risk	Aspect analysed in the Assessment tool	Assessment tool possible result	Methods	Instruments and possible actions
		terms of employment				<p>professional training or work experience) and sandwich courses (educational course integrated with period of work);</p> <ul style="list-style-type: none"> <li>- Developing internships schemes in which employment is guaranteed (e.g. Budapest Metropolitan University scheme or the NOVUS scheme in Huddersfield);</li> <li>- Creation a virtual job search platform specialized in logistics positions;</li> <li>- Organizing job fairs with Companies.</li> </ul>
				Yes	(1) Check the percentage of employment up to the total number and (2) consider some strategies to increase it	(1) Check the effectiveness of the activities activated, (2) consider increasing activities (see above).
	3.3 - Production	Lack of intellectual outputs on Logistics	Presence of production of intellectual outputs: papers, patents, software etc. on Logistics	No	Promote collaboration to Companies and Research Institutions in the Logistics areas with the scope of developing intellectual outputs	<p>Develop of a framework of activities which will enable an opportunity of co-development of intellectual outputs in the Logistics areas:</p> <ul style="list-style-type: none"> <li>- Agreement with Companies and Research Centers for developing research project/ thesis/ PhDs projects oriented to the creation of software/ drafting of papers;</li> <li>- Creation a virtual research platform specialized in collect proposals of articles, papers;</li> <li>- Organizing job fairs with Companies and Research Centers to stimulate the cooperation.</li> </ul>
				Yes	(1) Check of the production coming from the active collaborations and (2) consider some strategies to increase it	(1) Check the effectiveness of the active collaborations and production, (2) consider increasing activities (see above).





## Bibliography

- Bartol, N. (2014). Cyber supply chain security practices DNA–Filling in the puzzle using a diverse set of disciplines. *Technovation* 34(7), 354-361.
- D’Aleo, V. &. (2017). Human factor: the competitive advantage driver of the EU’s logistics sector. *International Journal of Production Research*, 55(3), 642-655.
- FRAMELOG. (n.d.). Compendium of good practices\_O1. *European framework for ‘Knowledge Triangle’ in the logistics sector*.
- Harvey, M. G. (2001). Global supply chain management: The selection of globally competent managers. *Journal of International Management*, 7(2), 105-128.
- Hult, G. T. (2006). Knowledge as a strategic resource in supply chains. *Journal of operations management*, 24(5), 458-475.
- Lamba, K. &. (2017). Big data in operations and supply chain management: current trends and future perspectives. *Production Planning & Control*, 28(11-12), 877-890.
- McKinnon, A. C. (n.d.). *Assessing and Improving Countries’ Logistics Skills and Training*.
- McKinnon, A. F. (2017). *Logistics Competencies, Skills, and Training: A Global Overview*. *World Bank Publications*.
- Wang, G. G. (2016). Big data analytics in logistics and supply chain management: Certain investigations for research and applications. *International Journal of Production Economics*, 176, 98-110.