APPLICATION

Study field "Transport Services" for assessment

Study field	Transport Services
Title of the higher education institution	Transporta un sakaru institūts
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Self-evaluation report

Study field "Transport Services"

Transport and Telecommunication Institute

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1. Information on the Higher Education Institution/College

1.1. Basic information on the higher education institution/ college and its strategic development fields,.

The Transport and Telecommunication Institute (henceforth *TSI*) is a higher education institution of applied sciences, which offers the full cycle of higher education in computer sciences and electronics, robotics, aviation engineering, transport and logistics, management.

On September 6, 1999 the joint stock company *Transporta un sakaru institūts* (*Transport and Telecommunication Institute)* was registered and the day became known as the TSI Foundation Day. Nowadays, in according with the TSI Constitution, September 6 is the TSI Celebration Day.

TSI received the certificate of its registration as the educational establishment on November 21, 2001 (registration No. 339 4801782). On January 25, 2002 TSI was accredited for the indefinite period (accreditation page No. 032). TSI was registered as a research institute in the Scientific Institute Register on February 27, 2006 (registration certificate No. 432062).

So far the total number of the graduates of the Institute has exceeded 8900 people. Students that pursue their education at TSI come from Latvia, Kazakhstan, Ukraine, Uzbekistan, Moldova, Russia, Azerbaijan, India and other countries.

TSI conducts multifaceted scientific research activities in the areas of strategic specialisation defined in the Constitution: *Engineering and Technology* and *Social Sciences*, covering the educational thematic groups of *Computer Science and Engineering and Technology*; and *Business and Administration* and *Transport Services*.

Implemented study directions and the program numbers at TSI

The Transport and Telecommunication Institute implements academic and professional study programs in 5 directions across 2 departments (see Figure 1):

- Information Technologies, computer hardware, electronics, telecommunications, computer management and computer science – 3 Bachelor's programs, 3 Master's and 1 doctoral program;
- Mechanics and metalworking, thermal power engineering, heat engineering and machinery – 1 Bachelor's program;
- Transport services - 2 Bachelor's programs and 1 Master's program;
- Management, administration and real estate management – 1 Bachelor's program and 2 Master's programs, and 1 doctoral program.
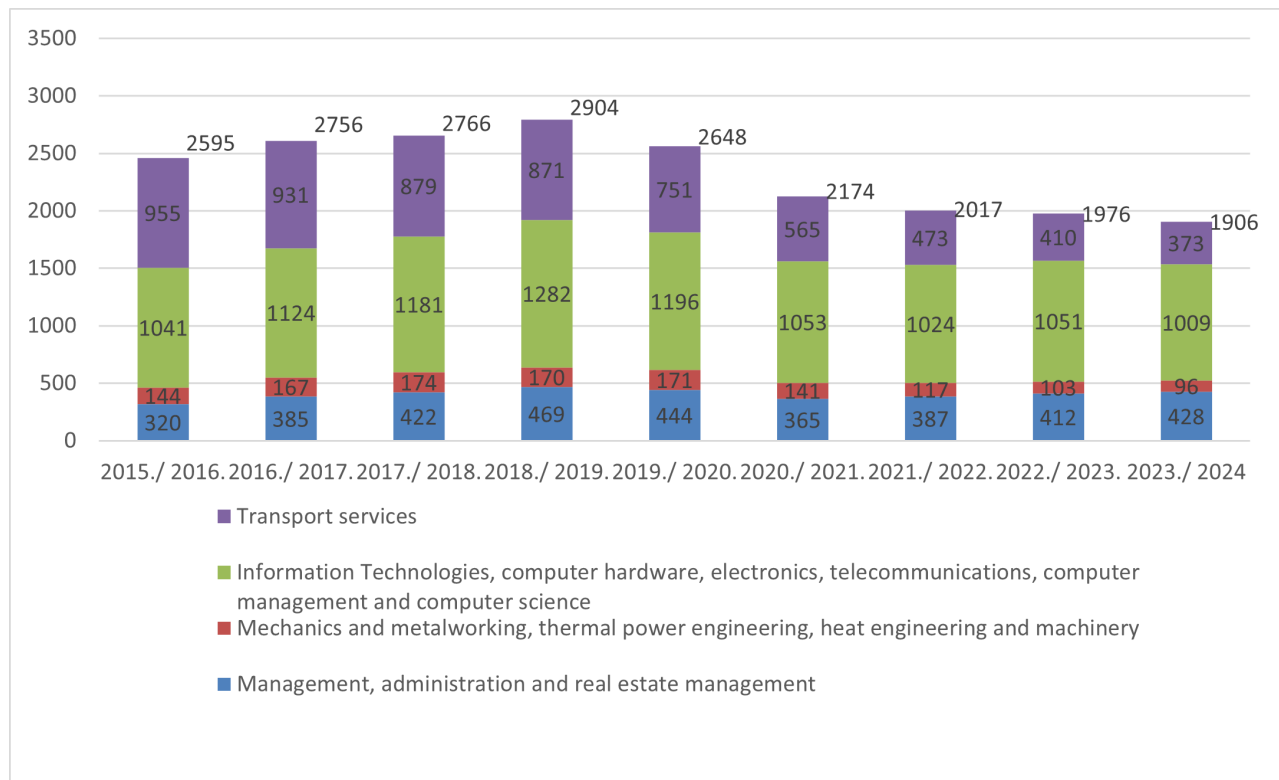
Fig.1. Number of students in study directions implemented at TSI over the reported period

TSI vision is to be the leading private technical University in the Baltic Sea region

TSI mission is to create and disseminate knowledge and make a positive difference to our community and the wider Baltic Sea region.

The strategic TSI aim is to make TSI a modern international technical university with a competitive set of higher education programs, a research and innovation plan, and a lifelong learning offer that meets the needs of all our target groups - students, employees, partners, our society and the region.

In its development strategy for 2020-2025, TSI has identified five strategic priorities: international involvement, education, research and knowledge transfer, business and society involvement, personnel.

The aim of *international involvement* is to increase the number of foreign students and increase the level of student preparedness by strengthening the TSI position as a leading private university in the Baltic Sea Region that offers higher education in computer science, electronics, robotics, transport, logistics and aviation. Establish a strong and deep strategic partnership with a British university, thereby enhancing the set of TSI study programs and research projects.

The aim of *education* is not only to develop study programs in computer science, electronics, robotics, transport, logistics and aviation, to attract an international audience by providing studies in a flexible format in English, but also to offer a wide range of lifelong learning opportunities.

The aim of *research and knowledge transfer* is to train graduates that meet the demands of the industry and of the changes in business operations, business organizations and public life of the next industrial revolution. As for the *research* area, there will be set up an appropriate number of targeted, multidisciplinary research clusters addressing key societal challenges that might have a national or international impact.

The *business and society involvement* involves strengthening partnerships with employers in the region so that the TSI study programs are based on the needs of partner companies and provide

internship opportunities for TSI students. It also focuses on encouraging partners to contribute to the enhancement of the TSI research programs and share the essential information so that research results have an impact on business and bring positive changes to society.

The aim of *staff development (personnel)* is to attract and develop excellent staff as well as to provide all employees with opportunities and support for personal development and high performance.

The full version of the Strategy of the Transport and Telecommunications Institute for 2020-2025 is available on the TSI website in Latvian and English.

In the Appendix 25, an explanation is provided regarding the reasons and criteria for choosing UWE Bristol as a strategic partner.

1.2. Description of the management structure of the higher education institution/ college, the main institutions involved in the decision-making process, their composition (percentage depending on the position, for instance, the academic staff, administrative staff members, students), and the powers of these institutions.

Description of the TSI governing body

The general structure of the Transport and Telecommunication Institute was approved on September 28, 2021 at the TSI Senate sitting. The information is published in Latvian and English on the TSI website at https://tsi.lv/about-us/structure-and-government/.

Description of the main TSI decision-making bodies

The TSI activities are regulated by the Constitution of the Transport and Telecommunication Institute, Law on Higher Education and other external and internal regulations. According to it, decision-making at TSI is ensured by the Constitutional Assembly, Senate, Audit Committee, Academic Arbitration Court, Board, Rector, Vice-Rectors, Student Self-Government, Faculty Councils and Study Direction Councils.

The highest decision-making body of TSI in strategic and financial matters is the Supervisory Board of the Joint Stock Company Transport and Telecommunication Institute appointed by the founders. In turn, the Management Board of the Joint Stock Company ensures the implementation of the decisions of the Supervisory Board as well as the management and control of the operational activities of the Joint Stock Company. (Article 14 of Part III of the TSI Constitution). Considering that TSI is a joint-stock company according to its legal status, its operation is also regulated by the Commercial Law and other legal documents and regulations in force in the country, which determine the work of private commercial companies. The composition of the Council and the Management Board of TSI is registered in the Enterprise Register and can be consulted in the Lursoft database. The activities of the Council and the Board of the joint stock company, including their functions, tasks, rights, etc. regulated by Articles 291 - 311 of the Commercial Law.)

The highest representative, governing body and decision-making body in academic and scientific matters is the Constitutional Assembly. The Constitutional Assembly adopts and amends the TSI Constitution, elects and revokes the Rector, the Academic Arbitration Court and the Senate (in accordance with the Constitutional Assembly Regulations). The Constituent Assembly consists of 50

persons, of whom 30 people (i.e. 60%) hold elected academic positions, 10 people (i.e. 20%) are representatives of general staff and 10 people (i.e. 20%) are student representatives.

The Senate is the highest academic decision-making body of TSI, responsible for the excellence, development and compliance of the university education, research, creative activity and compliance with internationally recognized quality standards. The Senate regulates the academic, creative and scientific activities of the university.

According to the by-laws of the Senate, the Senate comprises the following permanent committees: the Development Committee, Study Committee, Regulatory Enactment Committee and Competition Committee. The Senate is composed of 21 Senators: including the Rector ex officio, and 20 (twenty) elected Senators, including fifteen (75%) representatives of the academic staff of TSI, four (20%) representatives of the students and one (5%) representative of the general staff.

In accordance with the by-laws of the Academic Arbitration Court, the Academic Arbitration Court consists of representatives of the students' self-government and academic staff. The Academic Arbitration Court is made up of five members: 3 academic staff and 2 student representatives.

The Academic Arbitration Court examines the applications of the staff of the higher education institution on challenging administrative acts or actual actions issued by TSI, reviews the issues stipulated by the Law on Higher Education Institutions and the Constitution of TSI, and also performs other functions in accordance with the laws in force and the current regulatory enactments.

In accordance with the TSI Constitution, the Rector carries out general administrative activities in academic and scientific fields of the TSI specialization. In coordination with the TSI Board, the Rector represents the Institute in financial matters. The Rector is responsible for the quality of education and science as well as the promotion of staff development and academic freedom.

Effective management and supervision of business operations are conducted by the Vice Rector for Academic and Scientific Affairs and the Vice Rector for Studies as well as academic, research and administrative structural units under their supervision.

The students' self-government is an elected and independent body representing students' rights and interests. It operates in accordance with the by-laws of the Students' Self-government and represents students' interests at the Constitutional Assembly, in the Academic Arbitration Court, Senate, Faculty Councils and Study Direction Councils. In the Senate, students' representatives have a veto right on issues pertaining to students' interests.

In accordance with the Faculty Regulations, the Faculty Council is a collegial body management institution consisting of the head of the faculty, representatives of the permanent staff of the faculty, external employers and representatives of the students' self-government. The Council is elected at the general meeting of the faculty.

Study Direction Councils (following the regulations of the Study Direction Council) evaluate the compliance of study programs with the requirements of legislation and the labor market, discuss assessments provided by external experts and coordinate plans aiming at the elimination of shortcomings, discuss and coordinate study plans and study program development plans. The composition of the Study Direction Council is approved by the Rector's order.

Participation of external partners in decision-making

External partners are involved in the activities of the Study Direction Council, Faculty Council as well as Alumni Association and the International Scientific Advisory Council.

The Study Direction Council includes cooperation partners from relevant higher education

institutions.

Employers are included into the Faculty Council. The Faculty Council reviews and tackles issues related to the planning of faculty activities.

Founded on January 30, 2016, the TSI Alumni Association promotes cooperation between the Institute and its alumni by creating a positive environment for the exchange of experience and business contacts, offering opportunities for raising qualifications, promoting and supporting TSI, and thus, suppporting education processes at the Institute.

The International Scientific Advisory Board is composed of leading international experts and researchers in the scientific fields relevant to the TSI research program. The Board members are approved by the order of the TSI Rector. The Board evaluates the TSI research activities and advises on global and strategic research directions.

Participation of structural units in decision-making

The TSI structural units include faculties, research and study laboratories, administrative departments and units, which operate in accordance with regulations approved by the Senate.

The faculty comprises units of one scientific or one professional direction or of several directions and is chaired by the Dean

The involvement of structural units in decision-making and budget planning at TSI proceeds in accordance with the financial management plan and is monitored and analyzed by the heads of the Financial Responsibility Centers. The Financial Responsibility Centers (FRCs), in accordance with the approved Budget Policy, are the TSI structural units specified in the organizational structure of the Institute of Transport and Telecommunications, which can influence the relevant types of revenues and/or expenses (items) and can take responsibility for these revenues and/or expenses. The Financial Responsibility Centers are financial accounting units, not organizational units, and therefore are not included in the TSI organizational structure. The main functions of the FRCs are as follows:

- participate directly in the budget planning process;
- determine the goals and tasks of the FRCs and coordinate them in general with the goals and tasks of TSI;
- prepare a plan of events for the fulfillment of goals and tasks;
- express goals, tasks and measures in figures, developing a detailed FRCs budgets;
- prepare a monthly report for TSI management on the execution of tasks, measures and goals in the prescribed format;
- perform corrective actions within the approved deadlines.

The budget is formed based on the needs of responsibility centers, and its resources are allocated consistently with the approved plan. The financial plan provides for a separate development fund, which is aimed to support research activities. Annual activities and the budget plan are developed considering the needs of structural units and the results of the current year.

The budget plan for the unit is drawn up by its head upon assessing the efficiency of use of resources considering both technical and human resource aspects and in collaboration with this unit's staff as well as attracting and consulting personnel of other units. The head of the unit agrees upon this plan with his/her immediate supervisor, considering the hierarchical management scheme of the Institute.

Along the similar lines is the annual performance plan drawn up. In this plan, the head of the unit reviews information on the current work processes (which are more relevant to the core functions

of the unit) and on strategically sound projects that contribute to the development of the unit and increase its efficiency. In turn, the performance of the faculty, the budget planning and control are conducted by the dean in accordance with the by-laws of the faculty.

Therefore, the detailed planning of the budget includes specific responsibilities, as units should conduct their activities within the approved budget resources. To implement new projects and innovations, TSI sets up working groups and organizes discussions and seminars, thus encouraging the involvement of staff and managers in decision-making.

1.3. Description of the mechanism for the implementation of the quality policy and the procedures for the assurance of the quality of higher education. Description of the stakeholders involved in the development and improvement of the quality assurance system and their role in these processes.

The quality policy is the declaration of the TSI Board pertaining to the quality of aims and principles, which the Board follows when organizing the development of educational products and study processes. The quality policy is documented and approved in the quality manual. The quality manual is the main document of the TSI quality management system. The current (fourth) version of the quality manual was approved on April 15, 2021. The quality policy is based on the TSI Strategy.

The quality policy is available on the TSI website in Latvian and English.

The overall quality of the activities of TSI, including the compliance of the quality management system of the university with international requirements, is confirmed by the fact that TSI has been positively assessed by external auditors for several years for compliance of the higher education services and scientific research activities with the ISO 9001:2015 standard.

TSI's Strategy and Quality Policy are implemented through the TSI's operational directions. This process is reflected in Fig. 2. The hierarchy of TSI plans is shown in Fig. 3.
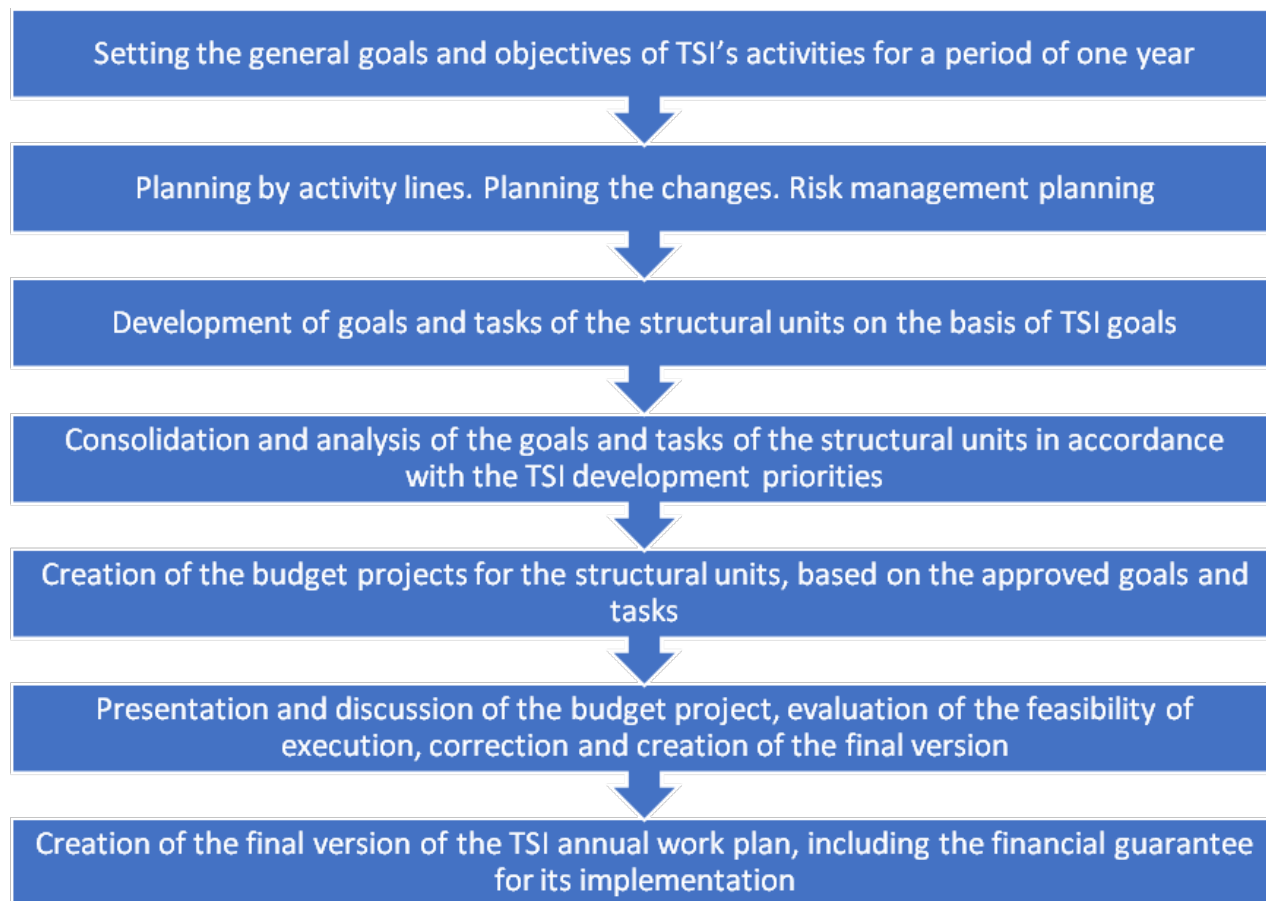
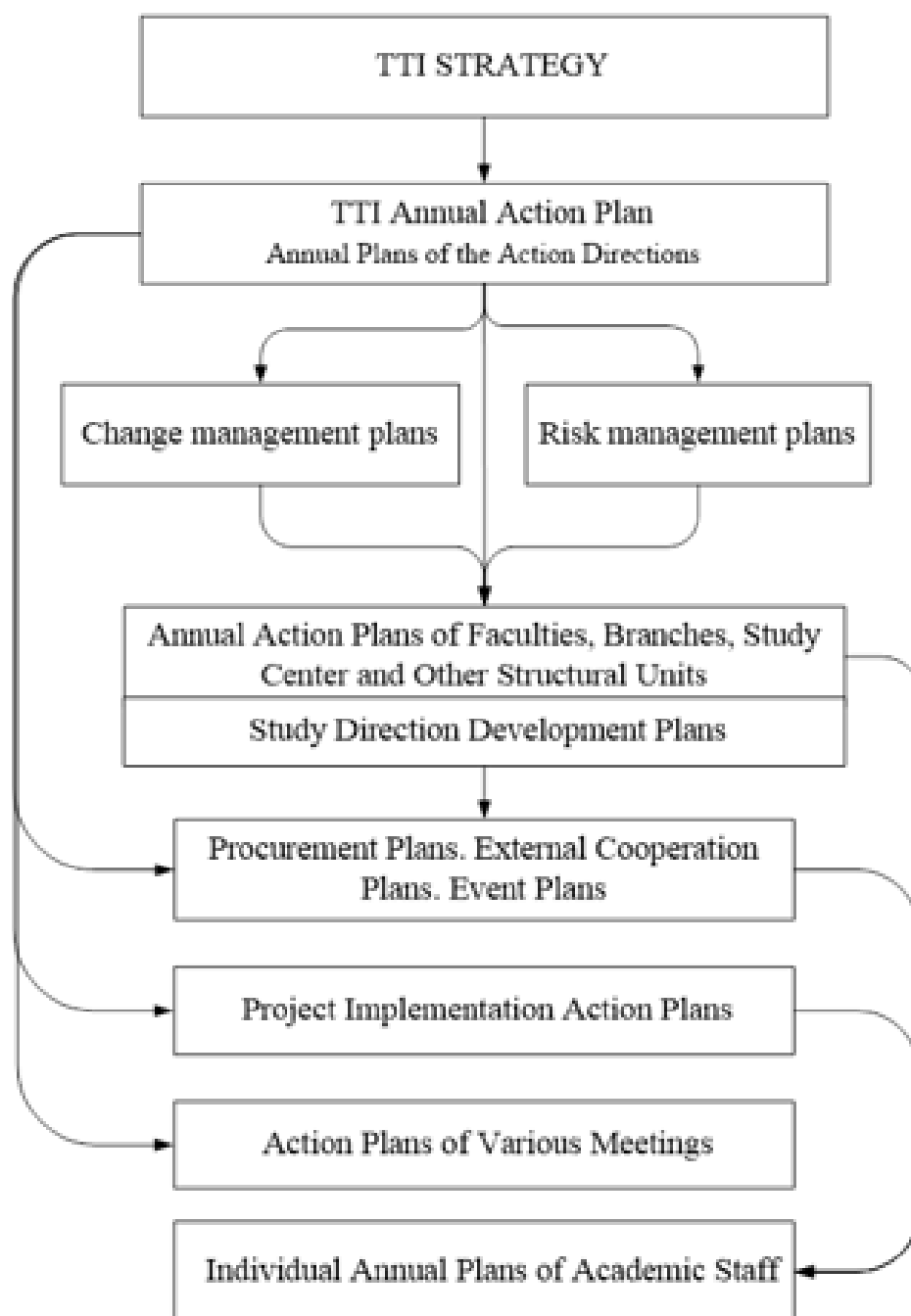Fig.2. Scheme of the planning process

Fig.3. Scheme of the planning process

Procedures for quality assurance in higher education

The quality assurance of the TSI education services is based on the quality management system designed in accordance with the requirements of the ISO 9001 standard. It consists of processes whose structure is illustrated in Figure 4

QUALITY MANAGEMENT SYSTEM PROCESS STRUCTURE

Total management

- Task
- P31. Management review
- Planning recommendations
- P32. Development planning
- P33. Internal quality auditing
- P34. Control of nonconformities. Korrective and preventive actions
- Reports
- Development program / Admission plan

Studying process

- P11. Customer needs and satisfaction monitoring
- Task
- P12. Education service design
- P13. Study process planning
- P14. Preparation of study resources
- P15. Admission and registration of students
- P16. Realisation of study program
- P17. Student certification
- Student register
- Needs and satisfaction assessment
- Study program
- Study work schedule
- Study resources
- Graduation tasks

Resource management

- P21. Personnel management
- P22. Management of information resources
- P23. Management of infrastructure
- P24. Management of documents
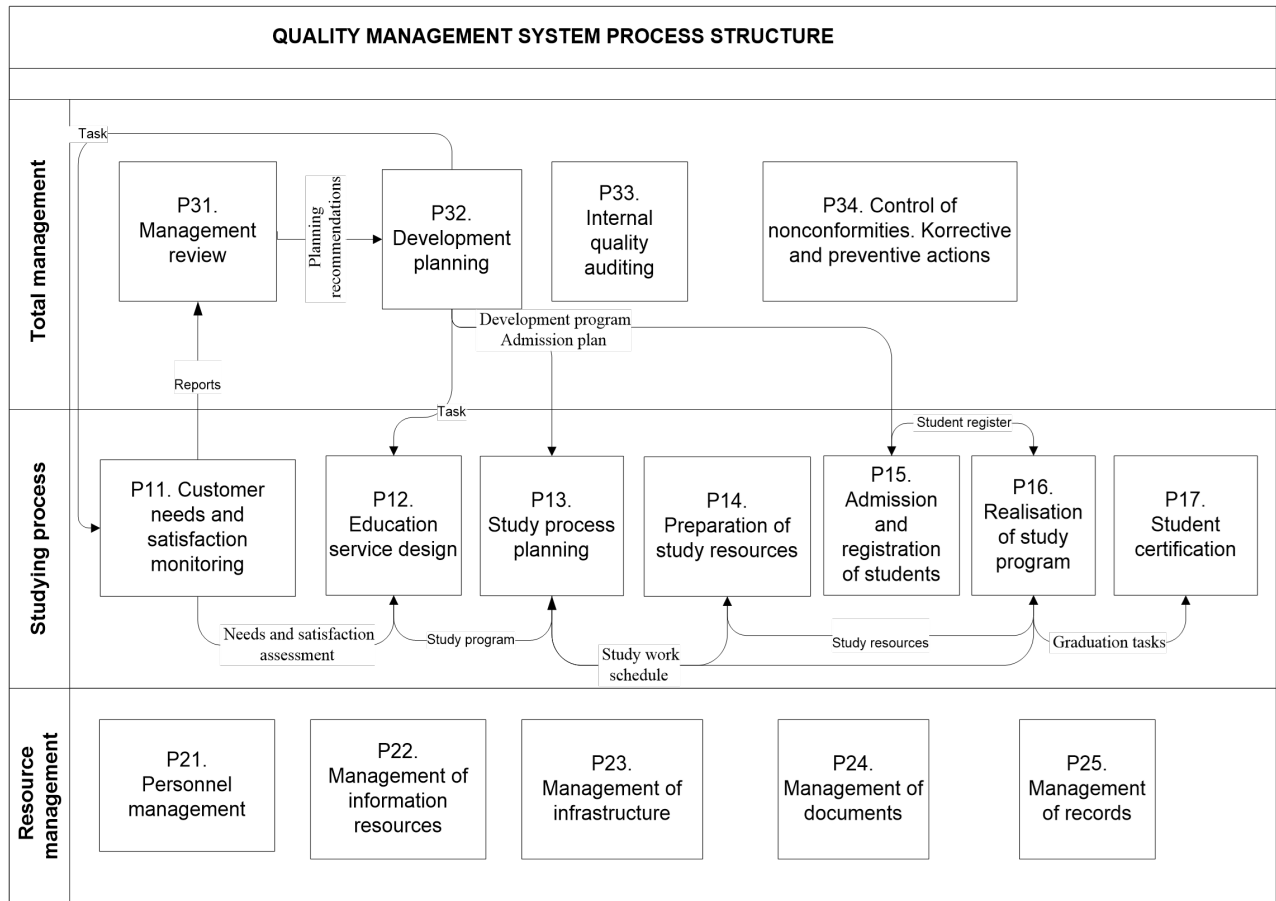- P25. Management of records

Fig.4. Structure of the quality management processes

Consistent with ISO 9001:2015 Quality Management System Requirements, the TSI quality assurance and enhancement processes are conducted at different levels.

The lower level assesses learning outcomes (examinations, tests, final examinations). The next level focuses on the control of lesson processes (whether resources and methods meet relevant requirements). The third level is characterized by the control and audit of management processes. At the fourth level the Board evaluates the compliance of educational products and services with the market and employer demands, legislation as well as their transformational trends. At the highest, fifth, level, resources and opportunities are analyzed and development strategies are designed (see Figure 5).

Fig. 5. TSI quality assurance and enhancement processes

1.4. Fill in the table on the compliance of the internal quality assurance system of the higher education institution/ college with the provisions of Section 5, Paragraph 2(1) of the Law on Higher Education Institutions by providing a justification for the given statement. In addition, it is also possible to refer to the respective chapter of the Self-Assessment Report, where the provided information serves as justification.

1.	The higher education institution/ college has established a policy and procedures for assuring the quality of higher education.	The developed and implemented quality management system meets the requirements of the ISO 9001:2015 standard. It determines the field of the quality policy and the structure of quality management processes. More information is available in the description of the criteria 1.3., 2.2.1 The mentioned TSI regulatory documents are available on the TSI website in Latvian and English see Annex 2 of the study direction. TSI internal regulation list

2.	A mechanism for the creation and internal approval of the study programmes of the higher education institution/ college, as well as the supervision of their performance and periodic inspection thereof, has been developed.	The procedures for the development, internal approval, implementation of amendments and periodic examination of study programs are stipulated in the Regulations on Study Directions and Study Program Management. The management of the development and implementation of collective study programs is ensured by the Study Direction Boards. Regulations on Study Direction Councils was approved by the Senate on May 21, 2019. Students, graduates, employers and external experts are involved in the development of study programs, annual evaluation and program enhancement by participating in Study Direction Councils, Faculty Concils, Senate Committees, Senate and completing questionnaires. Students, graduates and employers are engaged in the development of study programs and study directions within the framework of the program self-assesssment procedure. The periodic review of the program takes place during annual self-assessment. The course of the annual self-assessment, deadlines and persons responsible for these matters are approved by an order in September each year. More information is available in the description of criterion 2.2.2. The mentioned TSI regulatory documents are available on the TSI website in Latvian and English see Annex 2 of the study direction. TSI internal regulation list

3.	The criteria, conditions, and procedures for the evaluation of students' results, which enable reassurance of the achievement of the intended learning outcomes, have been developed and made public.	Lecturers inform students about the knowledge assessment criteria and methods during the first class. The assessment methods and criteria of learning outcomes are included in the course description and are available to students in the e-learning system. Study programs that include internships are designed in such a way that during their internships students consolidate the knowledge acquired in courses and develop practical skills. To assess graduation theses, internship reports and final examinations, there have been established committes that include representatives of employers. The committee members are informed about the basic principles of assessment. The degrees and professional qualifications awarded to students upon successful completion of their studies are regulated by national standards of higher education. The Regulations on the Award of Professional Bachelor's Degree, Professional Master's Degree and professional qualifications at the Transport and Telecommunication Institute describe the procedures for organizing final examinations and determine duties, actions, terms for both students and staff. Assessment criteria and methods for final examinations are included into the Methodological Guidelines for Writing Graduation Theses as well as into the Regulations for the Award of Academic Bachelor's and Master's Degrees and Regulations for the Award of Professional Bachelor's Degree, Professional Master's Degree and Professional Qualifications. Learning outcomes achieved in prior education or professional experience are recognized in accordance with the TSI Regulations on the Evaluation and Recognition of Prior Learning and Professional Experience. The procedures are included into the Final Examination Regulations and Regulations on Study Procedures, which additionally describe the system of assessment of learning outcomes. Recognition of learning outcomes achieved through participation in the ERASMUS + Programme is regulated by the TSI ERASMUS + Programme Scholarship Instructions. Each students receives an ID card created in the TSI internal information system Intranet. This card contains information on the student's academic progress, student's plan for the entire study period and assessment outcomes, which enables the student to control his/her own study plan and the achievement of the expected learning outcomes. More information is available in the description of the criteria 2.1.5., 2.2.4., 2.3.4. The mentioned TSI regulatory documents are available on the TSI website in Latvian and English see Annex 2 of the study direction. TSI internal regulation list
4.	Internal procedures and mechanisms for assuring the qualifications of the academic staff and the work quality have been developed.	The descriptions of academic positions, the Regulations on the election of academic staff and the assessment of their scientific and pedagogical qualifications are approved More information is available in the description of the criteria 2.3.5., 2.3.6. The mentioned TSI regulatory documents are available on the TSI website in Latvian and English see Annex 2 of the study direction. TSI internal regulation list. The descriptions of academic positions are available in the TSI record keeping system Lotus Notes in Latvian.

5.	The higher education institution/ college ensures the collection and analysis of the information on the study achievements of the students, employment of the graduates, satisfaction of the students with the study programme, efficiency of the work of the academic staff, the study funds available, and the disbursements thereof, as well as the key performance indicators of the higher education institution/ college.	Information on student achievements is available in the TSI internal information system. The Study Department collects and analyses information on academic progress indicators, the results of which are regularly reviewed at the Rectorate meetings. Information on student satisfaction is collected through surveys and analyzed at department, faculty, and Institute management levels. During annual attestation the efficiency of academic staff is evaluated. The criteria include indicators of methodological output, student feedback and participation in the Institute management processes. Training aids used in the implementation of study programs are described and evaluated during self-assessment of study programs. Key Performance Indicators (also KPI) of the Institute have been determined. The performance of the Institute and its structural units is periodically evaluated in accord with KPI. Regulations on Student, Graduate and Employer Surveys have been developed. More information is available in the description of the criteria 2.2.4., 2.3.1., 2.3.3. The mentioned TSI regulatory documents are available on the TSI website in Latvian and English see Annex 2 of the study direction. TSI internal regulation list.
6.	The higher education institution/ college shall ensure continuous improvement, development, and efficient performance of the study field whilst implementing their quality assurance systems.	Every year the Senate approves reports on self-assessment of study directions and makes decisions on the compliance of study programs and study directions with the requirements of state accreditation. Every study direction has its own development program, which is consistent with the Institute Development Strategy. More information available is in the description of criterion 2.1.3., 2.2.2, in Appendix 4. The development plan for the study direction, developed in accordance with the university's development strategy, is available in Annex 4 of the study direction. "Study Direction Development Plan."

2.1. Management of the Study Field

2.1.1. Aims of the study field and their compliance with the scope of activities of the

higher education institution/ college, the strategic development fields, as well as the development needs of the society and the national economy. The assessment of the interrelation of the study field and the study programmes included in it.

The goal of the study field is to prepare the highly qualified specialists in the field of transport and logistics who are able to apply their theoretical knowledge and practical skills at any stage of the development and operation of a freight and passenger flow handling system using any type of transport or infrastructure (warehouses, passenger terminals and transhipment points); it is also aimed at the preparation of students for further studies in the programmes of higher level, scientific activity and further self - education.

The objectives of the study field are as follows:

- To provide students with the fundamental knowledge and practical skills required for the profession;
- To develop students' system and critical thinking and to promote their analytical abilities;
- To promote self - learning, to develop the ability and skills to acquire information, to analyse it critically and to use it in their field of activity;
- To develop and provide the opportunities for the students to actualize their potential in research, innovation and project activities;
- To develop and foster cooperation between students, industry, academia and scientific environment;
- To provide students with a friendly, modern, multicultural and stimulating environment for study, research and self - education;
- To ensure the study process using the state- of- the- art information technologies in order to provide the competences for future professional activities in the single European labour market.

The objectives of the study programmes in the field of study are subordinated to the goal of the field of study, forming a coherent framework, while reflecting the specificities of each study programme (see the description of each programme for more details).

The objectives set for the field of study and its programmes are derived from the 5 strategic development directions set out in the TSI Strategy 2020 - 2025: International Engagement, Education, Research and Knowledge Transfer, Business and Public Involvement, Human Resources, and the objectives to be achieved in each direction.

The study field "Transport Services" comprises study programmes corresponding to the thematic field "*Transport Services*" of the Latvian Classification of Education:

1. Professional Bachelor's (first cycle) study programme "Transport and Business Logistics", licensed on 13.10.1999. During the accreditation process, the name change to "Transport and Logistics" was applied for.
2. Academic Master's (second cycle) study program "Master of Social Sciences in Transport and Logistics" of the second cycle of higher education, licensed on 11.06.2007. During the accreditation process, the change of the title to "Intelligent Transport and Smart Logistics" was applied for.
3. Professional bachelor's (first cycle) study programme "Business Administration in Transport" of the first cycle of higher education, which was not submitted for evaluation since it was closed due to low demand.

Studies in the Transport and Logistics programmes in TSI cover the full three-level study cycle, ensuring the continuity of all levels and specialisation options, which allows for efficient continuation of the study process and improvement of the knowledge and competences acquired by the students. Professional bachelor's (first cycle) study programs "Transport and Logistics" can continue their education after four years of study in the academic Master study programme "Intelligent Transport and Smart Logistics", obtaining an academic degree in engineering in the relevant field, and then to continue their studies in the Doctoral study programme "Telematics and Logistics" of in the study field "Information Technology, Computer Engineering, Electronics, Telecommunications, Computer Management and Computer Science", or in the Doctoral study programme "Digital Economy and Entrepreneurship" of the study field "Management, Administration and Real Estate Management".

According to the Research Agenda of TSI, the research focuses of the study programmes included in the field of study *"Transport Services"* on Smart Solutions in Transport and Logistics; this focal point corresponds to the strategic specialisation area of engineering and technology as it is defined in the TSI Constitution.

The transport sector is one of the most important sectors of the national economy, the development and competitiveness of which is an essential prerequisite for ensuring the economic stability of the country not only at the national level but also at the international level. New technologies, innovation and digitalisation, environmental (climate change) aspects, are becoming increasingly important in all sectors, including transport, especially taking into account the emissions occurred due to the transport sector. In the transport sector, research and application of digital solutions for the needs of Latvia, including intelligent transport systems and automated traffic management, as well as planning of logistics and transit transport flows, is particularly relevant (Transport Development Guidelines 2021-2027, available only in Latvian).

The Latvian transport and logistics sector will undergo major changes in the coming years. The European Green Deal policy emphasizes the growing need to develop automation and digitalisation to facilitate the sustainable mobility and logistics services. Due to the development of the *Rail Baltica* project and the modernisation of the railway infrastructure and the rolling stock, modern technologies will enter Latvia, providing ample opportunities for the development of the industry; however, it will simultaneously create the challenges and opportunities in the education sector. A large number of employees in various fields and specialities will be needed, including professionals in logistics with adequate, competitive knowledge of transportation, logistics technologies and multimodal supply chains.

Assuming as inevitable the increase in automation in the transport sector, and the sub-consequent necessary reskilling of workers, new enriched learning programmes will be necessary. The most important trend is the availability of multidisciplinary knowledge among specialists working in the industry, the ability to understand the logic, implement and intelligently use information communication technologies, make Big Data driven decisions, and therefore the master's program is shifting towards engineering knowledge and the whole direction is enriched with new subjects that reflect innovative processes in transport and logistics.

Based on the forecasts of the Ministry of Economy for changes in labour demand by profession in 2030, the Transport and Storage sector is projected to see an increase in the demand for labour in such professions as senior specialists in such areas as science and engineering (296), science and engineering specialists (1107), ICT senior specialists (154), managers in the fields of production and specialised services (202), with a significant decrease in the number of employees in elementary occupations. (Presentation by the Ministry of Economy , available only in Latvian).

According to the forecasts of the Ministry of Economy, the transport and logistics sector will grow at

an average annual rate of 4% between years 2021 and 2030 and 2.7% between years 2031 and 2040. The growth of the transport and storage sector will be largely driven by the development of the air transport and road transport sectors. The dynamics of the transit sector, on the other hand, will demonstrate a significantly slower pace; it is determined by the need to find new types of cargo and delivery routes to replace the volumes of Russian oil products and coal freights. In the longer term, the implementation of the Rail Baltica project will play an important role, including the expected impact on the development of education in the transport sector. While the transport sector is currently suffering from the consequences of the war in Ukraine caused by Russia, with GDP in the transport and storage decreased by 4.9% in the 2nd quarter of 2023 according to the CSB data, there are positive contributions from growth in air transport (24.6%) and water transport (4.0%) activities

Thus, the demand for middle and high-level workers in the labour market in the field of transport is predicted. The Ministry of Economy forecasts that in 2030 there will be a shortage of almost 2 thousand specialists with higher education in the group of educational programmes "Transport services". Economic growth will be based on the growth of productivity, but the main job opportunities will be created by replacement demand. In both the medium and long term, labour demand in the transport and logistics sector will continue to restructure in favour of highly qualified specialties. A shortage of highly qualified professionals in natural sciences, ICT and engineering is expected. Similarly, an increase in labour demand is expected both for specialists with higher education and vocational education (Ministry of Economy. Informative report on medium- and long-term labour market projections, available only in Latvian).

The study programmes of TSI take into account the above-mentioned trends, for example, the first cycle programme of the Professional Bachelor level includes groups of courses in such areas as information technology, data analysis techniques, IoS and others. Each student has the option to choose one of the specialisations on offer: "Sustainable Transport Solutions" or "Intelligent Logistics Systems".

Digitization and automatization call for advanced planning methods in transport and logistics. The focus of updated MSc programm line is on the application and development of Big data-driven approach, using optimisation and modelling tools to analyse the transport and logistics systems from different perspectives, including the emerging technologies and solutions.

This programme focuses on the integration of ICT into transport and logistics systems and solutions, with the aim of increasing efficiency, safety, mobility and customer satisfaction while reducing environmental impact.

The faculty members of the TSI are highly qualified specialists in applied mathematics, computer science and engineering and active researchers in projects of different levels: from European (Horizon; InterReg; oth.) till national and commercial (MSC; RIX and others companies). Students studying in the programmes "Transport Services" are provided with the conditions for an in - depth study of both analytical methods and engineering solutions used in modern transport and logistics systems. This approach to the organisation of learning is in line with the trends and perspectives in the development of modern transport and logistics systems. Students learn the basics of digitisation of specific technological processes in warehouses and terminals as well as supply chain processes and their management. Great importance in the study courses is given to the issues of ecology and environmental protection, including measures aimed at the implementation of the European Green Deal. This means that the demand in this field will be consistently high both in Latvia and in the EU.

In general, it should be concluded that the field of the study and its programmes are in line with both the strategic development plans of the university and the direction of strategic specialisation,

as well as with the needs of the national economy of Latvia and other Baltic States.

2.1.2. SWOT analysis of the study field with regard to the set aims by providing explanations on how the higher education institution/ college expects to eliminate/ improve weaknesses, prevent threats, and avail themselves of the given opportunities, etc. The assessment of the plan for the development of the study field for the next six years and the procedure of the elaboration thereof. In case there is no development plan elaborated or the aims/ objectives are set for a shorter period of time, information on the elaboration of the plan for the development of the study field for the next assessment period shall be provided.

To ensure the quality of the field of study, an annual self-evaluation of the field of study and the programmes is carried out; the results are reviewed by the Council of the field of the study and approved by the Senate. The self-assessment includes an assessment of the strengths, the weaknesses, the opportunities and the threats (SWOT) of the field of study. The SWOT analysis is used to develop the proposals for the improvement of the field of study and its programmes.

S - Strengths

- The higher education services and research activities of TSI are certified according to the ISO 9001:2015 standard; there also implemented the quality management system for study programmes
- TSI offers to obtain a full-cycle higher education in transport and logistics area at Bachelor, Master and Doctoral level programmes
- TSI is the only private higher education institution in Latvia with its own Doctoral programme and Promotion Council in the field of Engineering and Technology.
- In the 2021 International Assessment of Scientific Institutions in Latvia, TSI was recognised as a high performing research institution in Engineering and Technology with scores ranging from 3 to 4
- Information technology infrastructure (including laboratories) that meets modern requirements, accumulated valuable experience in digitisation of study processes and provision of distance learning
- Modern electronic library with subscriptions to the international databases (Academic Complete, Science Direct, SCOPUS)
- Established cooperation and the implemented wide range of contacts with employers (for example, MSC, MileLogistics, Conteinerships, Kriess, Food Union, Maxima Latvia and others), entrepreneurs, state institutions and other universities in Latvia and abroad
- Active work in various associations and societies: Latvian Information and Communication Technology Association (LIKTA), Latvian Logistics Association (LLA), European Conference of Transport Research Institutes (ECTRI), Woman in Transport etc.
- The faculty members of TSI have extensive experience in pedagogical and research work in the field of transportation and logistics, information technologies, robotics, economics and management, which is used in the courses of the study programmes. A great synergistic effect is achieved as a result of the cooperation of the faculty members from the fields of engineering, transport and social sciences. Undergraduate students acquire knowledge and skills in the field of digitalisation of the transport process management, while Masters students learn study the analytical methods for working with data
- Each semester, students are offered guest lectures by experts and academic staff from Latvia

and other European countries, which allow them to get acquainted with the specifics of transport and logistics companies and the experience of other countries

- Practical training on site (Open Air) is organised on the premises of companies (logistics centres, warehouses, port, etc.)
- TSI has a flexible system of paying the tuition fee that creates incentives for good academic performance, takes into account the special needs of the student, and family ties with the alumni and the institute staff
- For a long time, TSI has been organising the student conference RaTSiF (Science and Technology - A Step into the Future) twice a year. Participation in the conference is compulsory and free of charge for Master and Doctoral students. Students also have the opportunity to participate in the annual international scientific conference RelStat.
- Starting from 2021, TSI organises annual roundtable discussions with industry representatives, local and international academic staff to discuss the current issues in transport and logistics. Students of the senior years also actively participate in the round table discussion
- TSI students actively participate in BIP (Blended Intensive Programmes). Students from TTC University of Applied Sciences (Estonia), Kaunas University of Applied Engineering and Estonian Aviation Academy took part in this event together with the TSI students in March 2023
- TSI actively uses the learning materials offered by the Coursera learning platform. These materials are recommended as supplementary materials for undergraduate studies, and mandatory for Master studies
- In 2023, an agreement was signed with HZ University of Applied Sciences (the Netherlands) to the organization of joint studies in the professional Bachelor programme "Transport and Logistics". TSI students will have the opportunity to study part of their degree programme at HZ University. Such an opportunity is planned to be available starting from the autumn semester of the academic year 2024/2025, but informational seminars for students are already taking place.

W - weaknesses

- A major effort is needed to attract the professionals from the industry to teach in the study programme, since the remuneration of teaching staff is lower than that of professionals in transport and logistics companies
- The involvement of teaching staff in the scientific research is relatively weak due to the workload of teaching activities
- Insufficient (though positive) dynamics of involvement of student in the projects, scientific activities, etc.
- Low activity of students under the ERASMUS+ mobility programme, as well as activity of visiting lecturers, although the mobility rates of the TSI lecturers are relatively high
- The tendency of not enough renewal of teaching lecturers, as well as an insufficient number of foreign lecturers being attracted to teach in the faculty programmes
- Unavailability of state budget funding to cover the tuition fees for students studying at private universities.

O - Opportunities

- The field of study "Transport Services" fully meets the needs of the national economy of Latvia. The medium- and long-term forecast of the labour market shows that there will be an increasing demand for the specialists with higher education in transport and logistics
- Latvia has a well-developed transport infrastructure of all types: roads and railways, seaports and airports. A large number of warehouses and logistics centres have been built over the

last 20 years, both in the vicinity of Riga and in other regions of the country. The geographical location of the country creates favourable conditions for the efficient use of this infrastructure and for the development of logistics services business

- The *Rail Baltica* project is being successfully implemented in Latvia. New technological processes are expected to emerge, including the simultaneous use of old Soviet - and new - European - railway tracks
- There is an opportunity to focus on attracting the students from Western European and Asian countries, since the tuition fees are competitive compared to competing Western European countries
- Many years of experience in implementing the study programmes in the form of distance and remote learning
- TSI has the opportunity to raise additional funds by participating in the implementation of the European Union fund projects
- The importance of lifelong learning is increasing throughout a person's life; it is based on the need to acquire new knowledge, skills and experience in order to upgrade or change one's qualifications in line with the requirements of the labour market.

T - threats

- Competition with the companies from the industry for human resources engagement
- Unequal treatment of the private educational institutions and the private scientific research institutions by national legislation
- The decrease in the number of potential students willing to obtain the higher education due to the demographic situation in the country, migration and outflow of human intellectual potential to other countries of the world; increase in the "cost of living" index in recent years has also had a negative impact on the number of applicants to the studies
- During the pandemic, many companies in Latvia have reduced the number of internships offered to the students. In addition, not all companies in Latvia are prepared to employ students whose main language of communication is English
- The criteria put forward to classify the scientific institution as a research organisation are based only on the proportion of economic and non-economic activities, but not on the specific research results. Due to this fact, in 2021 the Ministry of Education and Culture made a decision that TSI did not comply with the definition of a research organisation, although the formal criteria for this compliance have still not been approved by the country.

Comparing the strengths and the weaknesses of the field of study implemented by TSI, it can be concluded that the strengths prevail and in the future TSI aims to strengthen further and to develop them, as well as to eliminate the weaknesses as far as possible and, avoiding threats, to exploit its development opportunities in order to achieve the objectives set out in the TSI Strategy.

For the development of the study field "Transport Services", TSI intends:

1. to use in the study process as much as possible the results of research carried out in the field of transport and logistics, including those obtained in the framework of the current international projects "Enhanced Physical Internet-Compatible Earth-friendly freight Transportation ansWer (ePIcenter)", "Workforce Europe - Transformation agenda for transport automation (We-Transform)", as well as in other projects.
2. to promote cooperation with partners in the field of information technologies, in particular with the company Accenture Baltics, Deloitte Latvia etc in order to increase the level of knowledge of students studying in the field "Transport Services".
3. to learn about and to draw on the best practices of the European universities, in particular taking into account the experience of two partners with whom there is real cooperation in the

study process: the HZ University of Applied Sciences (the Netherlands) and the University of the West of England (Great Britain).

4. to strengthen the composition of the teaching staff in the areas of the study programme:

- to invite professionals: for teaching the professional courses it is planned to attract more representatives of the industry, who are interested in the academic activities, directly through the cooperation with the partner companies, for example, *Accenture Baltics, Deloitte Latvija*, etc;
- to develop a talent identification strategy to attract Master and Doctoral students to the study process,
- to activate the attraction of foreign lecturers through the ERASMUS + exchange programme, the EU level projects, for example, *Marie Curie*, etc,
- to develop cooperation: a cooperation agreement with the international online learning platform *COURSERA* has been signed in 2022. Within the framework of this agreement, the academic staff of TSI will have the opportunity to upgrade their qualifications by taking COURSERA courses. Certain training courses, especially related to the methodological issues, will be compulsory for the academic staff, for example , the course Assessment in Higher Education: Professional Development for Teachers is compulsory in 2023;
- to continue to be involved in the projects aimed at strengthening the academic staff and improving the qualifications of the academic staff (for example, the project of the past period - "Strengthening Transport and Telecommunication Institute Academic Staff in the Areas of Strategic Specialisation").

5. to make active use of ESF projects (for example, post - doctoral fellowships) to attract the scientific researchers.
6. to establish new laboratories, research clusters and to involve the students in their activities.
7. to attract foreign students by implementing an active marketing policy in the Asian and European markets as well as in the post - Soviet countries. Implementation of micro-skills exchange programmes with the EU training institutions (for example, with HZ University of Applied Sciences).
8. to increase the use of ERDF funds for the development of ICT infrastructure, wider resource sharing activities with other universities, to establish the close cooperation with the industry.
9. to promote the interest of students in the scientific research by planning to attract the funds from ERDF. In autumn of 2021, the project "Innovation Grants for Students at the Institute of Transport and Telecommunications" / iDEAHUB (Nr.1.1.1.3/21/A/006) was launched; within the framework of this project some of the students' innovation ideas have been implemented in the research area "Smart Solutions in Transport and Logistics".
10. to involve the students actively in events, implemented by TSI: projects and clusters and to stimulate the participation in international scientific conferences.
11. to stimulate the academic staff to start doctoral studies by co-financing the doctoral studies, attracting foreign lecturers, and using the EU-funded projects.

The field of the study development plan for a 6-year period was elaborated based on the TSI development strategy for 2020-2025. The preparation of the development plan of the study area was led by the head of the area, involving the representatives of the TSI administration and all programme directors of the study area.

In the process of working out the development plan of the study area, there were considered the suggestions of the programmes of the study area; the competitiveness of these propositions in the local and international market was reviewed. In the decision-making process, the labour market and the forecasted demand of the potential students were analysed, as well as the effectiveness of the use of resources necessary for the implementation of each programme was evaluated.

The plan is reviewed and accepted by the Council of the Study Field; it includes employers and company representatives, and students of the faculty, approved by the Senate. The annual self-assessment includes elaboration and analysis of measures for implementing the six-year strategy.

2.1.3. The structure of the management of the study field and the relevant study programmes, and the analysis and assessment of the efficiency thereof, including the assessment of the role of the head of the study field and the heads of the study programmes, their responsibilities, and the cooperation with other heads of the study programmes, as well as the assessment of the support by the administrative and technical staff of the higher education institution/ college provided within the study field.

In accordance with the Regulation on Management of the Study Directions and Study Programs, it is the faculty that is responsible for the management of the study direction. The institutions included in the TSI structure participate in the management of the TSI study directions.

Visualisation of the study direction management processes is provided in the figure below.

SCHEME OF STUDY DIRECTION MANAGEMENT PROCESSES

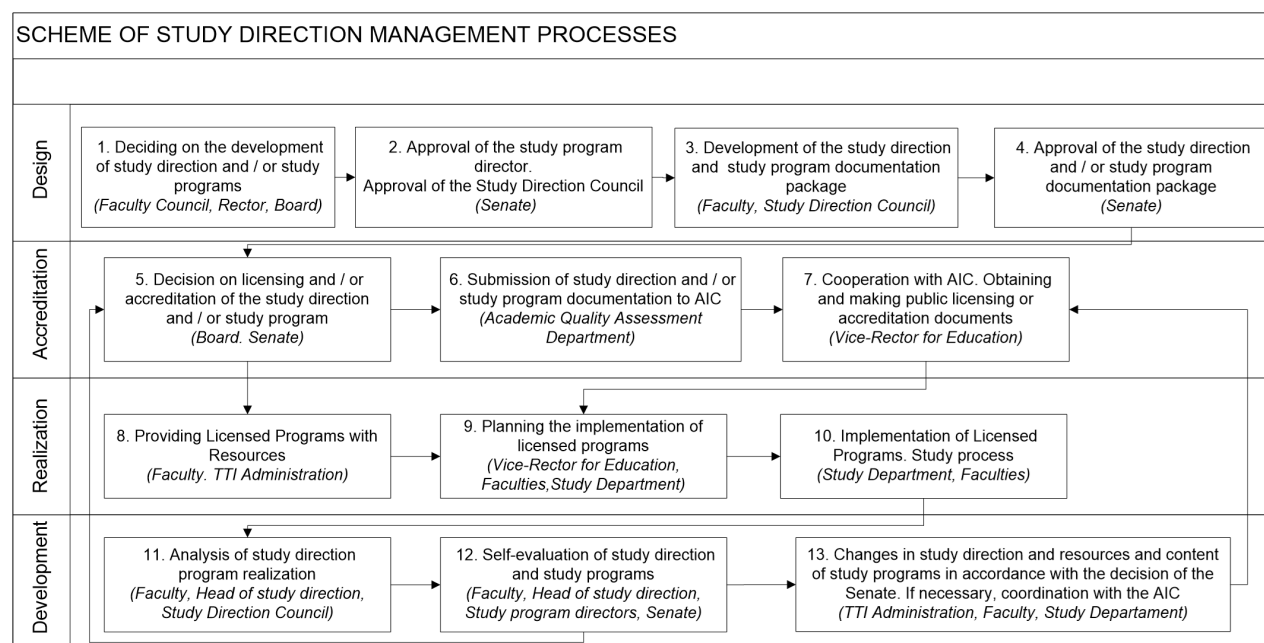|				
Design	1. Deciding on the development of study direction and / or study programs *(Faculty Council, Rector, Board)*	2. Approval of the study program director. Approval of the Study Direction Council *(Senate)*	3. Development of the study direction and study program documentation package *(Faculty, Study Direction Council)*	4. Approval of the study direction and / or study program documentation package *(Senate)*
Accreditation	5. Decision on licensing and / or accreditation of the study direction and / or study program *(Board. Senate)*	6. Submission of study direction and / or study program documentation to AIC *(Academic Quality Assessment Department)*	7. Cooperation with AIC. Obtaining and making public licensing or accreditation documents *(Vice-Rector for Education)*	
Realization	8. Providing Licensed Programs with Resources *(Faculty. TTI Administration)*	9. Planning the implementation of licensed programs *(Vice-Rector for Education, Faculties, Study Department)*	10. Implementation of Licensed Programs. Study process *(Study Department, Faculties)*	
Development	11. Analysis of study direction program realization *(Faculty, Head of study direction, Study Direction Council)*	12. Self-evaluation of study direction and study programs *(Faculty, Head of study direction, Study program directors, Senate)*	13. Changes in study direction and resources and content of study programs in accordance with the decision of the Senate. If necessary, coordination with the AIC *(TTI Administration, Faculty, Study Departament)*	

Fig. 6. Scheme of TSI study direction management processes

Such structure of the study process and study program management processes is efficient because the main role in the structure is assigned to the collegial bodies, such as the Faculty Council and the Senate, which evaluate the efficiency of performance of the study programme directors and the heads of the study directions.

According to the scheme of the study direction management process (Figure 11), the Senate participates in processes 1, 2, 4, 5 and 12, while the Study Direction Council and Faculty Council participate in processes 1, 3, 11 and 12.

The collegial bodies periodically request the deans and the heads of the study directions to submit reports on the compliance of the Directions with the accreditation requirements and the aims of the development of the Institute. These bodies also evaluate the efficiency of the management of study programs and study directions as well as make decisions regarding the enhancement of this

efficiency.

The head of the study direction is approved in accordance with the Study Direction and Study Program Management Regulations. The head of the study direction ensures the review and evaluation of the study direction and its development planning, external evaluation of the study direction as well as the promotion of cooperation between the directors of the study programs implemented within the study direction and the academic staff.

The programs included in the study direction are managed by the study program directors, who act in accordance with the Study Direction and Study Program Management Regulations.

The director of the study programme is responsible for managing the study process; development and updating of the study programme; development of documentation and methodological guidelines for the final exams (questions for the state exam, requirements for the tasks and content of the final thesis, criteria for its assessment); updating the study courses descriptions; preparation of the annual self-evaluation report of the study programmes; participates in the evaluation and comparison of the relevance of the scope and content of the course of study acquired in another programme or educational institution; participating in advertising campaigns.

The study programmes included in the field of the study are implemented at the Faculty of Transport and Management, while the study courses of the interdisciplinary Master degree programme are mainly taught by the faculty members of the Faculty of Engineering. The close and regular cooperation between the directors of the study programmes included in the field of the study should be emphasised. The programme directors participate in the daily work of the faculty and in regular faculty meetings, where the issues related to current the developments in the study process of all study programmes are discussed. The Dean coordinates the regular exchange of views and sharing of experience between the study programme directors and the head of the department, both on the study process in the daily work at the Faculty and University meetings and on the preparation and development of the planning stages of the annual self-evaluation.

The Study Direction Council (SDC) acts as support for the development of the study direction and study programs. It operates in accordance with the Regulation on the Study Direction Council. The SDC evaluates the necessity of the development of the study direction and study program in accordance with the contemporary labour market trends in Latvia and the EU, makes proposals for the engagement of independent experts (employers) for evaluation of the topicality and content of the program, discusses and coordinates the development plans of the study direction and study programs, discusses proposals for participation in the projects related to the development of joint programs with the Latvian and foreign higher education institutions and implementation of joint programs, coordinates interfaculty cooperation and adjusts joint matters related to the implementation of the study direction with all the faculties participating in teaching courses within the given study direction.

The SDC composition is approved by the rector's order, engaging therein the relevant dean, the head of the study direction, directors of the study programs, chairman of the Faculty Council, senior academic staff from other faculties involved in teaching relevant study courses, employers and students.

Close cooperation between the administrative and the technical support staff is also important for the implementation of the study field. The following structural units are involved in the provision of the study process and the implementation of the study directions and study programs:

- Faculties organize the preparation of study directions and study programs for licensing and accreditation and perform periodic self-assessment and improvement of the study directions and study programs.

- Study Department plans the study process (lesson scheduling, lecturer work, etc.) and records study achievement. Additionally, distance learning study forms provide students with access to learning and methodical materials of distance learning study courses; advises students; supervises the fulfilment of the mid - term control and final control requirements of study courses; organizes consultations for students in online or offline mode (according to the lecturers' consultation schedule and at the request of students).
- Digitization and Innovation Training Center - supervises the development, updating and placement of materials for distance learning study courses on the platforms of the TSI Learning Management System; provides methodological support and advises study programme directors and lecturers on the development of study materials for distance learning courses.
- Research Administration Department - organizes and supervises the scientific research activities at the university
- Teaching staff of the Faculties include the academic staff and guest lecturers, who prepare and improve the description and content of study courses, prepare study materials, update literature, determine assessment criteria, deliver lectures, conduct seminars and workshops, administer examinations, consultations, perform other academic duties
- Library provides students and academic staff with academic and scientific literature.
- IT Department supports IT infrastructure (computers, printers, etc) and also provides the support in organizing studies in the remote format.

Both faculties and support structural units (Study Unit, Digitization and Innovation Training Center, Research Administration Division, Library, etc.) are closely involved in the implementation and development of the study process, cooperating equally on a daily basis. Cooperation with structural units is coordinated through the study programme managers and lecturers, for example, in the creation of study plans in the TSI system, in the development and approval of the study course descriptions, in the placement of study materials in the e-learning environment, in the organization of the study process and in many other aspects of daily work and development.

In assessing the effectiveness of the management of the study field, it can be concluded that it is of high quality in terms of content and organisation and is well arranged in a transparent manner. It is implemented not only by the director of the study programme, but also by a group of participants consisting of heads of the study programmes, lecturers, course supervisors, student self-government, as well as a special Study Field Council which includes invited lecturers and representatives of professional organizations. In general, we can say that TSI has established a stable system for managing and improving the study programmes, and the support of administrative and technical staff is sufficient.

2.1.4. Description and assessment of the requirements and the system for the admission of students by specifying, inter alia, the regulatory framework of the admission procedures and requirements. The assessment of options for the students to have their study period, professional experience, and the previously acquired formal and non-formal education recognised within the study field by providing specific examples of the application of these procedures.

Description of the student admission requirements and system

Admission to TSI is based on the Admission Rules for the specific academic year approved by the

TSI Senate, which are approved by the Senate by the 1st of November each year. The admission rules for the current academic year are published on the TSI website in Latvian and English and are available to everyone.

Admission Rules have been developed and admission proceeds in accordance with external laws and regulations - the Law on Higher Education Institutions, Cabinet Regulation No. 846 of 10 October 2006 Regulations on Requirements, Criteria and Procedures for Admission in Study Programmes, Cabinet Regulation No. 543 of 29 September 2015 *Provisions for the Substitution of a Foreign Language Centralised Examination in the General Secondary Education Programme for a Foreign Language Examination by an International Testing Institution*, as well as other external laws and regulations and taking into account the specific entry requirements of the programmes.

Admission to later stages of studies at TSI is based on Cabinet Regulation No. 932 of 16 November 2004 Procedure for the Commencement of Studies in Later Stages of Studies, Cabinet Regulation No. 505 of 14 August 2018 *Regulations for the Recognition of Competences and Vocational Education and Training Acquired Outside Formal Education or Professional Experience and the Study Results Achieved in the Previous Education*, the TSI *Regulations on the Recognition of Competences and Vocational Education and Training Acquired Outside Formal Education and the Study Results Achieved in Previous Education, the TSI Procedure for the Commencement of Studies at Later Study Stages and other external laws and regulations.*

The admission terms and procedure for citizens and non-citizens of the Republic of Latvia as well as foreigners holding a permanent residence permit in Latvia, are determined in accordance with the general procedure and Paragraph 7 of Cabinet Regulation No. 846 of 10 October 2006 *Regulations on Requirements, Criteria and Procedure for Admission to Study Programmes*. The right of foreign nationals without a permanent residence permit to study at a higher education institution is governed by the requirements of Sections 83, 84 and 85 of the Law on Higher Education Institutions. Foreigners applying for distance learning do not need permanent or temporary residence permits (students at the Transport and Telecommunication Institute are asked to appear in person on one occasion only - to defend their final thesis).

Applicants who wish to study in English should present a document certifying their knowledge of English, which is a certificate of the centralized English examination (with a result of not less than 55%).

The foreign applicant shall attach to the application a document issued by an international testing institution within the last five years, which certifies that the foreigner's proficiency in the language of the relevant study programme is at least B2 level. The mentioned document is not attached if the foreigner obtained secondary education or higher education in the language of implementation of the relevant study programme, for which he submits a certificate issued by the relevant educational institution, or if the foreigner obtained secondary or higher education in a country of the European Union and the European Economic Area or in the Swiss Confederation and in the country certifying his education the document includes an assessment of foreign language knowledge equivalent to at least B2 level according to the European Common Language Proficiency Assessment System.

The admission rules set out the document submission procedure, deadlines, competition process, appeal and contesting procedure of the decisions related to admission, the procedure for entering into the study agreement and matriculation, the rights and obligations of the applicant and TSI. The appendices to the admission rules contain precise information about each study program for which enrolment is planned in a given academic year, including admission requirements, documents to be submitted, etc. The website of the TSI contains up-to-date information on the study programs, enrolment period, tuition fees, discounts and scholarships.

The Admission Department offers prospective students consultations on the admission process, including admission requirements, contesting admission results, rights and obligations of the applicants. The Admission Department provides services via e-mail, telephone and face-to-face meetings. Similarly, consultations on admission requirements, for example, entrance examinations and their specifics, are provided by the heads of the study programs, thereby ensuring that applicants are fully informed and prepared for admission to TSI.

TSI announces the admission results as stipulated in the admission rules and organises signing of the study agreements with the successful candidates. After signing of the study agreements and fulfilment of obligations by applicants, TSI ensures the matriculation of these applicants.

In terms of study, Bachelor's and Master's programmes in Computer Science with specialization in Artificial Intelligence are also implemented in a double degree format in cooperation with the University of the West of England Bristol (UWE). In accordance with the terms of the concluded strategic cooperation agreement and the Academic Study Regulations approved by UWE / TSI, which regulates the study process in double degree study programmes, TSI is responsible for the admission of students and their compliance with the admission requirements, which are synchronized between TSI and UWE Bristol.

Opportunities for recognition of previously acquired formal and non-formal education within the study direction

TSI ensures fair recognition of previous education and professional experience so that applicants can apply for studies at later stages. This process is implemented considering the fact that students are mobile both within the higher education system and between education systems.

Recognition of the study results achieved in previous education or professional experience is governed by the procedure *Rules for Recognition of Competences Acquired outside Formal Education or Professional Experience and of Study Results Achieved in Previous Education.*

To make a decision on the recognition of knowledge, skills and competences acquired outside formal education or through professional experience and on the recognition of study results achieved in previous education, TSI has established a commission ensuring the involvement of the director of a relevant study program. The establishment of one commission for all thematic areas of education allows for the implementation of a uniform approach throughout the Institute, which prevents from forming different interpretations and ensuring equal treatment of persons.

To have the study results attained in professional experience recognized, in addition to the application, applicants also submit certificates from workplaces and certificates on their previous education. The certificates must indicate both the length of service and detailed job responsibilities.

A total of 25 cases of professional experiences have been recognised at the University so far, including a **total of 26 credit points of internship in the professional Bachelor programme "Transport and Logistics" has been recognised 12 times.**

Recognition of the study period for studies at the later stages of studies is regulated by *the TSI Procedure for Starting Studies at Later Stages of Studies* and t*he Regulations on the Course Comparison Protocol and the Procedure for Preparation of Individual Study Plans.*

2.1.5. Assessment of the methods and procedures for the evaluation of students' achievements, as well as the principles of their selection and the analysis of the compliance of the evaluation methods and procedures with the aims of the study programmes and the needs of the students.

The assessment system of the students' achievements and study results is stipulated in the external laws and regulations: the Law on Higher Education Institutions and the Law on Education, and in several internal regulations: Study Regulation; Rules of Study Procedure; Regulation on Awarding Academic Bachelor's and Master's Degrees; Regulations on Final Examinations; Regulations for Doctoral Studies.

The mentioned documents are available for students in Latvian and English on the TSI website.

Different study methods and forms are used in the study process. The main criteria for the selection of training methods include the necessity to ensure the acquisition of required information and development of critical attitudes as well as the general need to attain the expected learning outcomes (specific knowledge, skills and competences).

When grading the students' achievements, the following principles of grading, which are set in the national standards of higher education, are observed:

- openness in the grading of knowledge and skills: when commencing a course, students have access to information on the set of requirements necessary for positive grading;
- compulsory grading: students have to obtain positive grading confirming the successful acquisition of the contents of the program, including tests and final examination (test or exam) with 'almost satisfactory' (4 points) or 'passed';
- grading review options: a procedure for reviewing the acquired grade;
- variety of testing types used in grading: different types of testing are used for grading the outcome of the study program acquisition: tests, exercises, case studies, projects, labs etc., described in the methodological materials of the course in the e-learning environment (based on *Moodle LMS)*.

The methods and criteria for assessing the students' achievements and study results are included in the course description of each study course, which is prepared by the course leader. The academic freedom of each lecturer is respected in the implementation of study courses, including the design and implementation of study examinations, considering that teaching and examination methods must be chosen in accordance with the study outcomes assumed to be achieved in the study course. This fact is reflected in the course descriptions. The course description is prepared by the leading lecturer in accordance with the Guidelines for the Preparation of the Study Course Descriptions (approved on 01.02.2022, Order No. 01 - 12.1/ 11, available in the TSI record keeping system Lotus Notes and the description of this criterion in the appendix).

Lecturers introduce students to the knowledge assessment criteria and methods in the first lessons. Students can access the description of study courses with the methods and criteria of assessment of learning outcomes in the e-learning environment (also known as TSI LMS (e.tsi.lv)) .

The summative assessment system is used in the evaluation of the students' achievement. A certain weight in the final course assessment is assigned to the assessment of group work, practical work, laboratory work, control work, tests, etc., carried out during the course implementation. The proportion of the grade obtained in the exam in the total course grade may not exceed 20%-50% of the final mark. When an examination is resit, its weighting in the overall course grade or the description of the examination itself may vary. Such an option is described in the course description and the students are introduced to it at the beginning of the course.

The types and criteria of assessment used in the study course are specified in the description of the study course. To obtain the right to take the final examination of the course, students have to meet the requirements specified in the course description (if any). If students have not fulfilled the

requirements of the study course, lecturers have the right not to admit these students to the final assessment of this course, be it an examination or test.

The choice of the type of knowledge assessment (written, oral or combined) depends on the specifics of the study course (including learning outcomes) and the lecturer's individual approach to the assessment of students' knowledge.

The grading methods of students' achievements and the assessment of study results are specified in the *Regulations of Study Procedure*. The outcomes of program acquisition taking place via final examinations at all levels is graded in a 10-point system, the lowest positive grade being "4".

The procedure for organizing and evaluating internships is defined in the *Regulations on the Organization of Student Internships at TSI*. Internships conclude with the defense of an internship report, in which the results achieved during the internship are assessed on a ten-point scale. Before that, the University Internship Supervisor reviews the internship report and the feedback from the Company Internship Supervisor and decides on the student's eligibility for defending the internship report. To be eligible for defending the internship report, the compliance of the report with the Internship Program and tasks, the content of the report, its formatting according to the University's requirements, and the positive feedback from the Company Internship Supervisor are taken into account. The criteria for evaluating internships are described in the *Internship Methodological Guidelines* attached to the x. appendix of the Professional Bachelor's Program "Transport and Logistics".

The procedure for a student to contest any assessment or decision made by the examination committee during any stage of the study process is outlined in Section 17 of the Study Regulations on the Procedure for Submitting and Reviewing Appeals.

In his/her student e-card, each student has access not only to all information about the course of studies completion – contracts, invoices, study plan for the entire study period, but also to mid-term and final examination grades, which allows the student to control the implementation of the study plan and the achievement of the study results envisaged in the programme.

Regulation on Awarding Bachelor's and Master's Degrees, *Regulations for the Award of the Professional Bachelor's/Master's Degree and Professional Qualification*, *Regulations on Final Examinations* regulate the final examination process for awarding academic degrees, professional degrees/professional qualifications in all study programs implemented by TSI. The final examination papers are evaluated by the state/final examination commissions. After the defence of each thesis, a review of the thesis reviewer and an opinion of the supervisor is read. The final grade of the thesis is determined in a closed session of the commission as a result of the discussion based on the assessment of the commission members, taking into account the assessment of the reviewer and the thesis supervisor by a simple majority vote. In the event of a tie, the vote of the chairman of the commission prevails. The member of the commission who is the supervisor of the thesis being evaluated does not vote.

The analysis of students' achievements is carried out twice in the academic year after the end of each semester at the meetings of the faculty, the rector's office and academic meetings.

Attitudes of students towards study courses being attended are evaluated at the end of each semester by conducting an anonymous questionnaire about the quality of studies. The questions of the questionnaire offer to evaluate the following aspects: understandability and content of the lectures, competence and personal characteristics of the teaching staff, level of requirements, possibility to receive a consultation outside the study time, etc. The results obtained are discussed at the relevant departmental meetings, methodological and administrative meetings. Following the results of the meetings, measures aimed at improving the study process are developed.

In accordance with the Procedure for Submission and Review of the Appeal contained in the Study Regulation, the student may contest the assessment of any examination undertaken during the study process or the decision of the examination commission.

2.1.6. Description and assessment of the academic integrity principles, the mechanisms for compliance with these principles, and the way in which the stakeholders are informed. Specify the plagiarism detection tools used by providing examples of the use of these tools and mechanisms.

The Transport and Telecommunication Institute has developed *the Code of Ethics* . The Code of Ethics defines the basic principles of ethics and conduct for administrative, scientific, and research staff, as well as students, creating a favourable, respectful and responsible working environment at the Institute. The Code of Ethics includes core principles and standards of conduct to be complied with by students and employees in their attitude to the Institute, their work and in relations with their colleagues, clients and business partners.

The general principles of ethics are the principles of honesty and justice, responsibility and loyalty, respect and collegiality.

Specifically, the TSI Code of Ethics defines basic ethical principles for students:

- Honestly complete the selected program, obtain theoretical and practical knowledge and skills;
- Do not permit a discriminating attitude towards other students or employees, comply with the principles of honest competition, creating constructive dialogue for the settlement of disputes and conflict situations, and respect the opinion of other persons;
- Be honest in study work, do not permit plagiarism and other kinds of fraud;

and for the academic staff:

- Honestly and responsibly perform their work duties;
- Adhere to the respectful culture of mutual relations;
- The academic staff shall serve as an example for adherence to moral norms;
- Do not permit a discriminating attitude towards students and employees;
- Assess the work of students in a timely manner, fairly and in a reasoned manner and to respect the opinion of students;
- Admit errors and shortages made during the study process or assessment of students' work and settle disputes by direct and open negotiations;
- Avoid the imposition of personal likes or dislikes during the assessment of students works;
- Academic staff shall take care to ensure academic and professional honesty, without creating conditions for the manifestation of academic dishonesty, to follow up the development process of students' papers, do not permit plagiarism, copying and other unfair use of intellectual property or fraud;
- Respect the results of individual work of other colleagues and do not use them for personal purposes.

The Ethical Commission is established on the basis of an order which shall assess complaints regarding a failure to comply with the core principles of professional ethics and conduct. The

agenda of the Ethics Committee is regulated by Order No. 01-12.1/24 of May 9, 2017.

Students are introduced to the principles of academic integrity, adherence thereto during their studies, and any sanctions for non-compliance with these principles from the beginning of the study process in the first introductory lecture. The Personnel Department introduces employees to the Code, while employees confirm becoming acquainted with the Code with their signature. The Code of Ethics of the Institute is available to all students, employees of the Institute as well as the public on the Institute's webpage.

TSI conducts regular student surveys, and students have an opportunity to express their views anonymously on the professional level of lecturers and on adherence to the Code of Ethics. These results are taken into account when planning the improvement of lecturers' work quality.

TSI acts in accordance with the principles and rules of good faith and responsible conduct described in the *TSI Plagiarism Control Regulations* . The regulations set out the procedures for identifying plagiarism in the papers of TSI students, including self-plagiarism, and the criteria on the identification of violation and on the applicable sanctions.

For a long time, TSI used the Unified Computer Plagiarism Control System developed by the University of Latvia, which did not allow for full and high-quality checking of all students' papers and final theses for plagiarism, taking into account the rapid increase in the number of students studying and submitting final theses in English. At the beginning of 2020, TSI purchased a new anti-plagiarism program and since the end of May, all TSI faculty members and students have been using Turnitin®, the world's leading tool for correcting papers and preventing plagiarism.

TurnitIn® is integrated into the TSI e-learning system Moodle and provides a full service for submitting, correcting, determining the originality (plagiarism) of content and returning submitted papers. Upon submitting their papers to Moodle, students immediately receive the assessment of the TurnitIn® system on similarities of their papers with other sources.

As of May 2020, all theses of the TSI programs are checked by TurnitIn®, but a year later, after the approval of the new version of the Plagiarism Control Regulations, TSI started to check other papers for plagiarism, including all study course papers, written examinations of study courses and specific tests of study courses.

In the distance learning study format, the anti-plagiarism system fully checks all written submissions, including assessments within the course (such as essays, presentations, etc.). This is in accordance with *TSI Plagiarism Control Regulations* 6.4.7.: if the student refuses to accept the EULA of the anti-plagiarism system when uploading the work to the TSI LMS, the work is not evaluated and is considered unfinished. Lecturer includes in the general requirements for the performance of work the information on the content of paragraph 6.4.7. and informs students about these conditions.

The Plagiarism Control Regulations set out the procedures for determining the signs of plagiarism in each of these types of tests and course papers and the applicable sanctions and appeal procedures.

No plagiarism violations have been detected in the final theses in the study programmes.

2.2. Efficiency of the Internal Quality Assurance System

2.2.1. Assessment of the efficiency of the internal quality assurance system within the study field by specifying the measures undertaken to achieve the aims and outcomes of

the study programmes and to ensure continuous improvement, development, and efficient performance of the study field and the relevant study programmes.

The TSI Quality Management System covers the processes of higher education service provision and scientific activities. It has been designed, implemented and certified in accordance with the requirements of the ISO 9001: 2015 standard. The operation of the Quality Management System ensures the quality of the study process and results in all types of studies and in all programs of the Institute as well as the compliance of research and other types of scientific activity with certain requirements.

Study direction management includes the following quality management processes:

P11. Research of consumer demands and satisfaction

P12. Development of educational services

P13. Planning of the study process

P14. Preparation of study subunits

P15. Admission and registration of students

P16. Implementation of the study program

P17. Study attestation.

TSI internal managerial documents, which regulate the quality management processes are presented in Table 1.

Table 1. List of the managerial documents of the TSI quality management system, which are relevant to the management of the study area

Processes (indices)	Title of relevant managerial document
P11	Rules for surveying students, graduates and employers.
P12	Regulations on the management of the study fields and study programmes. Regulations on the management of study courses. Regulations on teaching methodological work. Regulations on the faculty.
P13	Regulations of Studies. Rules of the study procedure. Doctoral Regulations
P14	Regulations on the Department. Procedures for inviting foreign professors for their temporary academic and scientific activities at TSI.
P15	Admission rules
P16	Rules of the study procedure. Regulations on internships. Regulations on the organisation of the distance learning form of study
P17	Rules of the final examination. Regulations on the award of academic degrees and professional qualifications.

* See Appendix 2 for availability of documents.

The operations of the TSI quality management system for the quality assurance of study direction products and services include:

- development, implementation and periodic updating of internal guidance documents;
- planning and conducting internal quality audits;
- control over study directions and study program development, implementation and evaluation processes;
- identification, recording and analysis of non-conformities identified during the audits;
- analysis of complaints and recommendations made by students and other stakeholders;
- development, implementation and evaluation of corrective works;
- research of satisfaction by the TSI students, graduates, employers and university staff, analysis of survey data;
- research of the standards and other regulatory requirements in the field of education and quality management, monitoring of changes, conformity assessment;
- preparation of reports on the state and efficiency of the management system and presentation to the rectorate and the board.

The University is in the process of developing the necessary guiding documents based on the Annual Work Plan of TSI with the chapter "Development of the Normative Base. Quality Management". In order to improve the study programme, the Regulations on the Management of Study Courses, the Regulations on the Methodological Work of Teaching, the Regulations on the Management of Study Directions and Study Programmes, the Regulations on the Study Direction Council have been developed.

The guiding documents are available to staff and students in the Normative Document Database (in LOTUS) and on the TSI website. Their implementation ensures timely, transparent and efficient evaluation and updating of study programmes and study courses.

As part of the TSI quality management system, quality audits (process inspections) are regularly conducted. The procedure for conducting internal quality audits is described in Table 2.

Table 2. Procedure for Performing Internal Quality Audits (Inspections)

Explanations	Form of recording
1. Decision on the performance of audits: In the decision of the Board or in the instruction of the Chairman of the Board. The decision on the extraordinary audit should include details of the inspection terms, the sub-bodies to be inspected, the objectives of the audit (processes to be audited) and appointment of the head auditor.	Internal Annual Audit Plan; Instruction of the Chairman of the Board
2. When coordinating the audit programme, audit deadlines may be moved at the initiative of the heads of the sub-divisions being audited, if appropriate.	Audit Program
3. In preparation for the audit, the head auditor shall distribute the tasks among the members of the audit team (where such a team has been established). The auditors examine the governing documents regulating the work of the sub-divisions to be audited and formulate a list of questions. These questions are formulated on checklists. The auditors should be familiarised with the procedures for conducting quality audits and the rules for completing checklists in the courses for raising qualification.	Control Sheets

Explanations	Form of recording
4. Before the audit, the heads of the audited entities should familiarise the staff with the auditors and ensure the cooperation of the staff with the auditors. The auditors must have access to the data pertaining to the processes being audited. If there are any obstacles to the audit, the auditor shall immediately report to the head of the sub-division and, where appropriate, to the chairman of the board.	Entries in the Control Sheets
5. The auditors shall discuss the identified non-conformities with the staff and the head of the structural unit. Non-conformities shall be recorded in the minutes. The corrective actions agreed with the heads of subdivisions shall also be included herein.	Non-Compliance Protocols. Entries in the Non-Conformity Registry (LOTUS)
6. After coordinating the identified non-conformities and planned corrective actions with the auditee, the head auditor shall summarise the work of the auditors' task group and submit it to the chairman of the board not later than one week after the end of the audit.	Annual Report
7. The chairman of the board shall discuss the results of the audit with the head auditor and (where appropriate) the members of the board and the heads of the audited subdivisions. Following the outcome of the discussions, the chairman of the board may make changes and additions to the composition and content of corrective actions. These decisions shall take the form of orders from the chairman of the board. 8. All documents relating to the audit shall be forwarded by the chairman of the board to the head of the Quality Management System.	Orders of the chairman of the board, minutes of board meetings
9. The corrective actions and their effectiveness shall be checked in accordance with the Procedure for Handling the Non-Conformity Register.	In the Non-Conformity Register (LOTUS)

The annual plans of internal audits are discussed and approved by the Board. The audit objects include study processes, processes of resource provisioning and management processes of the study fields. The results of the audits are discussed at the meetings of the Rectorate meetings. The found deficiencies and the taken corrective measures are recorded in the Register of Nonconformities (LOTUS).

Based on the results of the audits, the activities of the Councils of Study Areas were improved, the management of study internships was adjusted, and the content of study course materials was adjusted. Errors in study course descriptions have been identified and corrected.

The annual self-evaluations of the study fields and study programmes are carried out in accordance with the Regulations on the Management of Study Fields and Study Programmes. The self-assessment reports are evaluated by independent experts, discussed by the Senate Committee and approved by the Senate. Decisions of the Senate on the approval of self-assessments include plans for improvement of the study programmes, including measures to improve the identified shortcomings. For example, during the last self-assessment of the field of the study, a decision was taken to make changes in the content of the study programmes in line with digitalisation trends in the transport and logistics sector.

The acceptance and registration of students' applications and complaints is regulated by the Regulations on the Procedure for the Handling of Complaints and Applications. Records of their consideration and decision-making are kept in the Register of Complaints and in students' personnel files. After considering the received complaints, the student service procedures in the Study Department were improved.

The periodic surveys of students, employers and alumni take place in accordance with the Regulation on Surveys of Students, Alumni and Employers. The results of the surveys are discussed at Academic Meetings. As a result of the discussions, the Corrective Work plans are approved based

on the survey results.

The criterion for the effectiveness of the quality management system is its compliance with the requirements of the international standard ISO 9001:2015. This is confirmed by TUV Rheinland certification and annual monitoring.

Each year/semester/quarter, the Management Review of the quality management system is discussed at the Board meetings.

2.2.2. Analysis and assessment of the system and the procedures for the development and review of the study programmes by providing specific examples of the review of the study programmes, the aims, and regularity, as well as the stakeholders and their responsibilities. If, during the reporting period, new study programmes have been developed within the study field, describe the procedures of their development (including the process of the approval of study programmes).

The procedure for designing, approving, revising and modifying the TSI study programs as well as the responsibilities of the respective employees and structural units are specified in the *Regulation on Management of Study Directions and Study Programs*.The regulation is in line with the laws and regulations in force in the country regarding the licensing of the study programmes and changes to the programmes.

The procedure for the development, assessment, registration and modification of the study course description and course teaching and methodological materials included in study programs are specified in the *Regulation on Management of Study Courses* .

Collective management of the study program design and implementation is carried out by the Study Direction Councils (SDC), which operate in accordance with the *Regulation of Study Direction Council* . The deans of faculties and heads of study directions are responsible for the SDC organisation.

In conformity with the student-centred education principles, the TSI students are involved in designing study programs, annual assessment and program improvement by acting in the Study Direction Councils, Faculty Councils, Senate Commissions, Senate via filling out the survey questionnaires. Graduates, employers and external experts also express their opinion on the program in surveys.

Supervision over the implementation of the study program and its quality is ensured by the director of the study program by assessing the study process, study results, analysing the results of student surveys, changes in labour market trends and topical issues in the sector and the world. To analyse and summarise the results of the survey of students, graduates and employers and organise the elimination of the identified deficiencies and improvement of the program.

New study programmes are developed in accordance with the TSI development strategy. Their necessity, usefulness and relevance to the development strategy are assessed by several TSI structural units and collegial bodies, including the Study Quality Council, Faculty Council, Rectorate and Senate.

The design, approval and implementation of the study program involves several stages:

- Program development application, which includes justification of the program topicality, summary, and graduates' employment forecast;
- Developing program content, by including the program planning, course descriptions, and independent expertise;
- Preparation, examination and approval of the licensing document package in the Senate;
- Submission of the licensing document package to an agency included in the European Quality Assurance Register for Higher Education, expert visit and receipt of the licence;
- Marketing activities, announcement of admission and student admission;
- Preparation and placement of the study materials in the e-learning environment Moodle in accordance with the *Regulations on Study Course Management*;
- Accreditation of a study program/study direction in an agency listed in the European Quality Assurance Register for Higher Education.

After the accreditation, in accordance with the Rector's order, an annual self-assessment report is prepared for the study programs and study directions, which includes an overview of the activities undertaken for the improvement of the study direction and which is approved by the Senate of the Institute. The task of the annual self-assessment process is to check the preservation of compliance of the study programs and study directions (content and resources) for the accredited study direction; check the validity and permissibility of the changes made in the study program and the respective study plans according to the effective regulations as well as assess the conformity of the study programs with the higher education institution strategy and the requirements for the quality and efficiency of the study programs.

The self-assessment of the study direction and study programs is prepared by the program director and the head of the study direction. Self-assessment reports are reviewed by the Study Council and approved by the Senate.

During the self-assessment of the study programs, proposals and decisions regarding the inclusion of changes in the study program plans and the need to coordinate changes in the study programs with the AIC Study Direction Accreditation Commission are discussed as well as a decision on the usefulness of the program conformity measures, development of new study courses and the modernisation of the existing courses, and provision of resources thereto. These proposals and decisions are discussed and approved by the Senate as recommendations for the changes and development of the study programs.

In order to analyse the study fields and to obtain feedback, TSI conducts the regular surveys. The procedure for organizing surveys in TSI is described in the document *Rules for organizing students', graduates' and employers' surveys*. The results of the surveys are analysed and included in self-assessment reports.

Strategic decisions regarding the development of specific study areas, licensing of new study programmes or the closure of study programmes are taken in the context of the development and approval of the University's strategy for the current period.

The vision of external stakeholders (industry companies, associations and cooperation partners), labor market research, etc. is taken into account in the development of the strategy. The field of the study "Transport Services" was presupposed to develop and continue to implement one Bachelor and one Master level programmes, improving them in line with the current trends of the labour market.

2.2.3. Description of the procedures and/or systems according to which the students are

expected to submit complaints and proposals (except for the surveys to be conducted among the students). Specify whether and how the students have access to the information on the possibilities to submit complaints and proposals and how the outcomes of the examination of the complaints and proposals and the improvements of the study field and the relevant study programmes are communicated by providing the respective examples.

The procedure for submitting and reviewing student complaints and proposals is set out in the *TSI Regulations for the Admission and Examination of Student Complaints and Proposals* and the requirements for filing and reviewing appeals are additionally prescribed in by the *Rules of Study Procedure*

In accordance with the internal procedure, students may submit complaints and recommendations to the Study Department, which ensures that complaints and recommendations are registered and forwarded to the responsible department and official in accordance with the *Procedure for the Acceptance and Examination of Requests.*

Complaints and recommendations can be submitted by students in person or by e-mail by sending them to the Study Department e-mail or by filling in an electronic form on the TSI Intranet or else by sending them by post.

Complaints and recommendations received by the Study department are registered in the section *Complaints and Recommendations* of the Register of Applications, which is later supplemented with the information on the result of examination of the application and the decision taken. Complaints and recommendations are processed within 7 business days.

The Study department communicates the decision taken in writing to the person submitting the complaint or recommendation (for information) and the appropriate official (for execution). The registered complaints and recommendations are regularly reviewed and analysed by the Quality Department staff. Where complaints indicate significant deficiencies in the quality assurance system for education services, they are recorded in a register of non-conformities, and the development and implementation of corrective actions is organised in accordance with the rules for maintaining this register.

Immediately after matriculation, Welcome Week events are held for students, during which the students are introduced to the TSI structure, its officials, Student Self-Government, information system, library, regulatory documents and their availability, etc. All Welcome Week informative materials in the form of presentations are permanently available to students in the e-learning environment. These materials also provide links to the TSI regulatory documents and explanations, including the possibility for students to submit complaints and proposals. The document itself, the *Regulations on the Procedure for the Reception and Handling of Student Complaints and Proposals* is published on the TSI website and is available to the students on a permanent basis:

TSI has not received many students' complaints because problematic situations are usually handled and resolved via negotiations. In the previous academic year, no complaints were received. In the academic year 2021/2022 there were 2 complaints (in a different field of the study), both were related to the restrictions imposed by COVID-19, since the complainants were not vaccinated.

2.2.4. Provide information on the mechanism for collecting the statistical data, as developed by the higher education institution/ college. Specify the type of data to be

collected, the regularity of collection, and the way the information is used to improve the study field. Describe the mechanism for obtaining and providing feedback, including with regard to the work with the students, graduates, and employers.

TSI collects data on general statistical products characterizing the higher education institutions. The obtained information and data are used to find out the strengths and weaknesses of the study process and to improve the programmes implemented in the study field accordingly. The following information and data are collected:

- The number of received applications and matriculated students in the 1st year and senior years by study programme, language of instruction and home country. Based on the admission results, the possible reasons are analysed and changes are made in the marketing activities of the study programme. The information is reviewed at meetings of academic and collegiate bodies, included in self-assessment reports.
- The total number of students, including the student's status (active, inactive), by language of instruction, study programme, study level, study form and types; the number of students who obtained the degrees and /or qualifications; dropouts and their reasons. The information is reviewed at meetings of academic and collegiate bodies, included in self-assessment reports.

For simple and convenient obtaining of various reports, which characterize the course of the students' studies, the university has developed a special e-resource, which allows the responsible officials to obtain the necessary original reports easily and conveniently. Data collected in this way can be easily used for further processing.

- Analysis of the results of questionnaires on the satisfaction of students and graduates with the implementation of the study programme (content, quality of lecturers' work, objectivity of the evaluation system, availability of the information, career opportunities); analysis of the graduates' employability, which is discussed at the meetings of the academic and collegiate bodies and included in self-assessment reports.
- The results of the final theses of the programmes, the information is examined at the meetings of the academic and collegiate bodies, included in the self-evaluation reports.
- The students' success – the final evaluations of the courses. Student performance indicators are monitored at the faculty level according to the session results, data are collected once a semester. Success statistics are used to clarify the need for possible changes in the study course evaluation system, study course content and teaching in general.
- Analysis of academic staff's work efficiency (assessed in the connection with the election for the academic position, according to the results of surveys, at the end of each academic year the achievements in the scientific research are assessed).
- Analysis of the available study funds and their costs.
- Analysis of TSI core performance indicators, described in more detail in the financial section.

According to the results of the data analysis, the necessary improvements for the implementation of the study programmes and the organisation of the study process are determined.

Feedback analysis

In order to assess the satisfaction of students, graduates and employers with the study results and to take the necessary measures to improve the study programmes, TSI organises surveys. The procedure for organising surveys is described in the Rules for organising surveys for students, graduates and employers.

The students' survey in electronic format with further analysis of the survey data is organised at the university once a year in the beginning of the spring semester in 2 stages:

- *Survey on the students' satisfaction with studies.* The purpose of the survey is to obtain the students' general assessment of the study programme and the study process, for further improvement of the programme, improvement of the quality of the study process and the study environment.
- *Survey for researching the opinions on study courses*. The purpose of the survey is to find out the students' opinion about the content of study courses, including the study practice and coursework, and to get an evaluation of the work of the academic staff.

Based on the results of the survey, a corrective action plan is developed, discussed and implemented.

The procedure for organising the student surveys is currently undergoing changes, assuming that the students answer electronically to the survey questions immediately after completing each course of the study. The Regulations will be amended once the relevant changes have been made to e.tsi.lv. According to the new procedure, the survey is expected to start in the spring semester of 2024.

Survey to receive the opinion of foreign students at the beginning of their studies. The purpose of the survey is to find out the satisfaction of the foreign students matriculated in the 1st year with the services of the agents used and the work of the TSI admission commission, in order to develop the recommendations for improving the quality of the admission process based on the received feedback.

A survey to receive the opinion of the TSI graduates about the educational programme. The survey is organized at least once every two years. The purpose of the survey is to find out the opinion about the relevance of the knowledge, skills and competences acquired during the studies to the professional activity, as well as about the plans for continuing the studies.

A survey to receive the employers' opinions on the preparation of TSI graduates. The survey is organized at least once every two years. The purpose of the employers' survey is to find out how employers assess the compliance of the knowledge, skills and competencies acquired by the TSI graduates with the requirements of the labour market. As a form of surveying the employers, not only questionary is used, but also direct interviews, which are conducted by the Corporate Clients Department during meetings with the representatives of various companies, and round table discussions.

The results of the surveys are reviewed during the Rectorate, Faculty Councils, Study Direction Councils and are summarised in the annual self-assessment report of the study direction. Thus, the study program with the study courses is updated every year according to the students' assessment. Students' survey results are used by:

- teaching staff: for the assessment of their professional skills and for the enhancement of their study courses;
- study program directors: for the enhancement of the content of study programs and courses;
- deans: for the assessment of performance of the teaching staff and planning activities for the improvement of the professional qualification of the teaching staff,
- rector and academic and scientific vice rector: for determining remuneration of the teaching staff and enhancement of the quality of the studies at the overall level of the Institute.

In recent years, 30-35% of the students complete survey questionnaires.

Following the questionnaire, students are informed of the survey results, impact of their responses,

the actions taken and planned and the changes brought about by the recommendations made in the questionnaires. Students receive information during a specially organised general meeting.

According to the point of view of graduates and employers, the training provided by the faculty programmes is generally in line with the labour market requirements.

2.2.5. Specify the websites (e.g., the homepage) on which the information on the study field and the relevant study programmes is published (in all languages in which the study programmes are implemented) by indicating the persons responsible for the compliance of the information available on the website with the information published in the official registers (State Education Information System (VIIS), E-platform).

Full information on the study programs implemented at the Institute is published on the TSI website at www.tsi.lv in accordance with the accreditation pages of the study direction, program licenses and information included in the National Education Information System.

For each program, the name of the program, obtained degree/qualification, program volume in credit points, type and form of studies, language of implementation, program director and contact information, admission requirements, program annotation, learning outcomes, possible career areas, program structure in the form of study courses, tuition fee, graduate references and other program-specific information are listed on the program website.

All information about the programmes on the TSI website is published in the languages of instruction, except for registration, accreditation sheets, certificates, and other documents that are not translated. Information about the programmes in the Latvian and foreign languages: https://tsi.lv/lv/study_programmes/

Information about the programmes in English: https://tsi.lv/study_programmes/

The Director of each study programme is responsible for publishing the study programme information on the website of TSI, and the Academic Quality Assessment Department is responsible for the compliance of the published information with the information available in the official registers (VIIS (State Educational Information System) and E-platform).

All research activities of TSI are administered, supported, recorded and documented by the staff of the Research Administration Department, who compile them in an internal database. In addition, the department is responsible for updating the information in the National Information System on Scientific Activities *sciencelatvia.lv.*

2.3. Resources and Provision of the Study Field

2.3.1. Provide information on the system developed by the higher education institution/ college for determining and redistribution of the financial resources required for the implementation of the study field and the relevant study programmes. Provide data on the available funding for the scientific research and/or artistic creation activities, its sources and its use for the development of the study field.

As a higher education institution with private capital, TSI supports its operations with its own revenues. Own revenues form up to 95–98% of the total financing, with the other financing of up to 2–5% coming from the implementation of various Latvian and EU funded projects.

The tuition fee is covered by the funds of individuals or legal entities, typically employers. Students have the option to apply for study loans with a state-provided guarantee, commercial loans, or funds from sponsors. TSI provides necessary consultations for obtaining loans and accepts applications for study loans.

The amount of tuition fees for each academic year shall be determined and approved by an order of the Rector. The tuition fee payment procedure is laid down in the Regulation of the tuition fee payment procedure, which provides the possibility to pay tuition fees for the whole study programme, for one academic year, for one academic semester or as a monthly payment (starting from the 2nd semester)

Due to the fact that most of the TSI total funding comes from tuition fees and most of its total costs are staff expenditure, the decrease in the number of students and the decline in staff professionalism and loyalty may have the destabilizing effect on the TSI financial position. Consequently, TSI, as an institution with private capital, implements various activities and measures aimed at achieving the set objectives persistently and purposefully and carries out planning of its activities, control and analysis of the implementation of the plan.

In accordance with the Financial Management and Accounting Policy, which was approved on 10.12.2020. with the order of the chairman of the board No. 01-20.2/264 (available in the TSI accounting system Lotus), TSI budgeting is carried out both in the short-term (for a calendar year) and in the long-term (up to 5 years), separately creating the budgets of Financial Responsibility Centers. 2 budgeting approaches, top-down and bottom-up, are used in creating the budget, but primarily using the top-down approach in order to be able to determine the priority sectors and areas of activity, as well as to allocate funding according to the strategic vision of TSI development and to determine the work performance indicators for each area of activity.

In accordance with the Financial Management and Accounting Policy, the Faculty of Transport and Management has been designated as a separate Financial Responsibility Centre (FRC). A separate budget is established for the faculty based on defined directions of operation in accordance with the TSI strategic vision; monthly reports on budget implementation are submitted to the Dean of the Faculty, and explanations are given on the reasons for significant deviations and risk mitigation. The general budget of the faculty includes direct income and direct expenses. The main source of funding for the faculty and therefore the study program is the revenue obtained from the tuition fees and related supplementary service fees, which are covered by the funds of natural and legal persons. The amount of the tuition fee and additional service fees is reviewed annually, taking into account market trends and cost prices, and is approved by an order of the Board.

Cost price is one of the management tools of an organisation which can be used for the analysis of its operations and decision-making. A finance module has been developed for calculating the cost of TSI study programs, with built-in activity based costing (ABC) that is used to assign cost to each activity (service or process) and allows to precisely determine the cost of the activity. The finance module allows deans not only to receive information about the cost of a program, but also to make planning and forecasts using the conditions of different scenarios. All programs implemented at the faculty are cost-effective.

All programs implemented at the faculty are cost-effective. The results of implementation of the

study programs indicate that resources used in the program implementation have been necessary and have been used efficiently.

Average costs in 2023

	Professional Bachelor's study programme "Transport and Logistics"	Master's study program "Intelligent Transport and Smart Logistics"
Average number of students	332	37
Average revenue per 1 student, EUR	1 483,61	2 073,90
Average expenses per 1 student, EUR	476,24	674,85
Profit/loss per 1 student, EUR	1 007,37	1 399,05

Percentage breakdown per student

No	Expense item	Professional Bachelor's study programme "Transport and Logistics"	Master's study program "Intelligent Transport and Smart Logistics"
1.	Wages and taxes	56%	57%
1.1.	including academic staff	30%	33%
1.2.	including administrative staff	26%	24%
2.	Development and implementation costs of study programs	8%	8%
3.	Teaching materials and other similar expenses	7%	9%
4.	Costs of scientific infrastructure and other similar expenses	8%	14%
5.	Advertising and marketing expenses	8%	2%
6.	Infrastructure costs (including IT expenses)	7%	7%
6.1.	Including utilities	5%	5%

6.2.	including maintenance costs	1%	1%
6.3.	Including IT expenses	1%	1%
7.	Depreciation and amortization	1%	1%
8.	Other administrative expenses	5%	2%

The main item of expenditure is labor and taxes, constituting from 57% to 59%, of which 30-33% is for academic personnel's remuneration and taxes. The next item is the expenses for scientific infrastructure and similar expenses, which range from 8-14%, allowing the strengthening of TSI's scientific laboratories and the capacity of other facilities, concentrating research resources. The expenses for the development and implementation of study programs constitute about 8% of the total costs and include accreditation of programs, engagement of external consultants, experts, and industrial partners for the development of the program development plan, as well as other expenses aimed at the development of study programs.

Every year, the TSI budget allocates funds to promote the research activities of faculties and their lecturers, specifically, to pay for publications and conferences, exchange visits as well as for international cooperation activities and membership fees. The budget for these purposes is planned based on the development and professional growth plans of each faculty and faculty staff.

At the beginning of each academic year, in September, the dean of the Faculty submits a plan for the academic research of the teaching staff to the Research Administration Division, which includes the plan in their budget.

The types, amount and procedure of payment for the scientific activity are specified in *the TSI Remuneration Rules for Academic Staff* (approved on 22 June 2021 in the TSI Senate sitting, protocol No. 01-7/11, available in TSI record-keeping system), defining the following types of separately payable research work for academic staff, such as supervision of doctoral thesis, review of the papers of TSI Scientific Conference's (RelStat/MIP/RatSif) participants, review of abstracts and articles for the TSI *RelStat* conference, publications in journals and conference proceedings included in the cited databases *WoS, SCOPUS* ***, publications in journals and conference proceedings included in the cited databases *ERIH, Engineering Village2, EBSCO***, review of articles based on the outcomes of the *RelStat* conference (participation with a report), review of articles for the TSI journal *Transport & Telecommunication*, patent registration.

The library budget allocates financial resources to the acquisition of study literature and scientific literature and expansion of library resource funds on the basis of orders submitted by the Financial Responsibility Centres. These orders in turn meet the objectives set out in the development plan of the Financial Responsibility Centres.

Much attention is paid to the possibility of raising additional project funds aimed at increasing the scientific and academic capacity.

- From 2018 to 2021 within the framework of the project "Strengthening the academic staff of Transport and Telecommunication Institute in the areas of strategic specialisation", No. 8.2.2.0/18/A/011, with a total budget of EUR 666 097. 02 there were recruited 9 foreign faculty members (14 in total at the university) to teach study field programmes, who read a total of 27 study courses and prepared the content of 9 study courses for distance learning, as well as allowed 17 faculty members of the study field to participate in internships in the companies of industry in the amount of 200 academic hours, and to improve their knowledge of English.

- From 2017 to 2020 within the framework of the project "Modernisation of STEM study programmes at Transport and Telecommunications Institute" 8.1.1.0/17/I/009, with a total budget of EUR 1246177. 44, there were modernised 3 classrooms by investing in the renovation works and equipment; 2 new laboratories - Industrial Robotics Laboratory and Mobile Robotics Laboratory - were created, and 1 existing laboratory was modernised; practical training facilities and equipment for the needs of STEM programmes were modernised; the IT infrastructure was improved and the library collection was supplemented with electronic literature and printed publications.
- In 2015, within the framework of the project "Development of the Institutional Capacity of Transport and Telecommunication Institute", No. 2DP/2.1.1.3.3.3./15/IPIA/VIAA/006, with a total budget of EUR 113 036, according to the recommendations of the external assessment of science, the TSI development strategy and the research programme were developed, the Institutional Development Plan and the Human Resources Development Plan were elaborated, cooperation between Latvian and foreign scientific institutions, higher education institutions and employers was improved.
- From 2010 to 2013 within the framework of the project "Information and Communication Technologies as a Common Academic Resource at Transport and Telecommunication Institute" No. 2010/0180/3DP/3.1.2.1.1/09/IPIA/VIAA/023, with ERDF funding of EUR 2.08 million and TSI contribution of EUR 0.37 million, the Centre for Telecommunications, Electronics and Robotics with 11 equipped laboratories were created; thee were also purchased and installed the lifts and the reconstruction and renovation of the TSI building was implemented.
- PostDoc project "Spatiotemporal urban traffic modelling using big data" (1.1.1.2/VIAA/1/16/112)
- PostDoc project "Nontraditional regression models in transport modelling" (1.1.1.2/VIAA/1/16/075)
- PostDoc project „Integrated Model for Energy Generation, Distribution and Management" (1.1.1.2/VIAA/1/16/095)
- PostDoc project "Model of Smart Economy in a Smart City" (1.1.1.2/VIAA/3/19/458)

2.3.2. Provide information on the infrastructure and the material and technical provisions required for the implementation of the study field and the relevant study programmes. Specify whether the required provision is available to the higher education institution/ college, available to the students, and the teaching staff.

The study program in Riga is implemented on the study premises with a total area of 13,567.10 m2, located on 1 Lomonosova Street. Currently, the TSI auditorium fund includes 12 lecture halls, 10 computer classes, and more than 20 classrooms for practical and laboratory classes. The study and research area is 9638 m2, the sports and recreation area is 2879 m2.

The study premises have undergone a modern reconstruction using the Institute funds. From 2011 to 2016, during the TSI project Information and Communication Technologies as a Single Academic Resource at the Transport and Telecommunication Institute (Agreement No. 2010/0180/3DP/3.1.2.1.1/09/IPIA/VIAA/023), building construction works were carried out, and the building

infrastructure was adapted for persons with functional disabilities: lifts were purchased and installed; the internal and external stairs were adapted for persons with disabilities; sanitation facilities were renovated and adapted for persons with disabilities.

As of January 2017, TSI students have access to a fully renovated and equipped gym that offers classes in a variety of sports. Students can choose sports activities according to their interests as well as practice sports in additional sessions.

During the project *Modernisation of STEM Study Programs at the Transport and Telecommunication Institute*, contract No. 8.1.1.0/17/I/009, classrooms of 656 m^2 on the 2nd floor were renovated (auditorium No. I - 170 seats, No. II - 216 seats and No. III - 170 seats). Renovations included repairs, insulation, heating, improvement of ventilation and air conditioning systems, power and fire protection, acoustic solutions, and furnishing the auditoriums. Outdated servers were also replaced - servers with study data and servers supporting the study process (providing e-mails to students and the distance learning system *Moodle*), the Multimedia Lab was updated (video lectures and other materials for on-site, off-site and distance learning departments were recorded), the Library fund was expanded. In April 2019, the Library's electronic reading room (72 m^2) with 30 user sites was opened. The e-library has workstations with 15 desktop computers, as well as 15 working sites for personal smart devices. An individual electrical connection is provided for each working site.

Provision of TSI with classrooms in Riga, 1, Lomonosov Street is provided in Appendix 9

The TSI physical IT infrastructure consists of

- TSI computer network, located in the study blocks in Riga, which are connected with IPsec VPN. More than 500 computers and other network devices are connected to the TSI computer network
- TSI data centre infrastructure located on 1 Lomonosova street in Riga: 25 physical servers, RAID, Hyper-V virtual server infrastructure with more than 25 virtual servers, backup power system, cooling, data backup infrastructure
- IT hardware and systems monitoring system Nagios (Centreon), Zabbix, MS SCCM with more than 500 monitored devices and services
- Computer network security is ensured by PaloAlto's New Generation network screen
- 3CX phone infrastructure maintenance and support for 100 connections
- Video conferencing system for online lectures
- E-mail system maintenance - employees use an Exchange server which offers calendar and contact management and provides a convenient tool to work with electronic mail; students are provided with Office 365 cloud service;
- MS Active Directory-based maintenance of an electronic identity management infrastructure (one username and password for all centrally maintained IT systems)
- Maintenance of a file server
- Maintenance of computerised workstations and computer classrooms (450 computers, 125 printers, scanners and other devices)
- Maintenance of classroom equipment - 35 rooms with stationary equipment, 25 projectors, also including preventive maintenance of the equipment
- Classrooms provide the necessary support for video recordings of the lectures, online lectures and lectures in classrooms with sophisticated multimedia equipment
- Self-service copy/print/scan system
- A software server that enables students to work remotely with the software used by TSI.

An IT support service is available to ensure the uninterrupted availability of IT resources throughout the learning process.

A secure wireless computer network is available in all TSI buildings. Students can connect to a wireless computer network that is protected by the PaloAlto New Generation Firewall.

Virtually all lecture halls are equipped with visual display equipment, and all lecture halls are equipped with high-power stationary video projectors or large television sets. There are 10 computer rooms equipped with computers intended for the study process

TSI offers its students to use *Office 365*, which provides the opportunity to use the full Microsoft Office, OneDrive file storage at no additional cost. While students are studying at TSI, they have access to all the software they need for a successful study process. The student can install the *Microsoft Office* applications - *Word, Excel, PowerPoint, OneNote* - on five computers (*PC* or *Mac*) and five mobile devices (for example, smartphone, laptop and tablet). The student can use *OneDrive* 1 TB for automatic synchronization of devices.

All classrooms are equipped with a student registration system for classes, which allows to automatically register students attending lectures and control attendance.

The laboratories of TSI provide the access to equipment and special software purchased for scientific research purposes. The Laboratory of Applied Research and Modelling (SimLab) is a multidisciplinary scientific research laboratory providing TSI students, faculty and researchers with access to the software products, some of which are unique. The range of software is wide, from simulation modelling tools: PTV VISSIM & VISUM – software for modelling the transport flows; AnyLogic – universal modelling software; Aris, BPWin, Busines Object – business process modelling software; finally, the software for data processing and mathematical calculations: R, SPSS, STATISTICA, MatLab, Mathematica and others. The main objective of the laboratory is to provide students, researchers and faculty with an access to the software, as well as to provide consultations on the use of the software. In addition, the laboratory is used for the implementation of scientific projects and contract research.

Two research clusters were opened at the Faculty of Engineering in the 2020/2021 academic year: the Data Analysis and Artificial Intelligence Research Cluster (DAAI) and the Systems Analysis and Modelling Research Cluster (MADSYS).

In 2021, the Institute of Transport and Telecommunications opened the Innovation and Entrepreneurship Center iDEAHUB, which ensures the implementation of the project "Innovation Grants of the Institute of Transport and Telecommunications for Students" /iDEAHUB (No. 1.1.1.3/21/A/006), providing for activities such as free training and innovation project competition (see Section chapter 4.5 for more details)

2.3.3. Provide information on the system and procedures for the improvement and purchase of the methodological and informative provision. Description and assessment of the availability of the library and the databases to the students (including in digital environment) and their compliance with the needs of the study field by specifying whether the opening times of the library are appropriate for the students, as well as the number/ area of the premises, their suitability for individual studies and research work, the services provided by the library, the available literature for the implementation of the study field, the databases available for the students in the respective field, the statistical data on their use, the procedures for the replenishment of the library stock, as well as the procedures and possibilities for the subscription to the databases.

The main goal of the library is to ensure the availability of the collection, electronic resources and information systems for the university students, staff and every user of the library.

The Library Terms of Use regulate the service and provision of services, determine the duties, rights and responsibilities of the users of the library, the premises, the system and the equipment.

Three qualified employees work in the library: the library manager and two librarians.

Key statistic indicators of the library (year 2022):

- Number of users – 814
- Number of visits – 1899
- Number of remote users – 2568
- Number of publications (print resources.) – 783
- Number of issues (e-resources) – 3832

The library premises are in good technical and visual condition. The total area of the Library premises is 308 m^2. Of these, the rooms available to users are 117 m^2, storage rooms are 171 m^2. The library's electronic reading room (72 m^2) with 30 user seats is ergonomically designed. The students can independently use its equipment and have access to e-resources for learning and leisure time. The reading room has workstations with 15 stationary computers, as well as 15 workstations for personal devices. Each workplace has an individual electricity connection

The working hours of the library are optimal, they are chosen based on the users' flow measurements and in accordance with the schedule of the study plans, providing services to both full-time and part-time students.

Working hours of the library service:

	Collections	E-reading room
Monday	10.00 - 18.00	8.00 - 21.00
Tuesday	10.00 - 18.00	8.00 - 21.00
Wednesday	10.00 - 19.00	8.00 - 21.00
Thursday	10.00 - 19.00	8.00 - 21.00
Friday	10.00 - 16.00	8.00 - 21.00
Saturday	10.00 - 14.00	8.00 - 17.00

User support and services

The library provides services to the Institute students, academic and general staff, and any user in the country in accordance with the *Regulation on the Use of the Library*.

Basic free library services are available to all library users:

- Providing textbooks for reading at home
- Lending books from scientific collections

- Library and e-library services
- Self-service copying/printing of materials (paid service)
- Interlibrary loan services
- Consultancy on the use of digital resources
- Consultancy on the search for thematic information in electronic resources
- Assigning ISBN/ISSN numbers
- Purchase of books published by TSI (paid service)
- 19-user computers
- Wireless Internet connection.

Provision of information resources

The university library centrally provides the TSI study process and scientific research activity with the quality information resources and services in accordance with the goals and tasks set by the institute.

Collection of the library information resources (2022):

1. Collection – 28,546 documents, of which:

- books – 23,863 copies. 1 900 titles of the books (2 890 copies in total) are intended for the specific needs of the Transport services direction, which is ~ 12% of the entire collection. Of these, about 55% of the books are in English. There are 3 415 titles of books (7 245 copies in total) available for students studying in the fields of Management, Economy, Finance and Marketing; these courses are included in the direction of Transport Services;
- e-books – 2 780 copies, and several hundred titles of e-books specific for the needs of the Transport services sector. For instance:

- *Kern, J. Mac S. 2021. The Digital Transformation of Logistics : Demystifying Impacts of the Fourth Industrial Revolution, John Wiley & Sons, Incorporated;*
- *Hossain,I Ullah, N., 2023. Data Analytics for Supply Chain Networks,;*
- *Kramarz, M., Dohn, K., Przybylska, E., Jonek-Kowalska, I. Urban Logistics in a Digital World : Smart Cities and Innovation; Springer International;*
- *Vandeput, N., Data Science for Supply Chain Forecasting, Walter de Gruyter GmbH.*

As well as in Management, Economics, Finance and Marketing sectors, for example:

- *Strohmeier, Stefan, 2022,. Handbook of Research on Artificial Intelligence in Human Resource Management, Edward Elgar*
- *Eisen, P.,2013. Accounting, Kaplan Publishing.*
- *Wang, Peijie, 2020. The economics of foreign exchange and global finance, Springer*
- *Kucuk Yilmaz, A.Flouris, T. 2017. Corporate Risk Management for International Business, Singapore, Springer;*
- *Kucuk Yilmaz, Ayse.; Flouris, 2017. Corporate Risk Management for International Business, Springer;*
- *Jelassi, Tawfik.; Martínez-López,2020. Strategies for e-Business : concepts and cases on value creation and digital business transformation, Springer.*

- periodicals – 1808 copies. The students of the field of the study *Transportation Services* have access to scientific journals in the Library, both in printed and electronic form (part of the journals), using the Library electronic catalogue, as well as the University website. For example:

- *Transport Journal;*
- *IEEE Inteligent Transportation Systems;*

- *Reliability and Statistics in Transportation and Communication (Abstracts of International Conference);*
- *Transport and Telecommunication;*
- *Harward Business revie;*
- *Academy of Management.*

2. Subscribed databases (2023):

- The Academic Complete e-book database contains a specialised collection of Civil Engineering books, which contains over 180 000 titles, including more than 750 specific scientific books in the Transport and Logistics collection. For example:
- *Miller, T, & Liberatore, MJ (2020). Logistics Management : An Analytics-Based Approach,* Business Expert Press, New York. Available from: ProQuest Ebook Central;
- *Elbert, R., Friedrich, C., Manfred Boltze and Hans-Christian Pfohl (2020). Urban freight transportation systems. Amsterdam, Netherlands ; Cambridge, Ma: Elsevier;*
- *Zsidisin, GA, & Henke, M (eds) 2019, Revisiting Supply Chain Risk, Springer International Publishing AG, Cham. Available from: ProQuest Ebook Centra;*
- *Attard, M. and Yoram Shiftan (2015). Sustainable urban transport. Bingley: Emerald,*

As well as in Management, Economics, Finance and Marketing sectors:

- *Zukof, K., 2023. The Hard and Soft Sides of Change Management : Tools for Managing Process and People, Association for Talent Development;*
- *Randolph-Seng,B.,Gupta, M. etc. edit., 2022. Analytics for Business Decisions, Emerald Publishing Limited;*
- *Guzman,F., Veloutsou,C, Christodoulides,G.,2022. Luxury Marketing and Branding,* Emerald Publishing Limited.
- *Science Direct.* Multidisciplinary database from the publishing house Elsevier. Contains full texts from 4 604 titles of journals published by Elsevier, several of which are thematically relevant to the Transport Services field, which allows TTI academic staff, researchers and students to use high quality and reliable scientific information in the process of development and research of their study papers. For example:
- *Transportation Geotechnics;*
- *Transportation Research;*
- *The Asian Journal of Shipping and Logistics;*
- *European Management Journal;*
- *Journal of Digital Economy;*
- *European Journal of Political Economy;*
- *Advances in Accounting.*

SCOPUS is Elsevier's multidisciplinary database of scientific publications and bibliographic citation information. information from SCOPUS is used to support the scientific and research work in TTI.

- In addition to subscribed scientific databases, the students of *Transport and Logistics* are encouraged to use a number of *Open Access* scientific databases and resources. For example:
- Civil Engineering database;
- CORE;
- Directory of open access Books (DOAB);
- Directory of open access Journals (DOAJ);
- Cooge Scholar;
- Index Copernicus; Open Aire u.c.
- The following *Open Access* journals in the field of the transport and logistics industry are also

recommended for the students of the programme:

- European Transport Research Review (Springer);
- IEEE Open Journal of Intelligent Transportation Systems (IEEE);
- Journal of Transport and Land Use (JTLU);
- Journal of Environmental Protection (Scientific Research Publishing);
- Smart Grid and Renewable Energy (Scientific Research Publishing);
- Journal of Transportation Technologies (Tailor&Francis);
- Journal of Shipping and Trade (Springer);
- Open Journal of Optimization (Scientific Research Publishing);
- Open Journal of Safety Science and Technology (Scientific Research Publishing);
- Urban, Planning and Transport Research (Tailor&Francis);

As well as in Management, Economics, Finance and Marketing sectors:

- European Research on Management and Business Economics;
- Future Business Journal;
- Journal of Marketing Management.

Provision of accessibility:

- The library electronic catalogue contains the records of the printed and electronic resources in the collection. Access to the catalogue from the library website http://lib.tsi.lv;
- The users have the opportunity to access remotely their virtual account and reserve the information resources;
- E-books can be read online or downloaded to the user's device. Books are available in EPUB and PDF formats;
- The database of works published by TSI lecturers has been created and regularly updated at the university http://research.tsi.lv/index.php?option=com_jresearch&view=publicationslist&Itemid=64&lang=en/
- Instructions for using the electronic book collection and electronic resources are posted on the library website;

- It is possible to contact the library staff remotely and to ask questions about the use of electronic books and e-resources ;
- The library regularly organises trainings for the academic staff and students to work with the electronic resources, including the foreign lecturers who represent the largest database publishing organisations. Since the beginning of 2020, these classes are held remotely. In total, 13 classes were organized in 2022, which were attended by 71 interested parties.

Principles of creating library collections:

- In cooperation with the TSI Library Council, a collection policy was created, which, in accordance with the TSI Development Strategy, determines the priority collection directions;
- At the beginning of the calendar year, the faculties fill out a uniform format of requests for the purchase of books and e-books, according to which the library purchases and processes the resources;
- Since 2018 requests are also accepted for the purchase of electronic books;
- Regular consultations with the academic staff and TSI management are held regarding the renewal and addition of the library collection, including electronic resources;
- Every year in October, faculties are invited to review the list of subscribed periodicals and to put forward the proposals for the subscription of periodicals for the next year.

- Information on the latest purchased resources is placed on the TSI library portal and sent out as electronic information to all TSI employees and students;
- Users are regularly offered trials of scientific databases.

2.3.4. Provide a description and assessment of information and communication technology solutions used in the study process (e.g., MOODLE). If the study programmes within the study field are implemented in distance learning, the tools specially adapted for this form of study must also be indicated.

Students and lecturers are already provided with a well-developed IT infrastructure and a virtual study environment.

To submit an application for studies and documents for admission, applicants use the Admission system, which is an Internet portal and is available worldwide. Applicants apply for admission, upload the necessary documents, which are then processed by the department staff. The system is also used to communicate with the applicants.

When an applicant becomes a TSI student, he/she receives a personal username and password to access the TSI information resources. Access to the personal cabinet is via *mans.tsi.lv*, where personal information is available (contact information, information about contracts, finance), schedule of lectures, study plan for the entire study period with the obtained evaluations of the study works and final evaluation of the study courses. This is the primary student resource that links to other TSI resources available to the students.

The e-study environment or Moodle platform is used as a tool for organising the study process in each study course. The mandatory teaching methodology set for each course, is defined in the Study Course Management Regulations; it must be placed on Moodle, and is as follows:

- description of the study course;
- tasks for the independent works planned in the study course;
- samples of independent work (if available);
- self-test tasks, exam questions;
- other learning materials used for independent learning of the study course (lecture materials, presentations, various additional materials, etc.)

In the TSI LMS(e.tsi.lv) environment, learning materials are exchanged and students communicate with the lecturer, individual works and tests are submitted, etc. The students and academic staff can access the internal and external regulatory acts, methodological instructions for the development of the final exam papers, practice programmes and other practice documents, application forms, etc., which are available here; current information about the student life and upcoming events is published here. Environment is available 24 hours a day from anywhere with the internet access.

Big Blue Button, an open-source web conferencing system linked to TSI LMS(e.tsi.lv), is used for the remote classes. Built for online learning, this system supports the real time audio, video, slides, chat, and screen sharing. In addition, instructors can record their lectures and later play back their content to share with the students. On the other hand, the Online Classroom function of the system allows registering the participants of the lecture, and thus gives the opportunity to control the participation of students in the lecture.

It is also possible to access the TSI LMS(e.tsi.lv) system from mobile applications, which expands the possibilities of using this system. A separate enviroment is designed for distance learning students (distant.tsi.lv).

The current schedule of classes and consultations, news and contacts of the TSI structural units and academic staff are also available to students and employees using the mobile application *tsi schedule*. A system that supports this application allow sending the short notifications to the phone, for example, about changes in the lectures timetable.

TSI has a relatively large and modern electronic library, which is available to every student using the address *lib.tsi.lv*. This resource allows accessing not only the electronic books, but also to obtain the information about and order the printed books available in the library.

Administrative information resources available to the TSI employees

The Moodle-based system *e-adm.tsi.lv* is designed to host internal working documents of structural units and to organise the virtual meetings. The academic staff uses it to improve their knowledge, since the materials for pedagogical seminars, projects, etc. are located here.

teacherplan.tsi.lv is a separate resource for the academic staff; the access is provided with a personal username and password. This resource allows planning and tracking the academic workload of lecturers, planning and controlling the scientific activity of the academic staff.
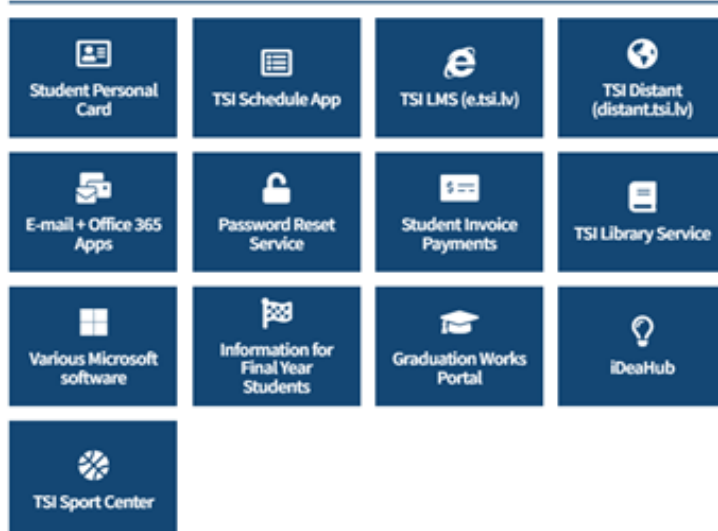
The study course management system *cms.tsi.lv* is used by the academic staff, programme directors and faculty management for organising the work with programmes and study course descriptions.

Intra.tsi.lv is the unified database containing the information on the study programmes, all types of the study plans of each programme and students and students' groups; it is the main work tool for the Study Department.
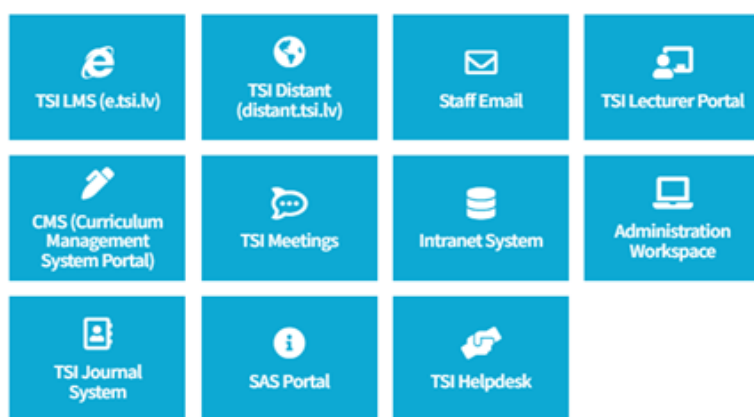
e-mail system maintenance is an Exchange server, used by the 33employees; it provides calendar and contact management and serves as a convenient tool for working with e-mail; the students are provided with the Office 365 cloud service.

To simplify access and usage of the TSI online resources, the specific web-page has been developed on TSI webpage – TSI IT Services.

For Students

Student Personal Card	TSI Schedule App	TSI LMS (e.tsi.lv)	TSI Distant (distant.tsi.lv)
E-mail + Office 365 Apps	Password Reset Service	Student Invoice Payments	TSI Library Service
Various Microsoft software	Information for Final Year Students	Graduation Works Portal	iDeaHub
TSI Sport Center			

For Staff

TSI LMS (e.tsi.lv)	TSI Distant (distant.tsi.lv)	Staff Email	TSI Lecturer Portal
CMS (Curriculum Management System Portal)	TSI Meetings	Intranet System	Administration Workspace
TSI Journal System	SAS Portal	TSI Helpdesk	

2.3.5. Provide information on the procedures for attracting and/or employing the teaching staff (including the call for vacancies, employment, election procedure, etc.), and the assessment of their transparency.

The teaching staff with high qualifications and the relevant knowledge and competences are involved in the implementation of the study direction and in the achievement of set objectives.

The procedure for application, selection, evaluation and election of the academic staff to the academic positions at TSI is regulated by the "Regulations on the Election of Academic Staff and the Evaluation of their Scientific and Pedagogical Qualifications" .

The number of academic staff positions is determined in accord with the list of positions of a specific faculty and its budget. The planned change in the position list of the academic staff for the next budget year is approved by the dean of the respective faculty. Unplanned changes may be implemented only with the consent of the Board.

The selection/election of the academic staff is carried out in several stages:

- Information on vacancies in the faculty or the need for new vacancies
- Submission of an application to the Personnel Department which is prepared by the dean of the faculty and agreed on with the Vice-Rector for Academic Affairs and the Rector on the need to organize a competition for a vacant academic position
- The dean together with a specialist of the Personnel Department determine the requirements, knowledge and competences that are necessary for the performance of the academic position and that are included in the advertisement.
- The Personnel Department announces the competition by publishing the advertisement, depending on the requirements and the vacancy status, on the TSI website or specialised job advertisement portals (e.g. CV-online).
- The Personnel Department accepts the candidates' application documents and carries out the initial evaluation of the applicants' documents for compliance with the established requirements.
- Depending on the vacancy requirements and status, applicants' pedagogical skills are evaluated by the faculty, for example, by asking candidates to conduct an open lecture after which the dean provides a statement of opinion, a recommendation.
- Evaluation of the provided information and professional abilities of the applicant by an expert nominated by the Senate Competition Commission and the presentation of this evaluation to

the members of the Senate Competition Commission

- Voting of the members of the Senate Competition Commission and recommendation to the Senate regarding the election/non-election of the candidate to the academic position
- Elections are held in the Senate, the most suitable candidate is selected and a job offer is made

The competency, professional skills and self-motivation level of potential employee are evaluated during the recruitment process. Since all TSI programmes are also taught in English, academic staff need very good English language skills.

Competitions for academic and research positions are advertised publicly - on the TSI web page, in the specialised job advertisement portals with which TSI has a contract (CV-online), if necessary, on the portal *Latvijas Vēstnesis*, the European Commission portal *Euraxess*, etc., giving a chance to all the interested parties to apply for employment at TSI within one month of the date of publication of the vacancy. Other recruitment methods, such as disseminating information through social media sites (Facebook, Linkedin, etc.), may be used to attract candidates from specific fields or with a narrow specialisation.

Applicants' application documentation, previous research and pedagogical qualifications and an open lesson, prepared and conducted by the candidate and attended by the students, after which the dean of the faculty provides a statement of opinion, are evaluated.

For the detailed evaluation of the documents submitted by the candidate, one expert is appointed from the TSI academic staff who is competent in the respective field.

During the meeting of the Senate Competition Commission, which assesses the candidate's scientific, pedagogical and organisational competences, the evaluation of experts and the dean of the faculty are heard, and personal interviews are conducted with the candidate. The Commission, by its decision, directs the most suitable candidates to the Senate for election to the academic position.

Within three days of the receipt of the Senate decision on the election of a candidate to an academic position, the Personnel Department informs the candidate on the Senate decision, whereas within five working days the Department prepares the necessary amendments to the agreements for the elected lecturers or concludes the employment agreements.

In the case of the election of a professor or associate professor, a package of documents with an extract of the Senate minutes is handed over to the candidate for its submission to the relevant Council of Professors.

TSI has established a Council of Professors of Transport Engineering. The current composition of the Council of Professors was approved by the Senate on April 12, 2022 (https://tsi.lv/research/excellence/professor-council/). The Council of Professors evaluates the scientific and pedagogical qualifications of professors and associate professors, as well as tenured professors or associate professors, in accordance with the criteria set out in the Regulations of the LR MK No. 129 on February 25, 2021 "The procedure for evaluating the results of scientific and pedagogical qualifications or artistic creativity of the applicant for the position of professor or associate professor and tenured professor or an associate professor".

The qualifications and competences of the academic staff have constantly been developed by the improvement of pedagogical skills, the development of English and professional training in the field.

The knowledge of the national language of the teaching staff is fully in line with Cabinet of Ministers

Regulation No. 733 07/07/2009 *Regulations Regarding the Amount of Knowledge of the Official Language and the Procedures for Examination of the Knowledge of the Official Language and the Amount of the State Fee for the Examination of Fluency in the Official Language* and with the level of knowledge specified in Appendix 1 of the Regulations. This requirement does not apply to guest lecturers from abroad who teach courses in the official languages of the European Union. The TSI Personnel Department verifies the state language skills when selecting staff and compiling documents in the preparation process for the academic position elections.

Guest lecturers and external instructors are also invited to teach specific study courses on a contractual basis; their competences are assessed in a similar way to those of the elected academic staff. In order to improve the content of the study programs, foreign visiting lecturers are invited to teach TSI study courses. The procedure for inviting foreign visiting lecturers is stipulated in the *Procedure for Inviting Foreign Visiting Lecturers for Short-Term Academic and Scientific Activities at TSI* (approved on 27/11/2012, Order No. 01-174-V, available in TSI record-keeping system).

TSI developed the publicly available Lecturer's Guide , which reflects the most important issues that should be known to the person, who starts working at TSI .

TSI fulfills the requirement of the Higher Education Law regarding the number of foreign guest lecturers, the number of foreign guest lecturers in the university has been 8% for the last three years.

The process of attracting and evaluating the academic staff is transparent, efficient, and it is one of the prerequisites for high quality of the study process.

2.3.6. Specify whether there are common procedures for ensuring the qualification of the academic staff members and the work quality in place and provide the respective assessment thereof. Specify the options for all teaching staff members to improve their qualifications (including the information on the involvement of the teaching staff in different activities, the incentives for their involvement, etc.). Provide the respective examples and specify the way the added value of the possibilities used for the implementation of the study process and the improvement of the study quality is evaluated.

In the Development Strategy 2020-2025 of TSI one of the most important aspects of the development of the study field Personnel is the design of the professional development system for the academic and administrative staff of TSI. The measures for qualification and professional development of academic staff are defined in the Procedures for the organisation of professional development planning for the academic staff of TSI (approved on 15.04.2014, Order No. 01-12.1/35, available in the TSI Records Management System).

The regular evaluation of competences of academic staff and the evaluation process includes the following:

- Preparation of annual action plans for the professional teaching and methodological development of academic staff and their implementation in accordance with the program and TSI senior management decisions
- Planning of the financial resources required for the enhancement of the qualifications of

academic staff

- Assessment of the professional growth potential of the academic staff of the faculties and the preparation of proposals on nominating the most promising lecturers
- Compiling individual plans for lecturers and proposals of the dean on the implementation of the required professional development measures during the academic year;
- Organisation of annual academic staff attestations.

The applied forms of professional development of academic staff include preparation and publication of scientific publications in international peer-reviewed journals; participation in international conferences, seminars, projects and experience exchange programmes; mobility activities; participation in scientific conferences organised by TSI (RelStat, R&T-SiF), participation in methodological seminars for learning new teaching methodologies and pedagogical skills; training/internships in international training centres, foreign universities or scientific institutes, companies in the industry; doctoral studies and elaboration and defence of a doctoral thesis.

In support of the qualification and professional development of academic staff, TSI implements a variety of support measures and provides various motivational tools:

1. Methodological seminars are organized, providing an opportunity to improve one's skills in the fields of university pedagogy, educational technology and educational management. The scheduled seminars are held once or twice a month. Seminars held in the 2022/2023 academic year are as follows: Overview of new open access resources OpenAire, OAPEN, Springer OA Books; Assessment tools and organization of work in groups in the Moodle system; Effective communication in the classroom of university: skills of a successful teacher; Artificial Intelligence in Higher Education; Artificial intelligence from the point of view of a software developer; DIGI projects as an opportunity to enrich TSI curriculum.
2. When it is possible, the academic staff do internships in companies. In the academic year 2019 - 2020, 27 lecturers (including 12 lecturers involved in the field of the study) did 200 hours of internship in Latvian companies "Kuehne+Nagel", JV "Accenture", "X Infotech" Ltd., "SAF Tehnika" Ltd., "RoboLogic" Ltd., "International Airport Riga", LGS, JV "Air Baltic Corporation", etc. The skills acquired during the internship were used to improve specific study courses.
3. Since TSI has long-term experience in attracting foreign students, the English language skills of academic staff are constantly monitored and the opportunities for improvement are offered. To improve foreign language skills, every 2 years the university usually offers the English language training course. In the academic year 2019/2020 a total of 19 university lecturers, 8 of whom are involved in teaching the programme courses, improved their English language skills in the above-mentioned project No. 8.2.2.0/18/A/011.
4. TSI supports and promotes participation of its academic staff in the Latvian and international professional associations, unions and clusters, which ensures a connection with the professional environment. Currently the teaching staff is represented in the following associations: Informatics Europe, Latvian Association of Information and Communication Technology (LIKTA), Latvian Association of Electrical and Electronics Industry (LETERA), Latvian Association of Transport Development and Education , European Conference of Transport Research Institutes (ECTRI), Latvian Simulation Society, Latvian Society of Operation Research, Latvian Aviation Association, Latvian Association of Remotely Piloted Aircraft Systems (LARPAS), Society "Women in Transport" , Latvian Logistics Cluster, Latvian Cluster of Goods Supply Chains, Informatics Europe
5. TSI supports and encourages participation in scientific and teaching methodological conferences, described in details in criterion 4.4.3.
6. Doctoral studies of the academic staff are supported. During the reporting period, several of

the current faculty members of the field of the study have completed their doctoral studies and obtained doctoral degrees: Savrasovs, I.Pticina, D.Pavlyuk, N.Spiridovska, O.Zervina, E.Budiloviča, O. Skorobogatova are currently studying for doctoral degrees. However, A. Kotļars is an applicant for a Doctoral scientific degree, whose doctoral thesis is planned to be defended at the end of this year.

7. Special seminars and science weeks are organised to improve professional competence.

- From 2017 TSI organised a series of open seminars on *Science for Business.*

The first seminar focused on the topic *From Data to the Added Value: Views and Solutions* and was marked by talks of the representatives of *Accenture*, TSI lecturers, doctoral and Master's students.

The second seminar *Digitalisation in Logistics and Transport* and was attended by outstanding scientists from Latvia and Germany, including Hon. -Prof. Dr.-Ing. Klaus Richter and Dipl.-Vw. Kay Matzner ofthe Fraunhofer Institute for Factory Operation and Automation IFF (Germany).

The third seminar *From Data to the Business Added Value* and was attended by the employees of Deloitte Latvia, who shared their experience with students and academic staff

- In 2017, TSI held an online seminar on Pedagogy for TSI Teaching Staff. A. Pupcevs, president of the Senate of the European Humanities University (Lithuania), delivered a lecture on *Distance Education as a Priority in the Development of a* Modern *University*, which focused on improving the quality of distance education with modern methods and technologies.
- In 2018, for the first time there was organized a *Science Week* which consisted of several events, such as the seminar *SCI-BI: Digitalisation in Logistics and Transport,* the closing conference of the ALLIANCE project *Sustainable Urban Interchanges: Trends and New Prospects* and the international conference *18th International Multi-Conference Reliability and Statistics in Transportation and Communication (RelStat-2018).*
- In 2019, the Transport and Telecommunication Institute hosted a *Digital Academy*, an intensive educator qualification improvement programe aimed at enhancing the lecturers' digital competencies needed to create online training courses. etc.

8. TSI offer all its teaching staff the opportunity to visit foreign universities within the Erasmus+ program, to conduct classes, attend lectures of foreign academic staff, learn new methods and share experiences. In the academic year 2022/2023, 9 members of the teaching staff involved in teaching the courses of the study area participated in ERASMUS+ mobility

9. The University supports the participation of the academic staff in projects (see Section 4), and also actively uses the opportunities provided by various projects to increase the competence of the academic staff in various fields:

- Participation in COST Actions, which are mainly oriented towards the professional qualification improvement measures (for researchers, the academic staff, Master and Doctoral students):
  - *COST Action CA 19102 Language In The Human-Machine Era*, - https://tsi.lv/projects/cost-action-ca-19102-language-in-the-human-machine-era/
  - *COST Action CA16222: Wider Impacts and Scenario Evaluation of Autonomous and Connected Transport*, https://tsi.lv/projects/cost-action-ca16222-wider-impacts-and-scenario-evaluation-of-autonomous-and-connected-transport/
  - *COST Action 15221 Advancing effective institutional models towards cohesive teaching, learning, research and writing development*, https://tsi.lv/projects/cost-action-15221-advancing-effective-institutional-models-towards-cohesive-teaching-learning-research-and-writing-development/

- COST Action TU1305 Social networks and travel behaviour ,https://tsi.lv/projects/cost-action-tu1305-social-networks-and-travel-behaviour/
- COST Action TU1306: Fostering knowledge about the relationship between Information and Communication Technologies and Public Spaces supported by strategies to improve their use and attractiveness (CYBERPARKS), https://tsi.lv/projects/cost-action-tu1306-fostering-knowledge-about-the-relationship-between-information-and-communication-technologies-and-public-spaces-supported-by-strategies-to-improve-their-use-and-attractiveness-cyb/
- COST Action TU1208 : Civil Engineering Applications of Ground Penetrating Radar, https://tsi.lv/projects/cost-action-tu1208-civil-engineering-applications-of-ground-penetrating-radar/

- Within the framework of the project *Enhancing Excellence and Innovation Capacity in Sustainable Transport Interchanges* (ALLIANCE). For two years, in July 2017 and July 2018, TSI hosted a summer school on decision-making methodology, business models for transport terminals, best practices in transport company management, etc. The lecturers, participating in the summer schools and developing their competence, as example D. Pavlyuk, N. Spiridovska, M. Savrasovs, I. Jackiva, J. Tolujevs, I. Pticina un citi.
- In project "Fundamentals of Design Competence for Our Digital Future" (H2020-MSCA-ITN-2020 (Marie Skłodowska-Curie Innovative Training Networks) the network in multidisciplinary field were organized.

The opportunities offered to improve the qualifications of the academic staff have a significant impact on the quality of studies. The knowledge gained during professional development and in-service training, as well as from the research work, is incorporated into the study process, thus improving and enhancing it. The study process is continuously updated with the latest developments in the field - academic staff participate in projects, and the results are used to update the content of the study courses. An important element of the staff development is local and international cooperation, which takes place both in the fields of research and academic work (see criteria 2.4.3, 2.5.1, 2.5.2).

The motivation of academic staff to engage in professional development is voluntary. The university merely creates a supportive environment and, within certain limits, provides opportunities for engagement activities so that academic personnel can meet the criteria for scholarly and pedagogical activities defined for their respective academic positions.

Professors and Associate Professors are re-evaluated after their first election, and their performance is evaluated every two years according to the established criteria for scientific and pedagogical performance (Regulations on the Election of Academic Staff and the Evaluation of their Scientific and Pedagogical Qualifications). The quality assessment of the academic staff is carried out with the help of regular students' surveys, and these assessments are also taken into account in the annual assessment of the academic staff.

In March 2020, TSI conducted an electronic survey of job satisfaction and engagement of employees, including the academic staff. In the survey, employees expressed their views on work content, work environment, communication and development issues. As the survey was successful, in the future such surveys will be conducted on a regular basis. The results of the surveys, taken together with the performance indicators of the planned work, are used to improve the internal communication, management and operational processes of the Institute.

Foreign teaching staff: Nathanail Eftychia (Lēmumu pieņemšana transportā un loģistikā), Gunnar Prause (Loģistika un piegādes ķēžu vadība) teach only in English in the study programmes for both students who study the programme in English and students who learn in Latvian, taking into

account that the university has the right to implement no more than one-fifth of the credit points of the study programme in a foreign language (article 56, paragraph 3 of the Higher Education Law, and paragraph 5.1.2 of the TSI study agreement).

On the other hand,Ilya Jackson teaches the study courses (Simulation Modelling in Transport and Logistics, Smart Warehouse) in English in cooperation with Emeritus Professor J. Tolujev, Ovezmyradov Berdymat teaches the study courses (Digital Transformation in Business, Smart Warehouse Management) in English in cooperation with Associate Professor E. Budilovič, who teach the same courses in Latvian.

2.3.7. Provide information on the number of the teaching staff members involved in the implementation of the relevant study programmes of the study field, as well as the analysis and assessment of the academic, administrative (if applicable) and research workload.

The qualification of the academic staff involved in the realisation of the study direction corresponds to the specifics of the study programs and the implementation conditions, as well as the requirements of the regulatory enactments. The academic staff are professionals in their field of science and have proven their competence in research of their respective fields.

In accordance with the Law on Higher Education Institutions, Cabinet of Ministers Regulation No. 445 *Regulations on the Teaching Staff Remuneration, TSI Regulation on the Remuneration of Academic Staff* (approved at the meeting of the TSI Senate on 22/06/2021 and available in the TSI record-keeping system) and the job descriptions for academic positions, the teaching load comprises student education, including teaching, conducting and supervising studies, organizing and supervising classes, tests and examinations; it also incorporates scientific research, including conducting and managing research in the relevant sub-branch of science, managing the doctoral studies and research, participation in conferences, preparation of publications, etc.; it also contains both organizational and methodological activities, including the organization of study activities, development and evaluation of study programs, participation in activities on the enhancement of performance quality of the Institute, training of young scientists and lecturers. All members of the academic staff elected to academic positions carry out academic, scientific, organizational and methodological activities.

According to Cabinet of Ministers Regulation No. 445 and the *TSI Regulation on the Remuneration of Academic Staff,* full-time academic staff are assigned annual workload that includes teaching hours, which is the reflection on the pedagogical activities, whereas the rest of the academic workload comprises scientific, organizational and methodological activities (see the table below). In addition to the workload hours listed in the table, research work is conducted in projects carried out outside main working hours of staff and is separately remunerated.

Table 3. Workload of academic staff

Academic position	Workload in hours (per year)		
	Teaching load	Other teaching load	Teaching load

Professor	500	400	900
Associate professor	550	350	900
Assistant professor	600	300	900
Lecturer	650	250	900
Assistant	700	200	900

Depending on the academic position, the relationship between these duties changes.

When determining the salary and workload for academic (pedagogical) work, research, and administrative work, the integrated planning principle is used, taking into account the planned workload for the upcoming academic year, corresponding to the semester, and making adjustments based on the work done in the previous period.

In most cases, it is not possible to strictly separate and determine the academic and research workload because the daily duties of personnel overlap, and all elected academic staff members have both academic and research loads, and in some cases, administrative work as well.

The proportion of academic and research workload for each academic staff member is determined individually, planning the employee's workload within the faculty, taking into account their positions and involvement in project implementation. When working in the main positions such as the rector, prorector, or dean, the recommended academic workload, as per the rector's order, is 0.3.

In general, the total number of students at TSI and in the specific study direction is not large, and the teaching staff does not experience excessive workload. Since the courses are taught by faculty members in their specific areas of expertise, there are several external lecturers based on company contracts in the programs. In the study direction, the total number of teaching staff, as of the assessment moment in January 2023, is 35, with 23 elected at TSI. External lecturers are invited not because the elected academic staff would have an excessive workload but to ensure that courses are taught by specialists in the field. Specific limitations regarding the number of supervised final theses or reviewed bachelor's and master's theses per instructor are outlined in the remuneration regulations for TSI teaching staff.

A total of 35 teaching staff are involved in the implementation of the study direction, of which 23 are academic staff (elected by TSI), including 9 professors, 5 associate professors, 6 assistant professors and 2 lecturers, as well as 1 emeritus professor .

Table 4. Academic and research workload of academic staff

	Number of academic staff	FTE academic activities	FTE research activities
Professor	9	3.32	5.02
Emeritus profesors	1	0.27	0.73
Associate professor	5	1.88	2,43

| Assistant professor | 6 | 3 | 2.1 |
| Lecturer | 2 | 0,95 | 0,34 |

It is evident that professors and associate professors are more engaged in scientific activities and less in the implementation and management of the study process, whereas assistant professors and lecturers are more involved in teaching.

TSI also emphasizes the importance of promoting the development of academic staff by engaging faculty members in research activities and encouraging them to pursue doctoral studies, the outcome of which is an increase in academic positions

Currently, there are 3 faculty members involved in the implementation of the doctoral program in the study direction, who will be able to apply for the position of an assistant professor after obtaining a doctoral degree.

Care has also been taken to improve the quality, not just quantity, aspects of performance of research staff. In order to balance academic and research activities, motivate academic and teaching staff to enhance the quality of academic and scientific performance, the Transport and Telecommunication Institute has included a detailed payment system for both academic and scientific activities in its *Regulation on the Remuneration of Academic Staff* (approved at the meeting of the TSI Senate on 17/09/2019 and available in the TSI record-keeping system).

In order to ensure that the knowledge and skills that are taught at the Institute are meaningful and useful on the labour market, in addition to the permanent staff, the Institute recruits the teaching staff who carry out their duties as lecturers on a contractual basis for a fixed period. They include industry experts, lecturers elected at other higher education institutions, etc.

A significant number of the TSI academic staff is working in industry. For example, E.Budiloviča, V.Gromule, A.Kotlars

Guest lecturers are mainly invited for academic work and less for research. However, they are highly ranked lecturers with specific knowledge or professional experience in their respective areas of specialization, which is why they provide high quality lectures and classroom management

Twenty one members of the academic staff teaching in the program (91%) hold a doctoral degree. Of the invited lecturers, there are 7 persons with a doctoral degree, while the rest have a Master's degree in the respective field.

The teaching staff involved in the implementation of the study direction and the programs, plan their pedagogical load according to the study plan of each semester and academic year.

The professional qualification of the academic staff fully corresponds to the requirements of the implementation of the study programs of the study direction; the competence of the academic staff is attested by:

- qualification of the academic staff, its compliance with the requirements specified in regulatory enactments;
- scientific output, topicality of scientific work and cooperation with scientific institutions in Latvia and abroad;
- professional competence as evidenced by the professional and academic experience; the postgraduate students they have educated; the developed study materials, scientific publications; participation in projects and their management, participation in the development or management of study programs, cooperation with Latvian and foreign higher education institutions; work with foreign students; development of study courses, self-

assessment of professional activity, etc.

Appendix 10. Biographies of the academic staff (Curriculum Vitae in the *Europass* format).

Appendix 11. Academic staff involved in the implementation of the study direction and their degree/qualification; electoral status at the higher education institution/college; study programs and study courses in whose implementation they are participating.

2.3.8. Assessment of the support available for the students, including the support provided during the study process, as well as career and psychological support by specifying the support to be provided to specific student groups (for instance, students from abroad, part-time students, distance-learning students, students with special needs, etc.).

During the matriculation process, each student receives a handbook with the useful information on how and where to find answers to their questions, who to contact to obtain required information.

TSI technical support is provided by the IT department. A centralised study process and information structure support - *helpdesk* - has been set up to receive applications, process them and give guidance to support staff. Table 5 describes the support staff.

Table 5. Description of support staff

No.	Speciality	Task	Quantity	Notes
1	Operating systems engineer	Support of users, study process, IT services	2	Monday-Friday: from 8:30 a.m. till 8:30 p.m. Saturday: from 8:30 a.m. till 6:00 p.m. Sunday: according to the lecture schedule of module training Applications sent to the email are accepted around the clock.
2	Computer technology engineer	Maintenance of computer hardware	1	
3	Computer systems administrator	Support of IT structure functioning	1	

As the study process at the Institute is also organised for full-time evening groups and part-time off-site sessions, which include Saturday classes or modular form training on Sundays, the *helpdesk* is available on weekday evenings and on weekends.

Questions related to the study process are supported by the Study Department and the Faculty Office, which also provide feedback for communication with students. The working hours of the

Study Department are from 8:30 a.m. till 6:30 p.m. on weekdays and from 8:30 a.m. till 4:00 p.m. on Saturdays. Thus, the Study Department is open to both evening students who arrive at the Institute after work and part time students on Saturdays.

TSI students can apply for tuition fee discounts. Discounts are granted to students for good and excellent progress, active participation in the Student Council, scientific activities and other criteria.

All TSI students are provided with the opportunity and support to become a member of iDEAHUB and get involved in the implementation of the innovations and projects. iDEAHUB is described in more detail in the specification of criterion 2.4.5.

The Association *Apeirons* has recognised TSI as an organisation friendly for people with disabilities. This has been achieved by adapting the building and study rooms for persons with disabilities (see Part II of Section 3.2). Heads of departments and teaching staff take an individual approach to such students in each situation in the study process. Although the lift is specially adapted, it is often lecturers who go to the student to provide individual consultation or to administer course tests in the ground floor hall.

TSI pays special attention to foreign students. Already at the time of enrolment, the prospective student is offered the opportunity to complete a questionnaire in the electronic system *Admission* that includes questions about whether the student will need to be picked up at the airport and whether he or she will need to be provided with a hotel room with "yes" and "no" as the possible answers. TSI does not have its own hotel, but it has concluded cooperation agreements with several hotels (SIA RIGAAPARTMENT.COM, AS 1Home Group, SIA DODO Hotels) guaranteeing the accommodation for TSI foreign students. Foreign students are provided with the addresses and contact information of these hotels. At the airport, students are welcomed by a TSI student - volunteer. TSI students are entitled to a tuition fee discount for performing such duties.

The organisation of work with foreign students at TSI is the responsibility of the Foreign Student Coordinator, whose responsibility it is to give advice on the study process organisation, behavioural and ethical issues at TSI, entry and accommodation in Latvia (places of residence, hotels, shops, pharmacies, medical institutions, the Office of Citizenship and Migration Affairs, etc.); to organise the integration of foreign students into the TSI study process and student life; to provide communication between TSI administration, departments, the Student Council and national regulatory authorities in order to offer support to foreign students to successfully complete their studies at TSI; together with the assistants of the deans of the faculties and the lecturers, to control the progress of the study process of foreign students (including attendance of classes, control of the study performance); to provide assistance to foreign students in the organisation of their compulsory internship (finding a place of internship, internship applications, preparing and registering an internship agreement, etc.), etc.

The first week of the semester is devoted to the adaptation of local/foreign students, when they are introduced to the structure of TSI, departments and staff (dean and assistant dean), academic culture, information about available IT resources, library, and a guided tour of the capital.

The TSI Corporate Clients Department, which oversees an information database about companies that provide internship opportunities, offers students both internships and information about the latest job offers. The latest job offers are posted and available to students in the TSI e-learning environment *Moodle.* Each spring, the TSI Corporate Clients Department organises Career Days for TSI students, including guest lectures by professionals from various disciplines on successful integration into the labour market, news and current affairs in IT, logistics, and aviation, and the aspiring entrepreneurs are given the opportunity to listen to tips for starting their own business.

Two positions of the Study Process Organisation Specialist have been created in the Study

Department for the organization and support of work of distance learning. These specialists implement all types of cooperation with distance learning students, ensuring students' access to teaching and methodical materials of distance learning study courses, and advising and assisting students during their studies to solve organizational, technical and content-related issues, including adjusting the deadlines for submitting the current assignments according to the students' needs , and taking into account the justifying reasons.

The Digitization and Innovation Learning Centre is responsible for the development and deployment of teaching methodological materials for distance learning study courses on the platforms of the TSI Learning Management System.

2.4. Scientific Research and Artistic Creation

2.4.1. Description and assessment of the fields of scientific research and/or artistic creation in the study field, their compliance with the aims of the higher education institution/ college and the study field, and the development level of scientific research and artistic creation (provide a separate description of the role of the doctoral study programmes, if applicable).

The Transport and Telecommunication Institute (TSI) conducts scientific research in accordance with the approved research strategy and program. The goal of the research strategy is to create an environment for scientific personnel training and the implementation of scientific research and developments in TSI's strategic research directions.

The research program of the Transport and Telecommunication Institute defines three strategic research areas: Information and Communication Technologies (telematics), Smart Solutions in Transport and Logistics, and Digital Society and Economy. All research directions conduct studies in accordance with the accredited study direction, as illustrated below.

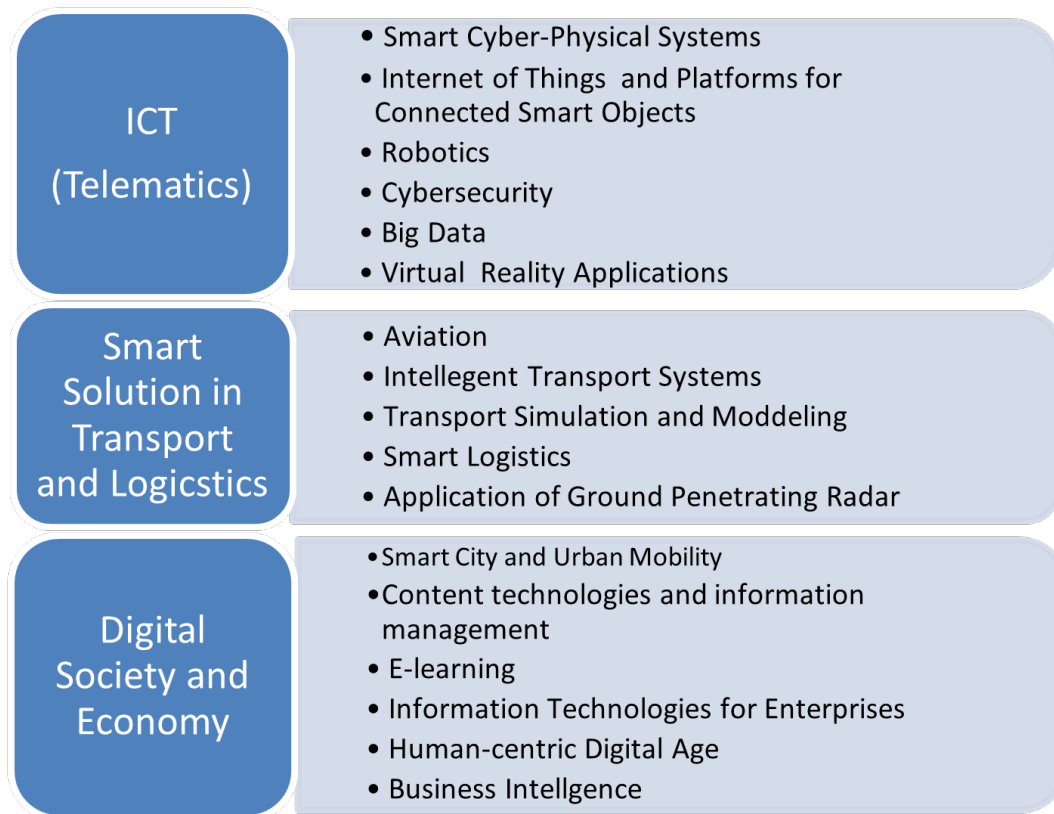|	
ICT (Telematics)	• Smart Cyber-Physical Systems • Internet of Things and Platforms for Connected Smart Objects • Robotics • Cybersecurity • Big Data • Virtual Reality Applications
Smart Solution in Transport and Logicstics	• Aviation • Intellegent Transport Systems • Transport Simulation and Moddeling • Smart Logistics • Application of Ground Penetrating Radar
Digital Society and Economy	• Smart City and Urban Mobility • Content technologies and information management • E-learning • Information Technologies for Enterprises • Human-centric Digital Age • Business Intellgence

Fig. 8. TSI research direction

The main directions of PhD research activities are carried out within the frame of TSI research strategy and grouped into 6 strategic initiatives and the roadmaps:

1. Improving the positions in research in the fields of TSI research interest.
2. Integration of TSI into the global research and educational system through leading research, information and learning technologies.
3. Creating a novel human resource system and forming a highly professional research staff.
4. Development of strategic communications and achieving high recognition of TSI nationally and globally.
5. Development of the innovation ecosystem to support the growth potential of TSI in knowledge and technology transfer.
6. Transformation and development of the TSI management system based on the principles of a research and business-oriented university.

The three core pillars of research activities cover fully the accredited study programs:

Pillar #1. Information and Communication Technologies (ICT) or Telematics. The main direction of research activities are:

- Smart Cyber-Physical Systems (CPS)
- Internet of Things and Platforms for Connected Smart Objects
- Robotics (multi-disciplinary and innovation activities like technology transfer via use-cases and industry-academia cross fertilisation mechanisms)
- Cybersecurity (Security-by-design for end-to-end security and Cryptography)
- Big Data where activities contribute to the challenge by addressing the fundamental research problems related to the scalability and responsiveness of analytics capabilities (such as data mining and visualization).

Pillar #2. Smart Solutions in Transport and Logistics with main direction of research activities:

- Aviation where research covers condition-based health management; autonomous, intelligent and evolving systems (e.g. Remotely Piloted and Unmanned Aerial Vehicle Systems for monitoring of critical infrastructure) and robust, cost-efficient solutions for the whole life-cycle, based on novel methodologies and technologies towards improving the safety of the air transport system
- Intelligent Transport Systems provides the key to achieving the vision of seamless transport both in passenger and in goods transport markets on the base of ICT use
- Transport Simulation and Modelling
- Smart Logistics
- Applications of Ground Penetrating Radar (GPR).

Pillar #3. Digital Society and Economy and research activities are:

- Smart City and Urban Mobility
- E-Learning
- Content technologies and information management
- Information Technologies for Enterprises
- Human-centric Digital Age
- Business intelligence.

Mentioned above research fields tend to be more interdisciplinary and TSI increases the shift from monodisciplinary research practices towards interdisciplinary approaches and improve the support towards stimulating and conducting the multidisciplinary research.

For instance, it is provided through project directions, invited professors, PostDoc researchers, visiting researchers, etc. These changes indicate increased interest in collaboration activities, often linked to special funding and stakeholder engagement. For becoming a more significant research player on the EU level, TSI puts special attention on international collaboration. One of the approaches is to increase TSI participation in international-level projects and establish research consortiums with leading European research establishments.

Study direction overall goal is to provide students with a sustainable, high-quality education in the field of transport services and engineering, ensuring competitive career development in the Latvian and international labor market and preparing internationally recognized, highly qualified research and academic staff in the field of transportation and logistics.

TSI research activities are critical to ability to produce graduates who can address the industrial demands of the 4th industrial revolution and its impact on industries, markets and society.

Apart from the national science, technology and innovation development policy (point 1.3.), TSI in its planning and activities relies also on cornerstone document: "Smart Specialisation Strategy (RIS3) (only Latvian)": Specifically, two objectives ("strengthening research, technological development and innovation" and "enhancing access to and use of quality of ICT") informs Strategy. TSI covers objectives in its research by addressing the ICT, smart materials and smart energetics specialisations (three areas of the RIS3).

Several priorities set by the Ministry - guide TSI planning and evaluation procedures. Priority 1 "effective high added values product development" is covered by the projects and research of Laboratories in the field of robotics, IT and IS. Priority 2 "search for new product/service development" is covered by successful business projects with the private sector, including innovative software and technologies in aerospace industry and priority 3 "energy efficiency" had been addressed in several patents obtained (related to wind power) and PostDoc projects, as example by Dr.sc.ing. Tatjana Endrjukaite, Jelena Popova. Priority 4 "contemporary standard-compliant ICT system" is covered by projects run by the TSI faculties and Research Administration

department (e.g. iSecret, Learn_IT projects). TSI addresses priority 5 through close collaboration with numerous industry representative from ICT, transport and logistics field.

Furthermore, in lines of action set by the RIS3, TSI:

- Integrates education, science, technology development, innovation and business by creating continuity between each of these areas of work: education process involves research and collaboration with industries, research in interlinked with technology development and innovation commercialisation, while business activities are based on educational and research capacities of the TSI.
- Strengthens the innovation capacity of the national economy by establishing mutually beneficial partnerships between academic and non-academic stakeholders.

Research infrastructure of TSI is under direct supervision by Vice-Rector for research and academia and Faculties. The main research Labs for students from this direction:

- SimLab (Applied Simulation Laboratory) which is supporting research in the area of complex systems analysis and simulation. Laboratory has more than 100 licenses of the software tools, including unique software for traffic flow, business-processes, logistic-process, manufacturing simulation (as example PTV VISSIM, VISUM etc.) and provides the consulting services to the local private and public sector. For the last 6 years SimLab staff has completed more than 15 projects.
- DevLab (Application and Information Systems Development Laboratory) is another lab dealing with development of the software solution with cutting-edge technologies. The lab intensively involves students of different level and is active participant of the applied research.

The main research infrastructure is concentrated around TSI Telecommunications, electronics and robotics Center (TERC), which unites 11 labs: Laboratory of Industrial Robots, Laboratory of Mobile Robots, Laboratory of Physics and Electrical Machines, Laboratory of Modelling of Electronic Systems, Laboratory of Embedded Systems and Digital Signal Processing, Laboratory of Industrial Automation, Laboratory of Subsurface Radiolocation, Laboratory of Robotics and Students' Research Work, Laboratory of Designing and Prototyping, Laboratory of Telecommunications and Electro-Optical Systems, Laboratory of Electronics. All listed labs are equipped by the modern devices and software, which supports academic and research process. More than 1000 units of equipment and software is available for researchers, students and academic staff.

In addition to TERC's labs TSI is operating:

- Image Processing, Biometry & Automated Border Control Systems (IPB & ABC) lab was developed in cooperation with local business entity "XInfoThech" Ltd. laboratory provides the research related with image processing, biometry, signal processing etc, also team of lab organizes the competition of research works among TSI students in annual bases.
- Laboratory for Modelling Machinery Mechanisms and Materials (4M) conducts applied research in the field of transport and mechanical engineering. The main activities are related to structural, computational and strength, reliability-diagnostic and hydro-gas dynamic modelling.

TSI supports "open-access" policy and provides share of its equipment and software. TSI is a part of the UseScience project which is targeted on equipment's sharing among research and academic entities.

As a member of association European Conference of Transport Research Institutes (ECTRI), TSI resources are included into global transport research sharing Database "Soft Research

Infrastructures" and TSI researchers could use the resources more ECTRI members (28 EU research Institutes) https://www.ectri.org/about-ectri/members/. In addition, TSI students academic and research staff has access to electronic library of TSI, which provides journals, conference proceedings, books and text books in electronic form. Library provides possibility to use international electronic databases: "Knovel"; EBSCO, "Academic Complete"; OAPEN-Library; DOAJ; PKP; WorldBank; VersitaOpen etc.

All research activities of TSI are administrated, supported, recorded and documented by the staff of Research Administration Department and aggregated in internal database. Additionally, Research Administration Department is responsible for information provision for sciencelatvia.lv (national science system).

Academic and research staff, as well as doctoral students, are involved in research by participating in the European Union (EU) research and innovation support programme Horizon 2020 projects, European Regional Development Fund (ERDF), European Social Fund – EU funds, COST activities, ERASMUS+, InterReg, State in development fund projects, etc.

As main results of active participation in European research community can be addressed the policy influence of TSI activities and the overall visibility and excellence of TSI. In Latvia TSI provides independent and evidence-based advice to decision makers and provide them relevant consultations in the field of transport research. One of the results as a direct effect of was in 2018 the participation of Prof Irina Yatskiv in 6th EU-US Transportation Research Symposium JUNE 26-27, 2018 (Brussels) "Socio-economic Impacts of Automated and Connected Vehicles". Prof. I. Yatskiv represented the Baltic countries.

On 29 November 2018, TSI research activities were certified according to the requirements of the ISO Standard 9001:2015.

In the last international assessment of scientific institutions, the Transport and Telecommunication Institute received a high rating as the best one among private higher education institutions. TSI was evaluated by the Engineering and Technology Group and received ratings on a scale of 3 to 4. This means a good level scientific institution that plays an important role at the national level and with a high level of international cooperation. The high rating of "4" was received for the economic and social impact, which is important for any scientific institution.

2.4.2. The relation between scientific research and/or artistic creation and the study process, including the description and assessment of the use of the outcomes in the study process.

Scientific research activity is an integral part of the study process. The connection of the research with the study process is characterised by the scientific research activity of lecturers, which creates the prerequisites for the improvement and updating the content of the study courses, preparing for lectures, developing practical tasks, topics for seminars, project work and final theses, etc., as well as for developing the students' research skills.

Students and teaching staff of TSI have access to the equipment and special software purchased for scientific research activities. The facilities of the laboratory are actively used by students for the development of their final theses, as well as for the needs of Bachelors, Masters and Doctoral students of the TSI.

Scientific research at TSI is related to the study process at all study levels. This is especially applicable to the study process at Master level in that study direction. The study plans for the Bachelor level programs include study courses oriented towards the project activities, which allow students already at the undergraduate level to be involved in scientific projects and applied research projects.

The advantage of this approach is related to the possibility of immediate use of the theoretical knowledge in practice, which enriches the content of the study course and makes it possible to move from the classical teaching approach to the learning-by-doing approach. Students of all levels are introduced to the projects implemented at the university.

Most of the TSI faculty members involved in the study area are also active researchers and scientists who participate in the projects and actively publish their research in journals and participate in conferences. In their courses, they both use examples and demonstrations from the projects and research, and offer students work themes related to their areas of expertise. For example, for the needs of the Alliance Project, the consortium with TSI leading developed an educational and training program "Sustainable Transport Interchanges Program (STIP)" for two Summer Schools. Based on STIP, partners developed digitalized courses to support lifelong learning purposes. Several courses of STIP were also included in MSc study programmes including "Sustainable Transport Interchanges", "Decision Making Methodology". In total, the consortium members completed 12 STSE's (Short Term Scientific Missions), which were very fruitful for all partners. TSI significantly improved collaboration in project theme areas, by organizing 5 research international teams consisted of young and senior researchers. This activity raised the number of publications produced by TSI staff.

TSI together with 2 partners TTK University of Applied Sciences (Estonia) and Häme University of Applied Sciences (Finland) in the frame of the project "Intelligent Transport and Transport Management study module (INTELTRANS)", 2020-2022, INTERREG Central Baltic developed the module "Intellectual Transport System".

In the study course "Information Systems and Technologies", one of the topics dealing with the ethical issues of artificial intelligence is taught by Aleksejs Veselijs, the doctoral student of professor Mihails Savrasovs.

Students of Master studies are involved in the research cluster activities: the Data Analysis and Artificial Intelligence Research Cluster; the Systems Analysis and Modelling (MADSYS) Cluster.

TSI organises the student scientific conference "Science and Technology - A Step into the Future", where students have the opportunity to participate and to present the results of their research work. The conferences are held twice a year, in December and April. It is compulsory for the students of all Master study programmes implemented at TSI to present their work at the conference before the final examination. The conference is also attended by students of Bachelor level programs, young scientists, doctoral students and students from other universities. Special sessions are organised at the conference where students of secondary school present their research projects.

Participation in COST actions, which often involve graduate students, provides both the opportunity to get acquainted with the cutting-edge research and to participate in summer and winter schools organised by COST Action project partners. For example, COST Action CA 16222 "Wider Impacts and Scenario Evaluation of Autonomous and Connected Transport" by Doctoral student Ilja Džeksons and his Master student, etc.

The scientific research in the field of study at TSI is aligned with the study process, which indicates its compliance with the development goals of the field of the study. The mentioned different types

of activities applied during the study process ensure the link between scientific and applied research and the study process.

2.4.3. Description and assessment of the international cooperation in the field of scientific research and/or artistic creation by specifying any joint projects, researches, etc. Specify those study programmes, which benefit from this cooperation. Specify the future plans for the development of international cooperation in the field of scientific research and/or artistic creation.

For the development of the study direction, international cooperation is an important and indispensable condition, since it ensures the continuous exchange of knowledge and practices that are necessary in science-intensive and technological fields to always remain in the field of advanced competencies, that arise around the world; and disseminate this knowledge to students, as well as develop own competences and innovations.

As one of the instruments of international cooperation - TSI implements academic, research staff, and student mobility activities. Cooperation agreements concluded by TSI with foreign scientific institutions are in Appendix 16.

Most of the mentioned partners are actively involved in research and applied projects, which is another most important domain for international collaboration. For such cooperation are used programs like Horizon2020, Interreg, ERASMUS +, COST, and other cofounding frameworks.

By participating in joint research projects within the framework of programs financed by EU funds, academic and research staff of study programs provide the opportunity to achieve new knowledge and skills, promote and develop new innovative ideas and find prospective collaboration for them, as well as promote the development of knowledge and best practices of foreign partners for the implementation of TSI initiatives as well in Latvia.

An example of international cooperation can be the ePIcenter – "Enhanced Physical Internet-Compatible Earth-friendly freight Transportation ansWer" project (H2020 program), in which TSI and the staff of study direction participate: the project consortium includes such representatives of the academic sector, scientific organizations, and industry representatives as: Port of Antwerpen; DHL; Stena; Panasonic, and others. Research staff of study direction develop working packages and tasks in frame of the project realization, disseminate common research outputs and cooperate with international partners to achieve planned results.

Another example of international cooperation – project "SCI-BI: Digitalization in Logistics and Transport" with Baltic-German University Liaison Office supported by the German Academic Exchange Service (DAAD) with funds from the Foreign Office of the Federal Republic Germany. The aim of the project was strengthening the research capacity of Latvia in Digitalization in Logistics and Transport and stimulating synergies between research and business in Baltic countries. Through planned cooperation in this project, the participants were developed new activities for tertiary education, staff exchanges, collaboration in science and publications.

Partners involved in the project: Transport and Telecommunication Institute (TSI, Latvia) – leading partner; Otto von Guericke University Magdeburg, Institute of Logistics and Material Handling Systems (ILM, Germany); Fraunhofer Institute for Factory Operation and Automation (IFF, Germany); Vilnius Gediminas Technical University (VGTU, Lithuania); Tallinn University of Technology (TTU, Estonia); RISEBA University of Business, Arts and Technology (RISEBA, Latvia).

The Sci-Bi project is a good example of the collaboration results, as the proposal for the project was prepared by TSI together with Fraunhofer IFF. Sci-Bi project implementation provided additional synergy as it involves also partners from Lithuania and Estonia.

The list of projects in which the study direction staff is involved is given in Appendix 12.

Research activities of the academic staff and students are facilitated by international scientific conferences, methodological conferences and forums. Between them:

1. TRANSBALTICA
2. Transport Research Arena
3. Winter Simulation Conference (WSC)
4. International Conference on Dependability and Complex Systems DepCoS-RELCOMEX
5. International Conference on MATHEMATICS AND COMPUTERS IN BUSINESS AND ECONOMICS
6. IEEE International Conference on Logistics Operations Management (GOL)
7. Conferences on Sustainable Urban Mobility (CSUM)
8. International Symposium on Stochastic Models in Reliability Engineering, Life Science, and Operations Management, SMRLO
9. International Conference on Harbour, Maritime and Multimodal Logistics Modelling and Simulation

The international conference Reliability and Statistics in Transportation and Communications (RelStat) has been organized by TSI for 20 years. The aim of the conference is to provide an international forum for scientists and professionals in academia, industry and government to focus on the latest research findings, present and discuss their ideas, theories, technologies, systems, tools, applications, work progress and experience in all theoretical and practical issues emerging in transport, information and communication technologies. For the fourth year in a row, selected articles from the RelStat conference have been published in the conference special edition, Springer Lecture Notes in Networks and Systems (indexed in SCOPUS). https://tsi.lv/wp-content/uploads/2023/10/relstat-2023_abstracts.pdf

TSI publishes the following internationally cited journals:

IEEE Transactions on Intelligent Transportation Systems; Sustainability; Sensors; European Transport Research Review; Transport; Aviation; Transportation Research Procedia; Transport and Telecommunication.

Transport and Telecommunication is the TSI indexed and peer-reviewed scientific research journal, ISSN 1407-6160, ISSN 1407-6179. Articles published in the journal Transport and Telecommunication include are included in the following databases: SCOPUS (from 2008, Vol. 9, No. 1), Elsevier Database; Web of Science - Emerging Sources Citation Index, Engineering Village, De Gruyter Open; The Summon; Transportation Research Board; ProQuest; ProQuest Engineering Journals; ProQuest Illustrata: Technology; ProQuest SciTech Journals; ProQuest Technology Journals; CNKI Scholar (China National Knowledge Infrastructure); EBSCO Discovery Service; Google Scholar; Primo Central (ExLibris); SCImago (SJR), and many other scientific databases

TSI researchers and leading academic staff are actively participation Latvian and International associations/communities, as example: prof. I.Jackiva in European Conference of Transport Research Institutes (ECTRI) and in the Board of Association Woman in Transport; prof. I.Kabaškins in Institute of Electrical and Electronics Engineers (IEEE), New York Academy of Science, International Telecommunication Academy, International Academy of Astronautics, OECD/ITF Transport Research Committee, etc.

All the activities described in the criterion have a positive effect on the implementation of all study

programmes, for example, when working in projects, the qualifications of lecturers are increased, knowledge of foreign languages is improved, new cooperation partners are obtained and the opportunity to take over their experience. The teachers can pass on the acquired knowledge and skills to their students.

Future plans for the development of international cooperation in scientific research:

- Publications of research and academic staff in internationally peer-reviewed publications
- Participation in international recognized scientific conferences
- Participation in the implementation of international projects, increasing the internationalization and international competitiveness of higher education and research
- Support measures for international mobility and cross-border cooperation. To conclude agreements for the implementation of international activities in the frame of the Erasmus+ programs
- Ensure scientific and professional development of academic staff and exchange of international experience within the EU support programs. Collection of good practice examples.
- Integration of digitalization and innovation learning tools and technics, providing high-quality and competitive educational service with higher added value
- To develop new directions for scientific and applied research and development of innovations, as well as for the development of new educational programs
- Strategic partnership with Latvian universities, research institutions, and the business sector
- Agreement on cooperation with industry and associations for the improvement of study programs, according to the needs of the labor market.
- Cooperation with employers, entrepreneurs, company managers, and industry specialists for the commercialization of research outputs
- Development of lifelong learning, according to labor market requirements and personal interests and needs - in cooperation with employers and industry associations.
- Increasing the involvement of students in the development of innovations, and support of promising projects transfer into startups and spinoffs
- Developing new thematic research Clusters within the main areas of research activities

2.4.4. Specify the way how the higher education institution/ college promotes the involvement of the teaching staff in scientific research and/or artistic creation. Provide the description and assessment of the activities carried out by the academic staff in the field of scientific research and/or artistic creation relevant to the study field by providing examples.

The staff development strategy of TSI is based on the multifaceted development of the academic staff, which includes their involvement in the scientific research. The TSI Development Strategy 2020 - 2025 defines 5 strategic objectives related to the research and scientific activity:

- to conduct high quality impactful applied research that will strengthen the reputation of TSI as a leading private technical university in the Baltic Sea region;
- to develop an internationally recognised research staff who are active in the innovations in the industry;
- to create a critical mass of employees involved in research and to establish a source of

training for future researchers;

- to establish focused, multidisciplinary research clusters addressing the key societal issues that can have national or international impact;
- to promote the achievements of TSI worldwide.

Members of the TSI academic staff participating in the implementation of the study program are experts of the Latvian Council of Science

- Engineering and Technologies – Civil and Transport Engineering – professors Igor Kabashkin, Irina Jackiva, Dmitry Pavlyuk, asoc.prof. Nadezda Spiridovska, Evelina Budilovicha, emeritus prof.Jurijs Tolujevs
- Engineering and Technologies – Electrical engineering, electronics, information and communication technologies - professors Igor Kabashkin, Irina Jackiva, Dmitry Pavlyuk, Yulia Stukalina
- Social Sciences - Economics and Business – professors Inna Stecenko, Yulia Stukalina, asoc.prof. Ilze Sproģe, Jelena Popova.

In order to systematise the publications of TSI lecturers, an open software integrated registration system of TSI lecturers' publications has been developed. The system is developed on the basis of web technologies that provide access to system resources through the Internet. Its task is to store data on publications of lecturers of the Transport and Telecommunication Institute in a structured way. The resource is available at: http://research.tsi.lv/.

The Institute of Transport and Telecommunications uses a variety of motivational schemes and policies to ensure and encourage the engagement in research and research activities.

1. Each faculty member shall include the research activities in his/ her individual work plan for the academic year. The submission and processing of information is organised on the TSI Lecturer portal https://teacherplan.tsi.lv/. The entered activities and the planned numerical results are discussed individually with each academic staff member by the Dean of the respective faculty. An example of the planning of academic and scientific activities for one faculty member is shown in Figure 9 below. These data are also used for budget planning.

Plan

Types of scientific work	Min. qty	Max. qty	Appr. qty	Comments
Doctoral student management		2		Aleksandrs Avdeikins Aleksejs Veselijs
Anonymously peer-reviewed scientific publication in a scientific journal indexed in the database SCOPUS or Web of Science Core Collection and included in the first quartile of the international ranking of journals Q1 (publication title)				
Anonymously peer-reviewed scientific publication in a scientific journal indexed in the SCOPUS or Web of Science Core Collection database and included in the journal's international rating quartile Q2 (publication title)		2		1) Journal: VGTU Transport, Mobility patterns analysis: Case of Riga, in collaboration with Irina Pticina, Evelina Budilovicha.
Anonymously peer-reviewed scientific publication in the conference proceedings, indexed in the database SCOPUS or Web of Science Core Collection, or ERIH (publication title), according to the conference results				
An article on the results of the RelStat conference (participation with a report) or in the publication of TSI 'Transport & Telecommunication'		1		Planned or publication in conference RelStat2022 or publication in Journal TTJ.
Article review in TSI publication 'Transport & Telecommunication'	2	4		Based on statistics for 2019-2021
Review of the abstracts of the MIP / RatSif / RelStat conference participant	1	5		Based on previous experience

Fig. 9. A view from the faculty workload planning portal

2. In order to increase the number of scientific publications of lecturers in internationally cited databases, the remuneration policy of the academic staff of TSI provides for separate payment for high-level scientific publications, patents, participation in conferences, etc. These activities are paid once a year. The budget of the Institute of Transport and Telecommunications also foresees the additional costs for publicity activities; in order to obtain funding a request must be completed and submitted (https://tsi.lv/staff/document-forms/).

3. The scientific and teaching activities of the professors and associate professors are evaluated every two years. This performance evaluation also includes an evaluation of scientific and research activities. During the evaluation procedure, the Commission shall examine and discuss the current performance results, make recommendations and discuss the plans for the next 2 years. The procedure is available at (https://tsi.lv/staff/document-forms/).

4. TSI participates in the implementation of the international projects involving TSI academic staff according to their scientific and professional interests. It provides an opportunity to acquire new knowledge and skills, to design and develop new innovative scientific ideas and to find promising applications for them, and also facilitates the transfer of knowledge and best practices from foreign partners (see Appendix 15).

5. The Department of Research Administration provides the support for the organisation of research and scientific activities of academic staff by informing them about the opportunities to participate in projects, the open calls for project applications, supporting the preparation of the project applications, and providing administrative management of the projects.

6. The research activity of the faculty is facilitated by the opportunity to participate in the conferences organised by TSI, which are available to the TSI academic staff at a significant discounted fee: the International Conference "Reliability and Statistics in Transportation and Communication" and the International Scientific Practical and Teaching Methodological Conference

"Modern Problems of Education", as well as participation in the international scientific conferences and seminars organised by the University cooperation partners in Latvia and abroad.

7. The TSI scientific journal "*Transport and Telecommunication*", indexed in more than 41 bibliographic databases (including SCOPUS, WoS etc.), is a good opportunity for the academics staff to share the research results with the journal audience. Both the journal and the conferences provide an opportunity for TSI faculty and researchers to carry out the publicity activities, especially useful for the doctoral students and young researchers.

8. In order to ensure the scientific and research environment, the research infrastructure and the material and technical base for conducting the scientific research are developed. The TSI has established 2 research clusters with the main objective of bringing together the researchers and leading lecturers, they are Data Analytics and Artificial Intelligence research cluster and Modelling-Based Systems Analysis and Design (MADSYS).

9. Honorable mentions and awards at the annual birthday celebration of the Transport and Telecommunication Institute on the 6th of September should be noted as a form of non-material motivation. The list of awards includes the ones to the best young scientist, for the contribution to the development of innovative methods and technologies, the involvement of students in scientific work, the implementation of scientific results, for the high scientific productivity of the young scientist (publications), for the contribution to the development of an interdisciplinary approach, etc.

Taking into account the directions of the research defined by TSI: ICT (Telematics), Smart Solutions in Transport and Logistics, Digital Society and Economy, it should be stated that the accredited study direction fully corresponds to the determined directions of the research activity. This is supported by the publication topics of the academic staff's publications (see Appendix 14) and the overall profile of the publications. According to Elsevier data (scival.com), the majority of publications are in the fields of Engineering and Technology and/or Natural Sciences (see Figure 10).
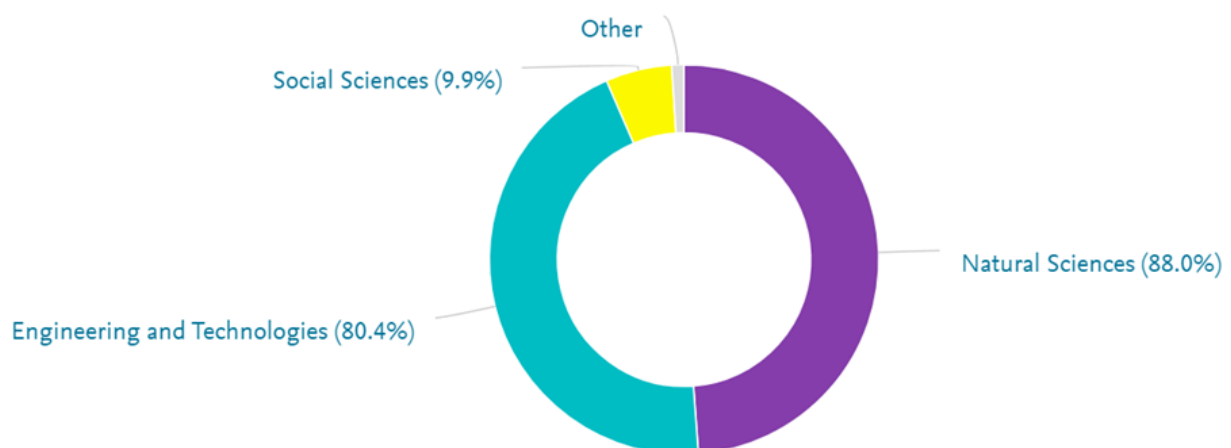

Fig.10. Distribution of publication by scientific directions (data from SciVal, a tool developed by Elsevier for measuring research performance, is available only in English)

The relevance of the research carried out by the faculty members to the scientific field is also reflected in the nature of the projects implemented by TSI, most of which are related to the identified research areas. Applied research is exemplified by joint research with industry:

- Simulation of traffic flow around the "Akropole" shopping centre

- Impact of traffic flow on airport development scenarios, and others

The projects at the EU level are also linked to the specific research directions, such as:

- Workforce Europe – Transformation agenda for transport automation (We-Transform)
- Fundamentals of Design Competence for Our Digital Future (D-Code)
- Enhanced Physical Internet-Compatible Earth-friendly freight Transportation ansWer (ePIcenter)
- Digitally supported and virtual study practices for modern logistic systems (DIGILOG)
- Ecosystem for European Education Mobility as a Service: Model with Portal Demo;
- INGENIOUS-strengthenINg diGital pEdagogy skills aNd competencIes Of edUcatorS
- Enhancing excellence and innovation capacity in sustainable transport interchanges (ALLIANCE) and others

The above-mentioned activities and measures allow stating that 1) Transport and Telecommunications Institute in general and within the specific direction supports and promotes the scientific and research initiatives of the academic staff by using various tools and activities; 2) provides an enabling environment for scientific and research activities; 3) the carried out scientific and research activities, publications and projects are in line with the defined directions of the research activities, the academic and scientific profile of TSI and RIS3 specialisation of Latvia.

2.4.5. Specify how the involvement of the students in scientific research and/ or applied research and/or artistic creation activities is promoted. Provide the assessment and description of the involvement of the students of all-level study programmes in the relevant study field in scientific research and/ or applied research and/or artistic creation activities by giving examples of the opportunities offered to and used by the students.

Students' involvement in the research projects during the implementation of the study programme is ensured by the development of study papers and final exams included in the study courses. Students are involved in scientific research work in order to obtain new, useful knowledge, professional skills, competence and to create a connection between knowledge and practice. The topics of students' research works are topical, related to the economic sector.

Starting from 2002, TSI organizes the student scientific conference "Science and Technology - a Step into the Future", RatSif, which provides an opportunity for young researchers to participate in an interdisciplinary scientific conference and cooperate with experienced scientists.

Conferences are held twice a year - in December and April. It is mandatory for students of all Master study programmes implemented by TSI to present the research at the conference before defending the work of the final examination. TSI undergraduate students and young scientists, doctoral students, graduate students and students from Latvian and foreign universities are also invited to participate in the conference.

A plenary session is also organized as part of the conference, during which participants have the opportunity to listen to interesting presentations by Latvian and foreign scientists: https://tsi.lv/the-annual-conference-ratsif-2021-was-held/

The abstracts from the conference are published in book of abstracts https://tsi.lv/research/publications/research-journals/research-and-technology-step-into-the-future-s

cientific-research-journal-on-line-editions/

Students, together with their supervisors, participate in the TSI international scientific conference "Reliability and Statistics in Transport and Telecommunication" (RelStat) with paper that published in Springer Lecture Notes in Networks and Systems.

For instance,

1. Voronin Y., Yatskiv I. (2022) Free Public Transport Policy: Modelling of Implementation in Riga. In: Kabashkin I., Yatskiv I., Prentkovskis O. (eds) *Reliability and Statistics in Transportation and Communication. RelStat 2021*. Lecture Notes in Networks and Systems, vol 410. Springer, Cham. pp.421-431 https://doi.org/10.1007/978-3-030-96196-1_39

2. Yatskiv, I., Budilovich, E., Blodniece, I., Nathanail, E. and G. Adamos. (2019) A Cross-case Analysis of Riga Interchanges' Information Services and Technologies, In book: "Reliability and Statistics in Transportation and Communication. RelStat 2018". I. Kabashkin, I. Yatskiv and O. Prentkovskis eds. Springer, Cham. 2019. pp. 582-592. https://doi.org/10.1007/978-3-030-12450-2_56

3. Yatskiv, I., Pticina I., Romanovska K. (2018) The Riga Public Transport Service Reliability Investigation Based on Traffic Flow Modelling. Kabashkin I., Yatskiv I., Prentkovskis O. (eds) Reliability and Statistics in Transportation and Communication. RelStat 2017. Lecture Notes in Networks and Systems, vol.36. Springer, pp. 252-261 DOI https://doi.org/10.1007/978-3-319-74454-4_24

Enhanced Physical Internet-Compatible Earth-friendly freight Transportation ansWer (ePIcenter). 2020- 2023: will create an interoperable cloud-based ecosystem of user-friendly extensible Artificial Intelligence-based logistics software solutions and supporting methodologies that will enable all players in global trade and international authorities to co-operate with ports, logistics companies and shippers, and to react in an agile way to volatile political and market changes and to major climate shifts impacting traditional freight routes.

The project **"Fundamentals of Design Competence for Our Digital Future"** (DCODE 2021-2024) will train a cohort of 15 PhD students in design, design anthropology, media studies, science and technology studies and data science, and equip them with the holistic understanding needed for the human-centric design of product service systems powered by Big Data, Machine Learning and Artificial Intelligence. DCODE brings together an exceptional team of internationally leading researchers in the required subject areas, and non-academic partners that bring societal, economic and political practice to the project and provide multiple forums for the dissemination of knowledge, results and best practices.

To maintain and further strengthen TSI excellence in research, TSI paid special attention to the chosen field of research - **smart interconnecting sustainable transport networks**. The scope of **ALLIANCE Project (2016-2018) is** the enabling of stimulating and strengthening the scientific and technological capacity of Latvia and the raising of the profile of the research staff and their institution, by providing knowledge in the field of smart interconnecting sustainable transport networks. The objective of ALLIANCE project is to advance research and higher education institution in the field of transport in Latvia by linking Transport and Telecommunication Institute (TSI) with two internationally recognized research institutions – University of Thessaly (UTH) and Fraunhofer Institute for Factory Operation and Automation (Fraunhofer IFF). The ALLIANCE project's purpose is to strengthen the scientific and technological capacity of TSI in research activities related to multimodal transport networks. ALLIANCE project considered significant number of activities, targeted to young researchers, master and PhD level students, academic and research staff. Among significant activities: - 3 training schools; 3 - young researchers' seminars; 2 summer

schools (freight and public transport); research teams: 5 international research teams performed the research published research publications.

The implementation of the ALLIANCE project allowed also attracting MSc students from the business area and setting up their research interest in the area of the ALLIANCE. A lot of them had possibilities to obtain knowledge in Transportation Planning (3 ECTS course); Presentation on 3rd Conference on Sustainable Urban Mobility, Volos, 26-27.05.2016, RelStat'2017 and RelStat'2018; to significant contribution their MsTheses (see Table below).

Study Direction student's activities in the frame of ALLIANCE project:

2016 -Training School "Urban and Transportation Planning" within UTH's Graduate program during 3rd Conference on Sustainable Urban Mobility, Volos, May, 2016. 3 MSc students

2017 -1st Summer school "Sustainable Transport Interchanges Program (STIP) - Part 1: Freight transportation"- Riga, 17-21 July, 2017. 4 MSc students

2017 -YRS in frame of RelStat2017 conference - Riga, 20 October, 2017. 1MSc & 2BSC

2018 - 4th Conference on Sustainable Urban Mobility - Skiathos Island, May, 2018. 1 MSc student

2018 -2nd Summer School "Sustainable Transport Interchanges Program (STIP) - Part II: Public Transport Systems: from research to decision making". 4MSc students

2018 -ALLIANCE Final Conference Sustainable urban interchanges: Trends and new prospects - Riga, Latvia, 17 October 2018. 3MSc & 1BSC

Additional involvement of students in research in the direction of studies is provided by the following activities: involvement in the research and applied projects, events related to the development of innovations and knowledge transfer (Innovation & Knowledge Transfer), and involvement in scientific events: conferences, seminars, workshops.

Students' participation in TSI projects ensures the development of additional competencies and skills: application of acquired knowledge in practice, research work, analysis, experimental work skills. Student involvement takes place at all stages of the project - from the development of the idea and project application, to real project activities and the use of project results. The body responsible for disseminating information about opportunities to participate in scientific activities is the Research Administration Department, which prepares and transfers information about current and planned scientific activities to faculty employees, for informing students. Also, the information is transferred to the TSI student self-government for distribution in the students internal environment.

Special attention is paid to students' creation of new products / technologies, transfer of developed results to industry, strengthening of competencies in creation and implementation of new companies and business solutions. In 2021, the innovation and entrepreneurship center iDEAHUB was established at TSI, the purpose of which is to promote the implementation of student innovation applications, which develops students' innovation potential, skills and entrepreneurial abilities, solves important problems for society, strengthens cooperation between universities and students with entrepreneurs, merchants and industry.

The functioning iDEAHub ecosystem allows you to implement projects with working prototypes:

- **RMP team** developed the *Railway Maintenance Web-platform* for railway operations, storing and analysing railway maintenance data using computer vision.
- **APDoc developed** application which is targeted to digitalise some of the freight-forwarding companies processes, associated with documentation collection.

- **DiPROGer**: development of a drone platform available and simple to use for all sectors of the national economy: from a small family farm up to critical infrastructure service providers. Core of idea – to use mobile device as a drone "all-in-one" electronic component (cameras, sensors, 5G, etc.). Project prototype includes algorithms, software, special control interfaces development. Research directions of the students' activities consist of data structures and algorithms, software engineering, programming.
- **iNNovatic**: developing prototype that automatically evaluates the compliance of the parameters of manufactured parts and structures with specifications and accuracy, based on a non-contact approach. Idea is to create manufacturing details acceptance control technology that would replace regular usage of hand-held measuring instruments, reduce human-factor in the acceptance process and automate manual work. Development includes integration of different scanning systems based on LIDAR technologies, CNC systems, image-recognition technologies, etc. Teams research area covesr directions of the object-oriented programming, systems modelling, software engineering, mobile and web application development.
- **Volkirion:** developing a prototype - a glove that will scan the environment and transfer information about objects to the hand using tactile input. Core idea is a stereo camera attached to the hand, the video from which will be converted into a depth map fed to the hand. The device will enrich the life experience of blind and visually impaired by expanding their sense via touch. Students works with sensors integration, algorithms development, system architecture and software development.

2021 - 2023 academic year a total of 20 projects are being implemented with a total number of more than 60 participants.

The active student's participation is carried out as part of the development of applied projects for the industry (R2B), where bachelors and masters' students are taking direct part in the projects. In many cases projects teams are multidisciplinary, and involves students from different study programmes, including from field of transportation and logistics.

2.4.6. Provide a brief description and assessment of the forms of innovation (for instance, product, process, marketing, and organisational innovation) generally used in the higher education institution, especially in study field subject to the assessment, by giving the respective examples and assessing their impact on the study process.

In the frame of the current study direction the different kind of the innovations are highly utilized implementing academic, research, and administrative processes. There are a lot of examples, therefore in this section only several will be highlighted as a core one. In the study process administration, the use of the IT technologies is high, as example students are needed to validate their students cards (using validators in each class-room), the data about the attendance is recorded to the database and next, data about attendance are analyzed in weekly basis. With weak attendance students are receiving SMS messages, about low attendance level.

Also, as TSI utilizes LMS system (Moodle base) several learning analytics tools of the platform are utilized to follow student's progress. The impact of the described solutions is targeted on improvement of the student's study experience. Additionally, students are provided by the personal student's workspace, which allows them to complete communication with TSI

administration and follow their progress and data in the remote form. The primary impact of the solution is to create a digital environment for students, which will make their study process smooth, clear, and transparent. In the academic domain several examples could be mentioned. From methodological point of view several innovation could be mentioned, as example use of flipped-classes, learning by doing, provision of online classes in synchronous and none synchronous modes, intensive used of simulators, game-based learning, use of the online courses to cover the part of the course etc.

Also, should be noted that in 2023 TSI has been involved in two projects for the activity "Digitalisation initiatives to improve the quality of studies. Both projects have been accepted and it is expected to have even more innovative solutions in the academic domain. All the mentioned activities are targeted on providing innovative, project-based, modern environment for which will motivate them and develop digital and soft skills. As the core example the learning-by-doing activities could be mentioned. The students are involved in different level projects and labs to develop their professional, research and soft skills. An example is APDoc project in which multidisciplinary team of the students has developed the application which is targeted to digitalise some of the freight-forwarding companies processes, associated with documentation collection.

Another example of innovation and its transfer to the educational process is the IdeaHub project. As part of the implementation, an innovative ecosystem has been created that combines the research infrastructure of TSI and external partners, research personnel, and experts. Competences for development and learning are combined in the form of innovative digital courses on the IdeaHub digital platform in the form of courses and training - both live and recorded, in areas such as Design, thinking innovations development and management, etc.

There are also different innovative approached utilized in the marketing of the study direction and programs, as one example is a humanoid robot NAO, which has been enriched by the specific presenter/teacher functionality (as part of the learning by doing project). And now the robot is highly utilized during different kind of the events (robot is able to conduct short multimedia presentations). As example last time it was during the EU level event – The night of science. The robot has provided several times the presentation about life in the digital city. Also the mentioned robot is used in activities with secondary schools to promote, not only TSI, but STEM in overall.

2.5. Cooperation and Internationalisation

2.5.1. Provide the assessment as to how the cooperation with different institutions from Latvia (higher education institutions/ colleges, employers, employers' organisations, municipalities, non-governmental organisations, scientific institutes, etc.) within the study field contributes to the achievement of the aims and learning outcomes of the study field. Specify the criteria by which the cooperation partners for the study field and the relevant study programmes are selected and how the cooperation is organised by describing the cooperation with employers. In addition, specify the mechanism for the attraction of the cooperation partners.

The aim of the study direction is closely related to the involvement of cooperation partners. Without cooperation partners there would be no sustainable development of the study direction, there would be no student training consistent with the requirements of the labor market.

The main criteria for initiating cooperation are the following: the reputation of the partner, compliance with the specifics of the industry, the common scientific and research interests of teaching staff and the benefits of all cooperation partners. The choice of cooperation partners of employers is determined by the demand of organizations for specialists in the relevant field. These are public and private organizations, various institutions and companies in Latvia and abroad.

Mechanisms for attracting employers are diverse; for example, several graduates and guest lecturers work in internationally recognized companies, state institutions, and international organizations, thereby forming productive collaborations with TSI. Former graduates, now employers, willingly participate in career days, host students for internships, and provide information to students about the relevance of acquired knowledge to the demands of the job market. The established TSI Alumni Association fosters a connection between the institute and its alumni, providing a favorable environment for the exchange of experience and business contacts, offering opportunities for professional development, and promoting and supporting TSI, thereby supporting educational processes at the university. An annual Alumni meeting serves as an excellent platform for collaboration with employers.

Employers are involved in study and research activities to ensure the use of their experience in the implementation of the programmes. The study programmes provide the following forms of cooperation with the employers and professional organizations:

1. Employers and their organizations are included in the Faculty Council and the Council of Study Fields, as well as in the accreditation working group of the study field. This ensures their involvement in the improvement of the study field and programmes, which allows maintaining a close connection with the current trends in the national economy. For example, employers are involved in the Council of the Faculty of Transport and Management and the Council of the Study Field, see Chapter 1.4. and Appendix 7.
2. The representatives of employers are included in the State Examination Committee. For the professional Bachelor programme, at least half of the committee members shall be representatives of the professional organisations or employers in the field.
3. Conducting and reviewing the study and the final theses and offering topics for the final theses (formulating the problems to be solved in companies so that companies can develop the economically sound solutions).
4. Employers are involved in the guest lectures. This happens both by centrally inviting industry specialists to present the professional study courses, and as individual company guest lectures. For example, during the last academic year , there were the following guest lectures for the students of the field of the study:

15.09.2022.- MSC "Learn the global possibilities to build your career at MSC"

14.10.2022.- MSC "Transport industry and consignment notes"

25.10.2022. -MSC "The Great Power of the Professional CV"

25.10.2022. - Riga International Airport "Cyber attacks in the transport sector V2"

25.10.2022. - Mile Logistics "The EU Personal protection in the professional field. Prevention of burnout syndrome".

25.10.2022. - PASSENGER TRAIN "Let's grow together!"

25.10.2022. Flight Consulting Group "Key To Flight organization: The Role Of A Dispatcher"

25.10.2022.- AirBaltic "Learn more about AirBaltic "

11.2022 – MSC "Costumere service"

02.12.2022 -AirBaltic "Metal sheet"

06.04.2023. - Latvian Air Traffic "Safety Management in Aviation"

28.04.2023. - MAXIMA "Non-logistics"

04.2023. - Inchcape Latvia "My strongest part are sales, procurement is slightly different thing"

5. The specialists of the industry's leading companies have been invited to teach several professional courses in the programme. This provides students not only with the practical knowledge acquisition necessary in the industry, but also promotes the cooperation opportunities of the university itself. In some cases, these specialists were elected to the TSI academic positions: Gromule, E.Budiloviča, A.Kotļars

6. Employers participate in the surveys for evaluating the skills acquired by the graduates of the programme and in the round table discussions. For example, on 11.05.2023 there took place the seminar discussion "Revolutionizing Logistics: Trends, Automation, Sustainability, Digitalization, and Human Resources", the representatives from HZ University (the Netherlands), TTK University (Estonia) as well as several representatives from the related industries participated in the discussion and shared their insights on the following topics: MSC - Trends in logistics, employment, and the importance of education, Maxima - Digitalization and data management in logistics, Containerships - Green logistics solutions and sustainability, Ceva Logistics Project

7. In the Professional Bachelor's program, collaboration with employers occurs through mandatory internships. The internship supervisor, a representative from the company, provides feedback on the student's skills, knowledge, work culture, and other aspects crucial to the implementation of the internship. This feedback allows an evaluation of the internship process and the achievement of study objectives. Each year, the offering of internship placements is reviewed, and new agreements are made as needed.

7. The representatives of the partner institutions, including industry, participate as experts in the iDEAHUB evaluation committee for students' projects applications: Institute of Electronics and Computer Science, Latvian Information and Communication Technology Association (LIKTA), Mechanical Engineering and Metalworking Industry Association (MASOC), Investment and Development Agency of Latvia (LIAA) and others.

8. The connection with the employers is also strengthened through the active participation of the academic staff in the professional organizations and associations, the most important of which are LIKTA, LETERA, Latvian Aviation Association, ECTRI, Latvian Transport and Education Association, etc. The academic staff of the field of the study participate in the working groups organised by the ministries (for example, the expert working group of professional standards)

9. Cooperation with the employers, providing training for employees of the corporate clients in the programmes implemented by TSI with a tuition fee discount.

10. Within the framework of some study courses, there were organized the excursions to the companies in the industry for the students, for instance, Excursion to the Riga Universal Terminal

11. The academic staff of the higher education institution of the study field actively participate in the contract research (detailed information is provided in Chapter 4.3), as well as participate in the provision of the training courses (for raising qualifications).

12. TSI organises Career Days every year. During them, the presentations of employers' organisations take place, and the guest lectures are delivered; the representatives of employers talk about career opportunities in the represented organisation and give practical advice on how to succeed in the labour market, as well as round table

There are various forms of cooperation with Latvian educational institutions, universities and scientific institutions: reviewing and advising the doctoral theses, joint participation of the academic staff and the doctoral students in research, conferences and seminars, joint scientific publications, etc

In order to strengthen the digital capacity of Latvia's leading universities, in the fall of 2022, the Institute of Transport and Telecommunications participated in 2 consortia for the implementation of projects in the field of digitization. The project "Automation tools for creative industries AutoRade" will be implemented in cooperation with 5 Latvian universities and 3 business partners - University of Economics and Culture (lead partner), University of Latvia, Rezekne Academy of Technologies, Vidzeme University of Technology, Liepaja University and Latvian Digital Accelerator, Ventspils High Technology Park and Valmiera Development Agency. The project "Digitalization initiatives for the involvement of students and the improvement of the quality of education at the University of Latvia and the universities - cooperation partners of the project" will be implemented in cooperation with 4 other Latvian universities - University of Latvia (leading partner), Latvia University of Life Sciences and Technologies , Vidzeme University, RISEBA University of Business, Arts and Technology, as well as three business partners – "Baltijas datu Akademiia" Ltd., "Tilde" Ltd. and "Computer Science Center" Ltd. The aim of both projects is to promote the use of digital technologies in the study process.

Several TSI professors are also involved in the Councils of Professors of other universities, for example, professor I. Kabashkins is in the Council of Professors of the University of Information Systems Management, etc. In cooperation with the University of Business "Turība" and BA School of Business and Finance (BASBF), a joint Council of Professors in the field of Economics and Entrepreneurship has been established.

Lecturers and students of TSI and other universities cooperate in the scientific and academic conferences, seminars, and in the preparation of the scientific publications.

Cooperation with various Latvian universities, scientific institutions, employers, employers' organisations, social partners, scientific institutions within the framework of the study direction provides an opportunity to ensure the goal set by the TSI study field and achieve the study results according to the goal of the study field.

2.5.2. Provide the assessment as to how the cooperation with different institutions from abroad (higher education institutions/ colleges, employers, employers' organisations, municipalities, non-governmental organisations, scientific institutes, etc.) within the study field contributes to the achievement of the aims and learning outcomes of the study field. Specify the criteria by which the cooperation partners suitable for the study field and the relevant study programmes are selected and how the cooperation is organised by describing the cooperation with employers. In addition, specify the mechanism for the attraction of the cooperation partners.

Taking into account the integration of Latvia into the European Union, business globalisation and the international nature of information and communication technologies, study programmes are implemented in both Latvian and English. As a result, the students learn english ICT terminology better. TSI education strategy envisages becoming the leading private technical university in Latvia and in the Baltic Sea region, also implementing the study programmes that meet the interests of the international target audience, based on the current and future needs of the industry, which will

be affected by the 4th industrial revolution, which will bring changes in the operation of companies, business organisation and the life of society. Therefore, the following goals of international involvement have been set:

- internationalization of studies, training and research;
- ensuring the effective attraction of foreign students, implementing marketing, recruitment and student attraction activities adapted to the specific countries;
- development of international partnerships and cooperation, creation of a strategic partnership with the University of Great Britain (UWE);
- expansion of the research cooperation networks;
- promotion of the mobility opportunities for the TSI students and staff;
- expanding staff opportunities and increasing the motivation to engage and actively participate in the internationalization process.

Within the field of the study, TSI participates in the work of several international organisations and the implementation of the international projects. Every year the cooperation is ensured with the increased number of foreign universities and scientific institutions, providing the opportunity for the students to study or do internships abroad, as well as the cooperation of the academic staff in the fields of research and academic work.

Cooperation with the foreign universities and scientific institutes takes place both at the level of guest lectures, at the level of scientific project applications and project implementation, doctoral student internships, experience exchange visits, participation in the organising Committees of the international conferences, Editorial Boards of scientific and academic publications: participation in the Promotion Councils, etc. (see more in Chapter 4.)

TSI has established a wide network of partner universities in Europe. Students and faculty actively utilize the opportunities provided by the international mobility programs. TSI implements the mobility activity of the Erasmus+ programme between the countries participating in the programme. In total, the university has concluded more than 50 bilateral cooperation agreements with the higher education institutions in 19 countries, including 30 agreements in the field of implementation of the study programmes, which allow both students to study at the partner universities as part of the exchange programme, and the lecturers to go on exchange trips to the partner universities to deliver the lectures and to visit seminars on the latest achievements in science. The concluded Erasmus+ cooperation agreements with the universities that implement the study programmes similar to the field of study https://tsi.lv/study/erasmus/.

TSI regularly collects experiences from participants of mobility programs who have returned from foreign universities. The implementation of these programs and their impact on the study and research processes is highly positive. After studying abroad, information about the positive results obtained reaches the faculties, and returning international students inform their peers about the perspectives of studying in Latvia.

When concluding cooperation agreements with foreign universities or research institutions, several criteria are taken into account. They must be internationally accredited with a good international reputation, and academic and scientific activities should align with TSI study directions. The course offerings for TSI students in English in the respective study field are expanded to ensure the maximum recognition and alignment of courses after exchange studies. There is also the opportunity to establish double-degree programs, comparing study plans and ensuring the necessary teaching opportunities in English at both institutions. Additionally, the research directions of the university and the possibilities for the development of scientific research are analyzed.

In 2020, a strategic partnership agreement was signed with the University of the West of England

Bristol (UWE), which, among other things, provides for cooperation in research and development of the competences of the faculty members and the establishment of double degree programmes, starting from September 2020, when the TTI Bachelor programme "Computer Science" is being implemented in the form of the double degree; starting in September 2021 with the professional Master degree programme "Aviation Management"; starting in February 2022 with the Master degree programme "Computer Science, with specialisation in Data Analytics and Artificial Intelligence". . In the assessed study direction, there is currently no double-degree program with UWE Bristol. However, TSI faculty members bring the best academic practices from UWE Bristol to the programs in the TSI study direction "Transport Services." TSI faculty actively participate in methodological seminars organized by UWE Bristol. Additionally, academic experience in assessing study work, among other things, is adopted. The knowledge and experience gained are utilized in all TSI study programs.

For example, in the description of the study direction in point 1.1 (Basic information about the university), criteria are added that helped choose UWE Bristol as a strategic partner for TSI. While double-degree programs are not implemented in the "Transport Services" study direction with UWE Bristol, faculty members involved in the "Transport Services" programs also teach in double-degree programs. This allows them to gain academic experience by participating in methodological seminars organized by UWE Bristol and collaborating with UWE faculty in jointly assessing study works.

In aprīlī 2022, a cooperation agreement has been signed with the Hogeschool Zeeland (HZ) University of Applied Sciences in the Netherlands, providing an opportunity for the students of "Transport and Logistics" to spend the last two semesters in the Netherlands, and to acquire an additional specialisation "Maritime Logistics", as well as to undergo a specialisation internship in the Netherlands. From the autumn semester of the academic year 2024/2025, students will have the opportunity to undergo internships and acquire additional specialization in the Netherlands. Informational seminars for students of the program are currently taking place during this spring semester.

Several conditions are taken into account when concluding cooperation agreements with the foreign universities. The offer of the study courses for the TSI students in English in the relevant field /sub-field of the study in order to ensure a maximum process of recognition and equalisation of the study courses after exchange studies. The possibility of creating the double diploma programmes is analysed, the study plans are compared, and the possibilities of providing the necessary study courses in English in both universities are compared. Also, the university research directions and the development possibilities of the scientific research are analysed.

Cooperation at the level of Promotion Councils. In accordance with the promotion regulations, the independent opinions of foreign reviewers are provided in the review of the doctoral thesis. TSI actively cooperates with the academic staff of various European universities as potential reviewers. A permanent member of the TSI Promotion Council is the professor of Vilnius Gediminas Technical University(VilniusTech) Dr. Olegas Prentkovskis.

2.5.3. Specify the system or mechanisms, which are used to attract the students and the teaching staff from abroad. Provide the assessment of the incoming and outgoing mobility of the teaching staff in the reporting period, the mobility dynamics, and the issues which the higher education institution/ college faces with regard to the mobility of the teaching staff.

System for attracting foreign students and number of foreign students

In accordance with the development strategy of TSI, one of the main components of which is the internationalization of the university, the wider attraction of quality students, the development of international partnerships, etc. TTI purposefully implements the attraction of foreign applicants:

1. To attract applicants from India, Egypt, Vietnam and Turkey, a strategic partner has been selected - an international company MSM (M Square Business Solutions Inc.), which ensures the high quality selection of applicants, their examination and at the same time advising the applicants on the study opportunities and conditions at TTI.
2. To attract the applicants from different countries, TTI uses the services of agents. TTI has terminated the cooperation with a number of recruitment agencies whose recruited applicants had a high drop-out rate after admission to the university or did not fulfil all the requirements of TTI. Each year, TTI reviews the list of active agents and conducts a quality audit of their work. One of the objectives for 2022 is to expand the cooperation in the European and CIS countries; the contracts are concluded with the new agencies in Bulgaria, Greece, Romania, Georgia, Kazakhstan and Uzbekistan.
3. Participation in the international education exhibitions: for example, in 2021, TTI participated in online exhibitions in Kazakhstan, Uzbekistan, Georgia, Ukraine. The year 2022 started with face-to-face exhibitions in Kazakhstan, Uzbekistan, Georgia and Lithuania, as well as participation in an exhibition in Serbia, which is a new region for TTI.
4. Seminars for potential students, in cooperation with agencies. Such seminars have been organised both during the visits to the foreign countries, and online, using modern technologies and various platforms (Zoom, GoToMeeting, BigBlueButtom, etc.).
5. Digital advertising campaigns on social networks (Facebook/Meta, Instagram) and the Google platform. Digital advertising campaigns are implemented by assessing the popularity of the social networks in each country, the available budget and the current offer at the time and the current economic and political situation in the world. In February 2022, an advertising campaign was also launched in Lithuania on distance learning study opportunities and the offer of TTI for the Lithuanian market.
6. PR activities in the foreign markets. When visiting the foreign countries, the opportunity to publish information is taken, mostly on social networks (Facebook, Instagram, LinkedIn) and on the TTI website about the visit, seminars, general information about studies in Latvia and in TTI.

TSI pays great attention to the selection and admission of foreign students. Various measures have been taken to attract the most promising students to the Institute and to address the risks associated with illegal immigration. The procedure for admission of applicants has been revised and improved by implementing the criteria for qualitative selection of foreign students for admission to TSI. With the year 2022, the admission requirements for applicants from India have been strengthened. Currently, students from India are not admitted with an average grade of the previous education certificate lower than 65%, and grades in Mathematics and English lower than 60%.

Foreign applicants who wish to study in the undergraduate programmes are required to take tests in accordance with the additional admission requirements of the study programme - a test in Physics and/or Mathematics and English.

The total number and share of foreigners studying in the programs of the study direction is given in Figure 11.
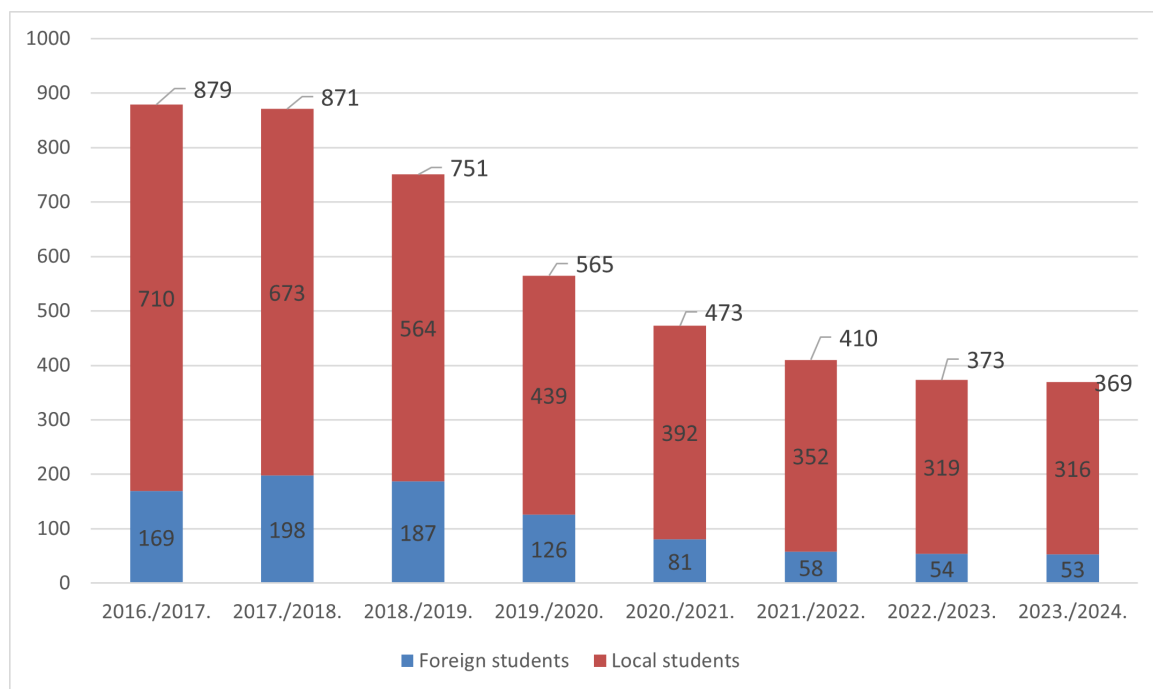
Fig.11. The number of foreign students in the study programmes

The number of foreign students in this field of the study increased from 10% in 2014/2015 to 25% in 2018/2019. One of the reasons for the increase was active marketing work in the foreign markets, especially in India; the other was the last year when the university accepted students to study in Russian, which was used by many students from CIS countries. In the following years, the requirements for foreign students, including their language skills, became more and more stringent, which reduced the number of foreigners enrolled, especially from India and Pakistan. Currently, for the second year, the number of foreign students is about 14% of the total number of students of the field of the study. There are a total of 288 foreign students in the university, which is 15% of the total students at university.

During the reporting period, there were 43 incoming and 91outgoing students and 16 foreign lecturers in the ERASMUS+ mobility programme. Incoming mobility students are enrolled as exchange students in the Bachelor or Master programmes of the field of the study, although in some cases the exchange students also choose to take individual courses from the programmes of other faculties. The recognition of the study results obtained during the ERASMUS+ programme is regulated by the TSI ERASMUS+ programme scholarship competition instructions

The number of students choosing to go on exchange mobility from a Master programme is lower than from a Bachelor programme. The main reason is that Master students usually start working already during their studies, since these specialities are in high demand on the labour market, or they start their studies while already working.

System for attracting foreign teaching staff

For internationalization of activities and increase of competitiveness on the national and international scale, as well as for the enhancement of study quality, TSI attracts foreign teaching staff using own resources and the financial resources of European Structural Funds. Foreign lecturers are invited to give guest lectures or teach study courses in accord with the Erasmus+ cooperation agreements and individual inter-university cooperation agreements. TSI announces recruitment on the European Commission's portal *Euraxess* and uses other types of attracting foreign lecturers, which tend to be various. Foreign lecturers are usually invited teach specialized and highly professional courses of the program, therefore, while selecting lecturers, the Faculty

management gets acquainted with the latest publications in the specific field and establishes cooperation with the authors of specific research.

The human resources policy, including the engagement of foreign lecturers in teaching activities at the Faculty, is implemented in accordance with the development plan of the Engineering Faculty, which envisages a continuous increase in the number of foreign lecturers, considering that the programmes are also taught in English.Each year, the faculties have a special budget for attracting the foreign teaching staff, in the amount of EUR 10 000 on average.

In the years 2019-2020, 5 foreign guest lecturers were attracted to the study area within the project "Strengthening the academic staff of the Institute of Transport and Telecommunications in the areas of strategic specialisation" No. 8.2.2.0/18/A/011. Cooperation with some of them takes place on the ongoing basis, for example, Ph.D. Ovezmyradov Berdymyrat. Currently, in the Master level programme, he is constantly teaching the study course "Decision Making in Transport and Logistics"; however, before that this study course was developed by Nathanail Efychia, visiting Professor from the University of Thessaly, Greece, in cooperation with Professor I. Jackiv. Gunnar Prause, Visiting Professor from Wismar University of Applied Sciences (Germany) is lecturing on the study course "Logistics and Supply Chain Management" as well as the free elective course "Green Logistics".

Evaluation of outgoing faculty mobility during the reporting period

Outgoing faculty mobility at the university is implemented within the framework of the *Erasmus+* program. Collaboration agreements have been concluded with other European Union universities where equivalent study programs are implemented to ensure full-fledged cooperation. The basic condition for an *Erasmus+* teaching visit is that the lecturer must provide at least eight academic hours, which can be either lectures or seminars. Before going on a guest lecture visit, faculty members contact the host university to develop an appropriate lecture plan. During the reporting period, faculty members involved in the study program have delivered guest lectures 58 times within the *Erasmus+* program, and in the last two years, the frequency of mobilities has increased.

The main difficulties are related to the academic workload of faculty and administrative activities, which are relatively high in the study program as a whole. Additionally, faculty members whose main job is not at TSI are less likely to utilize mobility opportunities, significantly narrowing the circle of employees who can be involved in mobility activities, even though these are short-term mobility events.

2.6. Implementation of the Recommendations Received During the Previous Assessment Procedures

2.6.1. Assessment of the fulfilment of the plan regarding the implementation of the recommendations provided by the experts during the previous accreditation of the study field, as well as the assessment of the impact of the given recommendations on the study quality or the improvement of the study process within the study field and the relevant study programmes.

In 2012, the Professional bachelor study programme Transport and Logistics (the previous title

"Transport and Business Logistics") was included and assessed in the study field "Management, Administration and Real Estate Management". One programme "Business Management in Transport" was evaluated in the study field "Transport Services", which is currently not being promoted for accreditation and is being closed.

By the decision No. 172 of the Accreditation Commission of the Ministry of Education and Science of June 14, 2013 the programme "Transport and Logistics" " (the previous title "Transport and Business Logistics") was accredited in the field of the study "Transport Services".

The recommendations made in the previous evaluation procedures of the field of the study have been fully implemented, an analysis of the recommendations has been carried out and they are suitable for the specifics of the field of the study and the corresponding study programmes.

The impact of the recommendations received in the previous evaluation procedures on the quality of studies and the improvement of processes is positive. Implementing the recommendations made during accreditation the following activities were carried out:

Changes in the evaluation system of the study courses

The final assessment of a course of study takes into account the intermediate assessments of the knowledge and competences acquired in the course, with the weight of the examination in the final mark of the course not exceeding 50%. The assessment system shall be visible in the course description and known and understood by the students. A new e-environment for the study course descriptions has been developed (cms.tsi.lv), where the procedures for agreeing and approving the study course descriptions also take place. To see the changes refer to the respective course description.

Feedback from the employers in the sector

In order to improve the study programmes, to ensure interdisciplinarity and to coordinate the cooperation with employers and graduates, a Study Programme Council has been established, which also includes the representatives of the employers. The Council organises meetings at least once a semester, so that employers are directly involved in reviewing and improving the content of the programmes. In order to implement the recommendations, TTI conducts a continuous survey of graduates and employers (at least once every two years). For more details see the description of Criterion 3.3. Several events are organised every year, or even several times a year, such as R2B events, round table discussions, seminars, meetings between students and alumni, who have often become employers themselves, and others.

Proportion of two-credit courses

Since the last accreditation, separate 2 credit point courses have been combined into 4 credit point courses, resulting in a reduction in the number of courses per semester to no more than 5 to 6 and in the amount of student work per semester in preparing reports has decreased.

Increased offer of free elective courses

The offer of free elective (Block C) courses has been considerably expanded. The Bachelor level programme offers two specialisations, which the student can choose freely starting from semester 4: Sustainable Transport Solutions and Smart Logistics Systems. Within the framework of a cooperation agreement signed with the Hogeschool Zeeland (HZ) University of Applied Sciences in the Netherlands, students can spend the last two semesters in the Netherlands and to study the additional specialisation "Maritime logistics" as well as a specialised internship in the Netherlands.

Library facilities and literature

Starting from the year 2015, all literature is purchased in English only. In addition, no students have been admitted to study in Russian since the year 2018. Academic Complete, Scopus, Science Direct databases are subscribed to, see more in the description of the field of the study, Criterion 3.3.

Overall, it can be said that the recommendations made during the accreditation period of the previous study direction were carefully analyzed and implemented. The implementation of the recommendations contributed to the improvement and development of the programs.

A detailed overview of recommendations and their implementation plan for the Professional Bachelor's study program "Transport and Logistics" is provided in Annex 18. The 2013 expert opinion on the study direction "Management, Administration, and Real Estate Management," which evaluated the study program "Transport and Logistics" (formerly titled "Transport and Business Logistics"), is presented in the appendix to this section.

2.6.2. Implementation of the recommendations given by the experts during the evaluation of the changes to the study programmes in the respective study field or licensed study programmes over the reporting period or recommendations received during the procedure for the inclusion of the study programme on the accreditation form of the study field (if applicable).

In 2014, a procedure was held to include the master study programme "Intelligent Transport and Logistics" (formerly called Master of Social Sciences in Transport and Logistics) in the study field "Transport Services".

The recommendations made by the expert during the evaluation were taken into account and the implementation plan for the recommendations received is presented in Appendix 19.

Following the recommendations of the experts, the need for internships in the programme has been reviewed, and the Master programme itself has been improved and supplemented with the study courses that correspond to the development trends in the field of transport and logistics, which nowadays require specialised knowledge in the field of ICT. The name of the programme itself has also been changed, which not only permits to avoid duplication of the title of the programme and the degree, but also provides precise information on the scope of the programme implementation.

Study course descriptions are clarified and updated, specifying the criteria and requirements for obtaining the credit points. To see the changes refer to the respective course description. More information on the developed e-learning environment is in the description of Criterion 3.4.

The offer of free elective (Block C) courses has been considerably expanded, allowing not only to acquire the general knowledge but also additional knowledge in the specialty. In some cases, the new study courses developed by the lecturers in the field of study of the programme are also offered in Block C. After the completion of such courses, the students feedback is collected on how interesting and useful the course was, and if the feedback is positive, the study course may be included as a stand-alone independent study course in Block B of the programme. Under a cooperation agreement with the international distance learning platform Coursera, Master students can choose any course, take and pass it, and receive a certificate of completion for that course.

It must be admitted that Master degree students make less use of student exchange and mobility

opportunities than Bachelor students, since practically all Master degree students are already working. However, the University is trying to promote this activity, several new cooperation agreements have been signed in the reporting period, and 12 students have used the mobility opportunity in the reporting period.

In order to support students' involvement in the scientific work, a regular 2 times a year students' scientific conference the students' scientific conference "Science and Technology - A Step into the Future" is held on a regular basis twice a year, where the participation of Master students is compulsory, see more information in the description of Criterion 4.5. Two research clusters have been opened which, among other things, involve students in the research: 1) Data Analysis and Artificial Intelligence Research Cluster; 2) Systems Analysis and Modelling Research Cluster. Students are involved in the following projects: the project "Innovation Grants for Students at the Institute of Transport and Communications" / iDEAHUB (Nr.1.1.1.3/21/A/006), in which 20 innovation projects have taken place, etc., the project "Enhancing excellence and innovation capacity in sustainable transport interchanges" (ALLIANCE) held summer schools, etc. Therefore, it can be stated that the involvement of students in the scientific activities is being promoted and the recommendation has been implemented.

Each year, the faculties have a special budget for attracting the foreign teaching staff, in the amount of EUR 10 000 on average. In the years 2019-2020, 5 foreign guest lecturers were attracted to the study area within the project "Strengthening the academic staff of the Institute of Transport and Telecommunications in the areas of strategic specialisation" No. 8.2.2.0/18/A/011. Cooperation with some of them takes place on the ongoing basis, for example, Ph.D. Ovezmyradov Berdymyrat. Currently, in the Master level programme, he is constantly teaching the study course "Decision Making in Transport and Logistics"; however, before that this study course was developed by Nathanail Efychia, visiting Professor from the University of Thessaly, Greece, in cooperation with Professor I. Jackiv. Gunnar Prause, Visiting Professor from Wismar University of Applied Sciences (Germany) is lecturing on the study course "Logistics and Supply Chain Management" as well as the free elective course "Green Logistics". Although the experts' recommendation has been fulfilled, the process of recruiting foreign teaching staff is continuous and ongoing.

The study program has been taught in distance learning in the Russian language since the academic year 2015/2016, as confirmed by the decision No. 382 of the Study Accreditation Commission on June 19, 2015. No recommendations were included in the decision.

Annexes

I - Information on the Higher Education Institution/ College		
Information on the implementation of the study field in the branches of the higher education institution/ college (if applicable)		
List of the governing regulatory enactments and regulations of the higher education institution/ college	Annex 2. TSI internal regulation list .pdf	2.pielikums. TSI Iekšējo normatīvo dokumentu saraksts 0103.docx
The management structure of the higher education institution/ college	Annex 3. Management structure.doc	3.pielikums. TSI Struktūra.pdf

II - Description of the Study Field - 2.1. Management of the Study Field		
Plan for the development of the study field (if applicable)	Annex 4. Development plan of the field of study 0103.docx	4.pielikums. Studiju virziena attīstības plāns Transporta pakalpojumi 0103.docx
The management structure of the study field	Annex 5 STUDY DIRECTION MANAGEMENT SHEME.pdf	5.pielikums. Studiju virziena parvaldibas strukturshema.pdf
A document certifying that the higher education institution or college will provide students with opportunities to continue their education in another study programme or another higher education institution/ college (agreement with another accredited higher education institution or college) if the implementation of the study programme is terminated.	Annex 22. Agreement TSI RTU.docx	22.pielikums . Ligums RTU_TSI_.edoc
A document certifying that the higher education institution or college guarantees compensation for losses to students if the study programme is not accredited or the study programme license is revoked due to actions (actions or omissions) of the higher education institution or college and the student does not wish to continue studies in another study programme.	Annex 23..Confirmation 1103.docx	23.pielikums. Apliecinājums par zaudējumu kompensaciju 1103.edoc
Standard sample of study agreement	Annex 24. Sample of the study agreement 0103.pdf	24.pielikums. Studiju l īguma paraugs 0103.pdf

II - Description of the Study Field - 2.2. Efficiency of the Internal Quality Assurance System		
Analysis of the results of surveys of students, graduates and employers	Annex.6 SURVEY.zip	6.pielikums. Aptauju dati.zip

II - Description of the Study Field - 2.3. Resources and Provision of the Study Field		
Basic information on the teaching staff involved in the implementation of the study field	Annex 10. Academic staff involved in the implementation of the study direction 0103.xlsx	10 pielikums Mācibspeku saraksts 0103.xlsx
Biographies of the teaching staff members (Curriculum Vitae in Europass format)	CV en.zip	CV lv.zip
A statement signed by the rector, director, head of the study programme or field that the knowledge of the state language of the teaching staff involved in the implementation of the study programmes within the study field complies with the regulations on the state language knowledge and state language proficiency test for professional and official duties.	Annex 20. Confirmation of knowledge of the state language.docx	20.pielikums. Apliecinajums valsts valodas prasme.edoc
A statement of the higher education institution/ college on the respective foreign language skills of the teaching staff involved in the implementation of the study programme at least at B2 level according to the European Language Proficiency Assessment levels (level distribution is available on the website www.europass.lv, if the study programme or part thereof is implemented)	Annex 21 Confirmation of foreign language skills at least at B2 level.docx	21.pielikums. Apliecinajums anglu valodas prasme.edoc

II - Description of the Study Field - 2.4. Scientific Research and Artistic Creation		
Summary of quantitative data on scientific and/ or applied research and / or artistic creation activities corresponding to the study field in the reporting period.	Annex 11. Quantitative data on scientific research activities .docx	11.pielikums. Kvantitatīvo datu apkopojums 0103.docx
List of the publications, patents, and artistic creations of the teaching staff over the reporting period.	Annex 13. List of scientific publications Scopus-W0S-- 2013-2023 08.01.2024.pdf	13.pielikums. Publikāciju saraksts Scopus-W0S-- 2013-2023 08.01.2024.pdf

II - Description of the Study Field - 2.5. Cooperation and Internationalisation		
List of cooperation agreements, including the agreements for providing internship	Annex 14. Cooperation Agreements 0103.docx	14.pielikums. Sadarbības līgumi 0103.docx
Statistical data on the teaching staff and the students from abroad	Annex 15. Statistical data on the teaching staff and the students from abroad 0103.pdf	15.pielikums. Ārvalstu macibspeki un studenti programmās 0103.pdf
Statistical data on the incoming and outgoing mobility of students (by specifying the study programmes)	Annex 16. Incoming and outgoing mobility of students 0103.pdf	16.pielikums. Studentu ienākoša izejoša mobilitāte 0103.pdf
Statistical data on the incoming and outgoing mobility of the teaching staff	Annex 17. Statistics on incoming and outgoing teaching staff mobility 0103.pdf	17.pielikums. Statistikas dati par macibspeku mobilitati 0103.docx

II - Description of the Study Field - 2.6. Implementation of the Recommendations Received During the Previous Assessment Procedures		
Report on the implementation of the recommendations received both in the previous accreditation and in the licensing and/ or change assessment procedures and/ or the procedures for the inclusion of the study programme on the accreditation form of the study field.	Annex 18. Report on the implementation of the recommendations Transports&Logistics.pdf	18..pielikums. Ekspertu rekomendāciju izpilde .pdf
An application for the evaluation of the study field signed with a secure electronic signature	Application for the assessment of the study direction 1103.doc	Iesniegums 1103.edoc

III - Description of the Study Programme - 3.1. Indicators Describing the Study Programme		
Sample of the diploma and its supplement to be issued for completing the study programme		
For academic study programmes - Opinion of the Council of Higher Education in accordance with Section 55, Paragraph two of the Law on Higher Education Institutions (if applicable)		
Compliance of the joint study programme with the provisions of the Law on Higher Education Institutions (table) (if applicable)		
Statistics on the students in the reporting period		

III - Description of the Study Programme - 3.2. The Content of Studies and Implementation Thereof		
Compliance with the study programme with the State Education Standard		
Compliance of the qualification to be acquired upon completion of the study programme with the professional standard or the requirements for professional qualification (if applicable)		
Compliance of the study programme with the specific regulatory framework applicable to the relevant field (if applicable)		
Mapping of the study courses/ modules for the achievement of the learning outcomes of the study programme		
The curriculum of the study programme (for each type and form of the implementation of the study programme)		
Descriptions of the study courses/ modules		
Description of the organisation of the internship of the students (if applicable)		

III - Description of the Study Programme - 3.4. Teaching Staff		

Confirmation that the academic staff of the doctoral study programme includes not less than five doctors, of which at least three are experts approved by the Latvian Council of Science in the branch or sub-branch of science in which the study programme intends to award a scientific degree (if applicable)		
Confirmation that the academic staff of the academic study programme complies with the requirements specified in Section 55, Paragraph one, Clause 3 of the Law on Higher Education Institutions (if applicable)		

Other annexes

Name of document	Document
12.pielikums TSI Projects	12.pielikums TSI Projects.pdf
19..pielikums. Ekspertu rekomendāciju izpildes pārskats programmai Inteliģentais transports un viedā loģistika	19..pielikums. Ekspertu rekomendāciju izpildes pārskats Intel.Transports & Viedā logistika .pdf
Annex 19. Report on the implementation of the recommendations MSc Program Intelligent Transport and Smart Logistics	Annex 19. Report on the implementation of the recommendations Intel Transport % Smart Log.pdf
Pielikumu saraksts	Pielikumu saraksts.pdf
APPENDICES	APPENDICES.pdf
Annex 1. Minutes of the Senate Session Excerpt	Annex 1. Minutes of the Senate Session Excerpt.pdf
8.pielikums. Laboratorijas	8.pielikums. Laboratorijas.pdf
Annex 8. Laboratories	Annex 8. Laboratories.pdf
Annex 7. PROVISION OF TSI WITH CLASSROOMS	Annex 7. PROVISION OF TSI WITH CLASSROOMS.pdf
7.pielikums. Mācību auditorijas	7.pielikums. Macību auditorijas.pdf
1.pielikums. Senata izraksts Transporta pakalpojumi akreditacijai	1.pielikums. Senata izraksts 2201.pdf
JOINT REPORT OF EXPERTS Management and Administration 2012	JOINT REPORT OF EXPERTS Management and Administration 2012.pdf
Ekspertu atzinums TSI-26-M-Transports-logistika-31032014	TSI-26-M-Transports-logistika-31032014.pdf
25.pielikums. Stratēģiskā sadarbibas partnera izveles procedura	25.pielikums. Stratēģiskā sadarbibas partnera izveles procedura.docx
Annex 25. Procedure for selecting a strategic collaboration partner	Annex 25. Procedure for selecting a strategic collaboration partner.docx
Annex 26. Course specification guidelines	Annex 26. Course specification guidelines.pdf
26.pielikums. Vadlīnijas studiju kursa apraksta sagatavošanai	26.pielikums. Vadlīnijas studiju kursa apraksta sagatavošanai .pdf
TSI atbildes uz AIKA komentariem.zip	TSI atbildes uz AIKA komentariem.zip
TSI prezentācija_24.04.2024_Final.pptx	TSI prezentācija_24.04.2024_Final.pptx
software_PTV_Initial_Invoice.pdf	software_PTV_Initial_Invoice.pdf
software_PTV_last_maintanace_invoice.pdf	software_PTV_last_maintanace_invoice.pdf
Student's Internship Report.pdf	Report.pdf
Supervisor feedback on internship.pdf	Supervisor feedback.pdf
IZF PLan 2024.docx	IZF PLan 2024.docx
Atbilde uz 1.jautajumu EN.docx	Atbilde uz 1.jautajumu EN.docx

Intelligent Transport and Smart Logistics (45840)

Study field	*Transport Services*
ProcedureStudyProgram.Name	*Intelligent Transport and Smart Logistics*
Education classification code	*45840*
Type of the study programme	*Academic master study programme*
Name of the study programme director	*Irina*
Surname of the study programme director	*Jackiva*
E-mail of the study programme director	*Jackiva.I@tsi.lv*
Title of the study programme director	*Dr.sc.ing.*
Phone of the study programme director	*29635322*
Goal of the study programme	*MSc Program Intelligent Transport and Smart Logistics aims to prepare through a multidisciplinary approach high-level specialists who can work with the design, planning and management of transport and logistics systems , as well as identify, analyse, and solve complex interdisciplinary transport and logistics problems and convey information about them to industry and society*
Tasks of the study programme	*1.High level education, theoretical knowledge and skills of solving practical tasks in business activities, particularly in the area of trnsport and logistics and optimization processes control* *2.Ability for independent mastering and creative employment of the formerly stored and newly acquired practical knowledge in professional activities as well as further education under the doctoral program* *3.Skills of defining aims and formulating tasks related to the functional responsibilities, skills of applying the received knowledge to solving practical tasks* *4.Skills of independent formulating and solving scientific tasks and preparing the research results for publishing.*

Results of the study programme	*1. Able to provide specialized up to-date knowledge of transport engineering in technology, develop specialized problem solving skills required for research, and acquire leadership and innovation skills applicable to solving real-world and theoretical problems in the field of transport and logistics.*
	2. Able to participate and actively contribute to all phases of research or development projects in the field of transport and logistics, taking into account the importance of technology in society, including economic, social, and sustainable development
	3. Based on a broad knowledge of intelligent transport systems able to effectively use computerised tools for modelling and analysis of transportation systems engineering problems
	4. Able to design, analyse, improve and manage the transport and logistics systems and emerging technologies
	5. Able to use a combination of approaches to critical analyze specific intelligent solutions with a view to practical implementation in intelligent transport and logistics systems
	6. Able to organise and lead teamwork, take responsibility for team performance, demonstrate leadership skills and results-oriented thinking
	7. Able to explore, identify the value and apply current and emerging technologies for for lifelong learning, professional activity and development
Final examination upon the completion of the study programme	*Master's Thesis*

Study programme forms

Full time studies - 2 years - latvian

Study type and form	*Full time studies*
Duration in full years	*2*
Duration in month	*0*
Language	*latvian*
Amount (CP)	*80*
Admission requirements (in English)	*Bachelor's degree in engineering, natural sciences, social sciences (economics or management sciences), or equivalent to higher education, with a completed program of 120 CP (180 ECTS)*
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	*Master of Engineering in Transport and Logistics*
Qualification to be obtained (in english)	--

Places of implementation

Place name	City	Address
Transport and Telecommunication Institute	RĪGA	LAUVAS IELA 2, LATGALES PRIEKŠPILSĒTA, RĪGA, LV-1019

Full time studies - 2 years - english

Study type and form	Full time studies
Duration in full years	2
Duration in month	0
Language	english
Amount (CP)	80
Admission requirements (in English)	Bachelor's degree in engineering, natural sciences, social sciences (economics or management sciences), or equivalent to higher education, with a completed program of 120 CP (180 ECTS) Studies in English require English language skills at least at B2 level
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	Master of Engineering in Transport and Logistics
Qualification to be obtained (in english)	--

Places of implementation

Place name	City	Address
Transport and Telecommunication Institute	RĪGA	LAUVAS IELA 2, LATGALES PRIEKŠPILSĒTA, RĪGA, LV-1019

Part time extramural studies - 2 years, 6 months - latvian

Study type and form	Part time extramural studies
Duration in full years	2
Duration in month	6
Language	latvian
Amount (CP)	80
Admission requirements (in English)	Bachelor's degree in engineering, natural sciences, social sciences (economics or management sciences), or equivalent to higher education, with a completed program of 120 CP (180 ECTS)
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	Master of Engineering in Transport and Logistics
Qualification to be obtained (in english)	--

Places of implementation

Place name	City	Address
Transport and Telecommunication Institute	RĪGA	LAUVAS IELA 2, LATGALES PRIEKŠPILSĒTA, RĪGA, LV-1019

Part time extramural studies - 2 years, 6 months - english

Study type and form	Part time extramural studies
Duration in full years	2
Duration in month	6
Language	english
Amount (CP)	80

Admission requirements (in English)	Bachelor's degree in engineering, natural sciences, social sciences (economics or management sciences), or equivalent to higher education, with a completed program of 120 CP (180 ECTS) Studies in English require English language skills at least at B2 level.
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	Master of Engineering in Transport and Logistics
Qualification to be obtained (in english)	--

Places of implementation

Place name	City	Address
Transport and Telecommunication Institute	RĪGA	LAUVAS IELA 2, LATGALES PRIEKŠPILSĒTA, RĪGA, LV-1019

Full time studies - 1 years, 6 months - latvian

Study type and form	Full time studies
Duration in full years	1
Duration in month	6
Language	latvian
Amount (CP)	60
Admission requirements (in English)	• First-cycle professional higher education in the field of transport or logistics and professional qualification as a logistics manager or equivalent to higher education, • Bachelor's degree in engineering, natural sciences, social sciences (economics or management sciences), or first-cycle professional higher education in relevant fields, or equivalent to higher education, with a completed program of 160 CP (240 ECTS) and 1 year of practical work experience in the field of transport and logistics; entrance exam.
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	Master of Engineering in Transport and Logistics
Qualification to be obtained (in english)	--

Places of implementation

Place name	City	Address
Transport and Telecommunication Institute	RĪGA	LAUVAS IELA 2, LATGALES PRIEKŠPILSĒTA, RĪGA, LV-1019

Full time studies - 1 years, 6 months - english

Study type and form	Full time studies
Duration in full years	1
Duration in month	6
Language	english
Amount (CP)	60

Admission requirements (in English)	• First-cycle professional higher education in the field of transport or logistics and professional qualification as a logistics manager or equivalent to higher education, • Bachelor's degree in engineering, natural sciences, social sciences (economics or management sciences), or first-cycle professional higher education in relevant fields, or equivalent to higher education, with a completed program of 160 CP (240 ECTS) and 1 year of practical work experience in the field of transport and logistics; entrance exam.. Studies in English require English language skills at least at B2 level
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	Master of Engineering in Transport and Logistics
Qualification to be obtained (in english)	--

Places of implementation

Place name	City	Address
Transport and Telecommunication Institute	RĪGA	LAUVAS IELA 2, LATGALES PRIEKŠPILSĒTA, RĪGA, LV-1019

Part time extramural studies - 2 years - latvian

Study type and form	Part time extramural studies
Duration in full years	2
Duration in month	0
Language	latvian
Amount (CP)	60
Admission requirements (in English)	-First-cycle professional higher education in the field of transport or logistics and professional qualification as a logistics manager equivalent to higher education, -Bachelor's degree in engineering, natural sciences, social sciences (economics or management sciences), or first-cycle professional higher education in relevant fields, or equivalent to higher education, with a completed program of 160 CP (240 ECTS) and 1 year of practical work experience in the field of transport and logistics; entrance exam.
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	Master of Engineering in Transport and Logistics
Qualification to be obtained (in english)	--

Places of implementation

Place name	City	Address
Transport and Telecommunication Institute	RĪGA	LAUVAS IELA 2, LATGALES PRIEKŠPILSĒTA, RĪGA, LV-1019

Part time extramural studies - 2 years - english

Study type and form	Part time extramural studies
Duration in full years	2

Duration in month	0
Language	*english*
Amount (CP)	*60*
Admission requirements (in English)	*-First-cycle professional higher education in the field of transport or logistics and professional qualification as a logistics manager or equivalent to higher education, -Bachelor's degree in engineering, natural sciences, social sciences (economics or management sciences), or first-cycle professional higher education in relevant fields, or equivalent to higher education, with a completed program of 160 CP (240 ECTS) and 1 year of practical work experience in the field of transport and logistics; entrance exam. Studies in English require English language skills at least at B2 level.*
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	*Master of Engineering in Transport and Logistics*
Qualification to be obtained (in english)	*--*

Places of implementation

Place name	City	Address
Transport and Telecommunication Institute	RĪGA	LAUVAS IELA 2, LATGALES PRIEKŠPILSĒTA, RĪGA, LV-1019

Part time extramural studies distance education - 2 years, 6 months - english

Study type and form	*Part time extramural studies distance education*
Duration in full years	*2*
Duration in month	*6*
Language	*english*
Amount (CP)	*80*
Admission requirements (in English)	*Bachelor's degree in engineering, natural sciences, social sciences (economics or management sciences), or equivalent to higher education, with a completed program of 120 CP (180 ECTS) Studies in English require English language skills at least at B2 level.*
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	*Master of Engineering in Transport and Logistics*
Qualification to be obtained (in english)	*--*

Places of implementation

Place name	City	Address
Transport and Telecommunication Institute	RĪGA	LAUVAS IELA 2, LATGALES PRIEKŠPILSĒTA, RĪGA, LV-1019

Part time extramural studies distance education - 2 years - english

Study type and form	*Part time extramural studies distance education*
Duration in full years	*2*
Duration in month	*0*
Language	*english*

Amount (CP)	60
Admission requirements (in English)	*-First-cycle professional higher education in the field of transport or logistics and professional qualification as a logistics manager or equivalent to higher education, -Bachelor's degree in engineering, natural sciences, social sciences (economics or management sciences), or first-cycle professional higher education in relevant fields, or equivalent to higher education, with a completed program of 160 CP (240 ECTS) and 1 year of practical work experience in the field of transport and logistics; entrance exam. Studies in English require English language skills at least at B2 level.*
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	*Master of Engineering in Transport and Logistics*
Qualification to be obtained (in english)	--

Places of implementation

Place name	City	Address
Transport and Telecommunication Institute	RĪGA	LAUVAS IELA 2, LATGALES PRIEKŠPILSĒTA, RĪGA, LV-1019

3.1. Indicators Describing the Study Programme

3.1.1. Description and analysis of changes in the parameters of the study programme made since the issuance of the previous accreditation form of the study field or issuance of the study programme license, if the study programme is not included on the accreditation form of the study field, including changes planned within the evaluation procedure of the study field evaluation procedure.

The master's program "Intelligent Transport and Smart Logistics" (previously named "Master of Social Sciences in Transport and Logistics") was licensed on June 22, 2012, with License No. 04038-22.

By the decision of the Study Accreditation Commission on April 23, 2014, with Decision No. 299, the study program "Intelligent Transport and Smart Logistics" (previously named "Master of Social Sciences in Transport and Logistics") was evaluated and accredited in the study direction "Transport Services."

Changes to the name of the programme

The increase in digitisation and automation in the transport and logistics sector inevitably leads to the necessity of retraining of the workforce within the sector. The most important trend is the interdisciplinary knowledge of professionals working in the industry, the ability to understand logic, to implement and use the information and communication technologies intelligently, to make decisions based on big data analysis. Therefore, in line with the technical competences demanded by the labour markets in the sector, the programme structure has been complemented with engineering or interdisciplinary courses reflecting innovative processes in the field of transport and logistics. In line with the changes in the programme structure, the title of the programme itself has been changed from "Master of Social Sciences in Transport and Logistics" to "Intelligent Transport and Smart Logistics".

Changes to the degree to be awarded

According to the Cabinet of Ministers Regulation No. 595 "Regulations on Latvian science industry groups, science sectors and sub-sectors" (available only in Latvian), all types of transport, as sub-sectors of Civil Engineering and Transport Engineering, belong to the industry group Engineering and Technology.

In order to ensure the compliance of the programme with the requirements of the Latvian legislation, in accordance with the provisions of the Cabinet of Ministers Regulation No. 322 on the Classification of Latvian Education (available only in Latvian) for the specified groups of programmes, the subject area programme group Transport Services, code 840, the degree to be awarded has been changed to Master of Engineering in Transport and Logistics.

Changes in the structure of the programme

During the previous accreditation of the programme, the experts pointed to the need to clarify the substantive content of the programme and to the excessive amount of internship, which are not necessary for an academic programme. The review phase ensured that the students coming to the programme already have the professional knowledge from the previously acquired education or professional activities; this result made it possible to remove the internship in the amount of 20

credit points (30 ECTS) from the programme structure.

The main changes in the structure of the Master programme "Intelligent Transport and Smart Logistics" are related to the expansion of the horizon of knowledge and skills of students, in line with the development trends of the transport and logistics industry. A module of 8 credit points (12 ECTS), consisting of Intelligent Transport Systems, Intelligent Warehousing and Urban Mobility and Smart Cities has been included. This module provides the knowledge and skills to apply sustainable planning principles and a user-centred and inclusive approach to the planning of modern transport systems. In the study course Digitalisation in Transport and Logistics in the amount of 4 credit points (6 ECTS), students learn the development of digital technologies including Internet of Things (IoT), artificial intelligence (AI) and blockchain and their integration into modern logistics and transport systems, demonstrating innovative solutions to transport and logistics problems, such as real-time tracking, predictive analysis, automated warehousing, etc., through the real examples.

The full-time and part-time study plan of the programme includes the Study Project in the amount of 4 credit points (6 ECTS), which has so far been taught only to the distance learning students, and which demonstrates the students' ability to apply the learned theoretical concepts (knowledge) acquired in the programme to solve the complex practical problems in the field of transport and logistics.

The programme has increased the free elective block from 2 to 4 credit points (6 ECTS), which allows not only to include the courses for broadening the general horizons, but also to offer the study courses that provide additional knowledge in the specialisation, or aligns with the specific student's interests, thereby ensuring a student-centered approach within the framework of the study program.

The changes made to the structure of the programme are aimed at providing the students with clear understanding of transport and logistics systems; they also provide the general engineering and analytical skills useful for a career not only in the transport and logistics sector but also in the related industries in public institutions and in the private sector.

Such changes contribute to the development of students' practical scientific competences and enhance the interdisciplinary links in the programme.

3.1.2. Analysis and assessment of the study programme compliance with the study field. Analysis of the interrelation between the code of the study programme, the degree, professional qualification/professional qualification requirements or the degree and professional qualification to be acquired, the aims, objectives, learning outcomes, and the admission requirements. Description of the duration and scope of the implementation of the study programme (including different options of the study programme implementation) and evaluation of its usefulness.

The master's study program is included in the study direction "Transport Services," which is characterized by a set of study programs that concentrate on the use of technology and scientific knowledge specific to the direction in the study process.

The Master degree study programme "Intelligent Transport and Smart Logistics" focuses on the integration of information and communication technologies into transport and logistics systems with the aim of increasing their efficiency, safety, mobility and customer satisfaction, while reducing the impact on the environment. The structure of the programme includes study courses in

different fields of knowledge: Transport Engineering - Smart Transport Systems and Freight and Passenger Transport, Computer Science and Information Technology - Information Systems and Technologies, Artificial Intelligence in Urban Mobility, Mathematics - Data Analysis Methods and Business Forecasting and Optimization Methods in Transport Engineering, Management Sciences - Logistics and Supply Chain Management and Transport Economics, while all other study courses, accounting for 42% of the total course load, are interdisciplinary courses, covering the use of ICT and management in the industry.

On the other hand, it corresponds to the development trends in the field of transport and logistics, which demand specialized knowledge in the field of ICT from industry professionals. For example, in the report 'The impact of emerging technologies on the transport system' (available only in English), several technologies (Smart Sensors, Connectivity, Blockchain, Digital Platforms, Big Data, Artificial Intelligence, Internet of Things) are indicated as the foundation for developing emerging areas such as Cooperative Intelligent Transport Systems (C-ITS), Connected Cooperative Automated Transport (CCAM), Mobility as a Service (MaaS), Self-organizing Logistics (SoL), and others. All of this indicates that both at the European Union and global levels, digitization in transport and logistics is considered a fundamental development strategy. This means that there will be a self-sustained demand for specialists with deep knowledge in both transport and logistics as well as ICT.

Such a division into branches of science allows us to conclude that the program itself is interdisciplinary. According to the "Regulations on the Classification of Education in Latvia," the code of the bachelor's and master's programs included in the study direction is 840, which corresponds to the educational thematic group "Transport Services."

According to the Cabinet of Ministers Regulation No. 595 "Regulations on Latvian Science Sector Groups, Scientific Sectors and Sub-Sectors", Transport Engineering is included in the Civil Engineering and Transport Engineering sector, in the Engineering and Technology sector group.

The master's program title "Intelligent Transport and Smart Logistics," directly characterizes its specific affiliation with the industry and study area; the content of the included courses providing knowledge and skills in the design, planning, and management of transportation and logistics systems, as well as the use of new technologies in this field; also, the program's affiliation with the educational thematic group of Transport Services indicates that the master's program aligns with the study direction of "Transport Services."

The aim and objectives of the Master's programme "Intelligent Transport and Smart Logistics", as well as the study results obtained during the study, correspond to the seventh level of the Latvian Education Classification (Cabinet of Ministers Regulation No 322 "Regulations on the Latvian Education Classification").

The tasks defined in the study programme are aimed at achieving the programme objective " to prepare through a multidisciplinary approach high-level specialists who can work with the design, planning and management of transport and logistics systems , as well as identify, analyse, and solve complex interdisciplinary transport and logistics problems and convey information about them to industry and society" and ensuring the study results.

The learning outcomes of the study programme are formulated using a student-centred approach, structuring and defining in detail the knowledge, skills, competences that the student possesses and is able to use and implement upon graduation.

The study programme focuses on the development and application of the data-driven approaches,

optimisation and simulation tools to analyse transport and logistics systems from various perspectives, including the advanced concepts and solutions. Job opportunities are very wide - graduates work as logistics and distribution manager/coordinator, transport planner and transport system analytics, Intelligent Mobility or ITS consultant, mobility managers and experts in mobility and sustainable logistics, in private or public companies

The mapping of study courses (Annex 2.3) for the achievement of the study programme learning outcomes allowed for in-depth analysis and specification of the learning outcomes of individual study courses. The aims, objectives and planned study results (knowledge, skills, competences) of the study programme " Intelligent Transport and Smart Logistics " are interrelated and they are feasible.

The admission requirements are defined in the TSI Admission Rules and are based on the following regulations: Articles 46 and 47 of the Law on Higher Education Institutions, as well as the Cabinet of Ministers Regulation No 846 of 10 October 2006 "On requirements, criteria and procedures for admission to study programmes".

According to Article 57 of the Law on Higher Education Institutions, the total duration of full-time Bachelor and Master studies may not be less than 5 years, but for the students entering the programme, the previously acquired education may be either of 3 years (especially for foreign students) or of 4 years of the study. Therefore, the Master programme has two implementation durations:

1) 1 year and 6 months of full-time studies and 60 CP (90 ECTS) - with a professional bachelor's degree in transport or logistics and a professional qualification in logistics management, or a bachelor's degree in engineering, natural sciences, social sciences (in economics or management) or professional higher education of the first level in the relevant fields, or equivalent education, with a completed program of 160 CP (240 ECTS) and 1 year of practical work experience in transport and logistics. In this case, the applicant will be required to have an interview with the programme director and to sit an entrance examination in the specialisation.. This option reinforces and promotes the interdisciplinary format of the study process, ensuring a link with the students' practical activities and high motivation of such students.

2) 2 years of full-time studies and 80 CP (120 ECTS) - with a bachelor's degree in engineering, natural sciences, social sciences (in economics or management) or equivalent to higher education, with a completed program of 120 CP (180 ECTS).

The programmes of 80 CP (120 ECTS) and 60 CP (90 ECTS) differ only by one semester, which contains the specific study courses the purpose of which is to provide the fundamental knowledge on topics and areas that would be essential for the students to complete the core part of the degree programme, such as Methods of Data Analysis and Business Forecasting, Information Systems and Technologies, Geography of Transport Systems, Logistics and Supply Chain Management, Freight and Passengers Transportation. The analysis of the programme structure (see mapping) shows that both the short and the long versions of the study programme enable achieving the specified study outcomes.

The study program is implemented in both Latvian and English in full-time on-site and part-time in absentia, but part-time distance learning is available only in English.

Studies in English are chosen not only by foreign students, but also by students from Latvia. This choice is influenced by the fact that, working in international transport companies, English is the basic language of communication. Training in English improves the employment opportunities for students not only in Latvia but also internationally because they can easily integrate into international companies and global supply chains. Training in English also facilitates collaboration

projects and research, making it easier to collaborate with international universities and research institutions (joint research projects, academic exchanges, and internships). Often, applicants who apply for distance learning are physically located outside Latvia, where they are building their careers, and therefore are interested in obtaining education in English. That's why the distance learning program is taught only in English.

Part-time or distance learning makes higher education more accessible to a wider audience, including working professionals and individuals with different work schedules, which is highly relevant in the field of transport and logistics. Part-time studies allow students to continue working while obtaining a master's degree. Additionally, it provides an opportunity for working professionals to advance their careers in the logistics field without interrupting their employment. The short version of the program is designed for individuals who have already completed relevant bachelor's programs or for professionals working in the field of transport and logistics who want to advance their careers directly in this field, acquire new skills, and stay updated on industry trends while continuing to work.

Foreign applicants shall be matriculated after having passed a test of at least B2 level by an internationally recognised testing body or a TSI entrance examination in English of at least B2 level, except in cases where the previous education was obtained in English.

The applicants' preparation in their previous education, motivation to pursue higher education and the organisation of the study process at the TSI shall be such as to ensure the achievement of the programme's learning outcomes and the award of the Master of Engineering degree upon completion of the programme.

3.1.3. Economic and/ or social substantiation of the study programme, analysis of graduates' employment.

The Master study programme "Intelligent Transport and Smart Logistics" is relevant both in Latvia and internationally, preparing high-level specialists in the field of transport and logistics, including the study with English as language of instruction.

In Latvia, as elsewhere in Europe and the world, the transport industry is one of the most strategically important sectors of the national economy, while transport infrastructure, as well as transport and logistics services, have a direct impact on the competitiveness and economic growth, creating conditions for the development of other sectors and attracting investments, generating significant revenues from the export services, thus positively influencing the development of the country as a whole. Strategic location of Latvia on the Baltic Sea and its proximity to Scandinavia make Latvia an important hub for transport and logistics services. The Baltic Sea and the Baltic Sea transport and logistics sector will employ around 66 thousand people.

It was noted in the Transport Development Guidelines 2021-2027 (available only in Latvian) that new technologies, including the innovation and digitalisation, the environmental (climate change) aspects, taking into account emissions from the transport sector, are becoming increasingly important in all sectors, including transport. The research and application of digital solutions for the needs of Latvia are particularly relevant in the transport sector, including intelligent transport systems and automated traffic control, as well as logistics and transit transport flow planning. Digitalisation and automation require the advanced planning methods in the field of transport and

logistics.

Well-designed transport and logistics systems are important for individual mobility, trade, prosperity and economic growth. With passenger and freight transport volumes constantly increasing, the transport systems face a huge challenge: how to balance the need for fast, efficient and sustainable transport with the negative impacts of congestion, pollution and accidents. The answer lies in closer integration of ICT and transport/logistics systems. Vehicles are connected to each other and to the infrastructure of smart cities, allowing a wide range of data to be collected to analyse and manage the movement of passengers and freight. The academic Master programme of TTI focuses on the development and application of the data-driven approaches, optimisation and simulation tools to analyse transport and logistics systems from different perspectives, including the advanced modern concepts and solutions.

The transport and logistics sector needs highly qualified professionals to compete successfully in the global transport and logistics business, to be integrated into the global product supply chains, to attract the highest value-added cargo and investments in cargo handling, manufacturing and logistics, and to offer the competitive passenger transportation. Based on the forecasts of changes in labour demand by occupation in 2030, provided by the Ministry of Economy (Economic Ministry Presentation,available only in Latvian) , the Transport and Storage sector is projected to see an increase in labour demand in such occupations as Senior Specialists in the field of Science and Engineering (296), Science and Engineering Specialists (1107), ICT Senior Specialists (154), Managers in the fields of Production and Specialised Services (202), with a significant decrease in the number of employees in elementary occupations.

According to the data of the Ministry of Economy, the Latvian transport and logistics sector will undergo major changes in the coming years. "The European Green Deal" points to the growing need to develop the automation and digitalisation to deliver sustainable mobility and logistics services. Due to the development of the "Rail Baltica project", the modernisation of the railway infrastructure and rolling stock will bring modern technologies to Latvia, providing ample opportunities for the development of the sector, while creating simultaneously the challenges and opportunities in the education sector. A large number of employees of various fields and specialties will be needed, including the specialists in logistics with relevant, competitive knowledge of transportation, logistics technologies and multimodal supply chains. According to the forecasts of the development trends of the national economy, it is necessary to raise the professional qualifications of those employed in the sector, paying special attention to the in-depth learning of the sector-specific English language in the programmes that in the future will potentially provide the labour resources in the areas with a technical and international orientation, which is undeniably present in the transport and logistics sector, and thus contribute to the development of competitiveness of the transport sector in Latvia and also at the international level.

Forecasting the demand for the medium and high-level logistics workers in the labour market (Informatīvais ziņojums par darba tirgus vidējā un ilgtermiņa prognozēm, available only in Latvian) the education programme group "Transport services" will face a shortage of almost 2 000 specialists with higher education in 2030.

Graduate employment is an important indicator that reflects the demand for specialists prepared in a study program in the job market. The employment rate of graduates from the "Intelligent Transport and Smart Logistics" program is high, and surveyed graduates are building careers in their acquired profession. Graduates mostly work in transportation and logistics, wholesale companies, IT firms, both in Latvia and abroad. On average, 95% of master's students are already employed during their studies or enter the program with work experience.

Graduates of the study program can become managers/coordinators of logistics and distribution

units, transport planners and analysts of transport systems, consultants in smart mobility or ITS, mobility managers and experts in the field of mobility and sustainable logistics in manufacturing, transportation, logistics, wholesale, and other private or state enterprises. The knowledge acquired during the studies enables them to hold leadership positions in private companies or government institutions and manage high-level engineering projects. Program graduates work for companies such as AS AIR BALTIC CORPORATION, SIA LDZ CARGO, Futurus Food, LIDL Latvija, Schunk Sintermetalltechnik GmbH, Cargill, TotalEnergies, and others.

3.1.4. Statistical data on the students of the respective study programme, the dynamics of the number of the students, and the factors affecting the changes to the number of the students. The analysis shall be broken down into different study forms, types, and languages.

The Master study programme "Intelligent Transport and Smart Logistics" is licensed and accredited for full-time in person and part-time in the Latvian, Russian and English languages, and part-time distance learning in the Russian and English languages.

The graphs presented in the Appendix show that after a relatively steady number of students over several years, the last few years are demonstrating the downward trend in the total number of students.

The change in the number of students can be explained both by the demographic indicators and by the decrease in the total number of students in the country, as well as by the Amendments to the Law on Higher Education Institutions and the University's own policy, since after January 1, 2019, students are no longer admitted to study in Russian, which led to a decrease in the total number of students and decrease in the number of foreign students. The students from foreign countries were admitted to study in English and Russian until year 2019, and many foreigners, mostly from former post-Soviet countries, took the opportunity to study in Russian.

The total number of students decreased from 51 in the academic year 2020/2021 to 34 in 2021/2022, and there were 26 students in the academic year 2022/2023. However, in the academic year 2023/2024, there is again a growing trend, with a total of 37 students. The decrease in these years is mainly attributed to full-time students, while the number of part-time and distance learning students has remained at the same level. In the last year of study, the number of students has increased in all study formats. In the academic year 2023/2024, there are 9 students in distance learning and 12 students in part-time studies.

In previous years, an average of 27% of all students in the short version of the program have studied (details in the appendix). Every year, at least one student has completed the short version of the program through distance learning, and 4 to 9 students in part-time non-contact form.

The number of international students has significantly decreased. It went from 43 in the academic year 2019/2020 to 8 in 2022/2023. However, in the last academic year 2023/2024, the number of international students has increased again to 15. At the same time, the number of local students has remained around 20 for the past five years. The decrease in the number of international students is attributed to the university's more selective approach in admitting foreign students, as well as changes in the offered language of instruction. The distribution of international students by home country is provided in the table below:

	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024
Republic of Belarus	1		1	1		
India	14	19	17	8	5	7
Kazakhstan	7	3	2	1	1	1
The Russian Federation	6	3	5	2	1	1
Uzbekistan	5	1	1			1
Lithuania		1	1			
Estonia			1			`
Pakistan			1			
Switzerland			1	1		
Ukraine			2	2	1	1
Azerbaijan						1
Cameroon						1
Lebanon						1
Nigeria						1

The number of local students has remained stable for several years, although TTI provides studies only on the fee-basis, and there is a similar Master programme in Transport field at Riga Technical University, where students have access to state-budget study places. Although this shows that the interest of applicants in the TTI study programme remains constant and steady, taking into account the impact of ICT on the development of the transport and logistics sector, the concept of the programme was changed to include the topical interdisciplinary courses in the programme.

The drop-out rate is around 15% annually, with higher rate among the international students. Statistical data show that students drop out due to the failure to complete their studies (the main reason for foreign students) or due to tuition fee indebtedness, or in some cases by choice. Statistics show that it is common case for people not to resume their studies after taking an academic leave.

3.1.5. Substantiation of the development of the joint study programme and description and evaluation of the choice of partner universities, including information on the development and implementation of the joint study programme (if applicable).

3.2. The Content of Studies and Implementation Thereof

3.2.1. Analysis of the content of the study programme. Assessment of the interrelation between the information included in the study courses/ modules, the intended learning outcomes, the set aims and other indicators with the aims of the study course/ module and the aims and intended outcomes of the study programme. Assessment of the relevance of the content of the study courses/ modules and compliance with the needs of the relevant industry, labour market and with the trends in science on how and whether the content of the study courses/ modules is updated in line with the development trends of the relevant industry, labour market, and science.

The study programme has been developed in accordance with the requirements of 13.05.2014. Cabinet of Ministers Regulation No.240 "Regulations on the State Standard of Academic Education" (can be seen in Annex 2.2.)

The study programme has been developed in compliance with the interrelation and sequence of study courses, which thus enables the maximum achievement of the aim of the study programme, to provide a set of knowledge, skills and competences in accordance with level 7 of the framework as defined in the Latvian Classification of Education.

In order to ensure the aim of the study programme, the set of knowledge, skills and competences to be acquired as a result of the study programme have been formulated (learning outcomes). In the light of the outcomes to be achieved within the study programme, specific study courses were identified and the scope of knowledge, skills and competences to be achieved within each individual course was defined (see the mapping of the study programme in Annex 2.3).

The correlation of the objectives and results of the study programme with the results of individual study courses can be found in each course description, which provides a description of the course content, the course plan, the requirements for the course, the results, the assessment methods and criteria, and the literature and other sources to be used.

The Master's program of Intelligent Transport and Smart Logistics prepares through a multidisciplinary approach internationally trained professionals with a deep knowledge in the design, planning and management of transport and logistics systems The graduates are able to identify, analyze, solve and communicate complex interdisciplinary problems in the field of transport and logistics, taking into account the importance of technology in society, including economic, social, and sustainable development.

The program provides a broad knowledge of intelligent transport systems and of engineering and technology solutions in the field of logistics systems and supply chains. The graduates can work in companies or research centres related to their field of study and participate and actively contribute to all phases of research or development projects in the field of transport and logistics.

The focus of this MSc program line is on the application and development of data-driven approach, optimization and simulation tools to analyse transport and logistics systems from the different

perspective including modern concepts and solutions. This program focuses on the integration of ICT into transport and logistics systems, with the aim of increasing efficiency, safety, mobility and customer satisfaction while reducing environmental impact.

The program is based on classical courses of Transport Engineering programs (for example, as in the program of the strategic partners (UWE - MSc Transport Engineering and Planning and VilniusTech – MSc in Transport Engineering):

- Transport Economics
- Transport Policy and Regulations
- Intelligent Transport System
- Optimization Methods in Transport Engineering

Some of the courses are based on the results of research in European projects:

- Course Multimodal Transport Interchange is based on project Alliance
- Course Intelligent Transport System is based on project IntelTrans
- Course Digitalization in Transportation and Logistics is based on project We-Transform

The master's programme is similar to other programmes in this field in Europe and the world, and includes similar study courses. For example, a number of subjects reflecting the analytical essence of the program (Urban Mobility and Smart Cities; Urban Data Analytics; Artificial Intelligence in Urban Mobility) are similar to the subjects of EIT Urban Mobility Master School programme (MSc Smart Mobility Data Science and Analytics) https://www.eiturbanmobility.eu/smart-mobility-data-science-and-analytics/#Degreetop

The study program focuses on the design of public transport systems, including new "Mobility as a Service" concepts, multimodality and transport on-demand and the analysis of travel patterns and traffic flows in order to design well-functioning traffic systems using computer-based models.

In the subjects of Transport and Logistics Process Modelling (incl. course project), Study Project and in the final work, students use modern software for the design and analysis of systems - PTV Visum/Visim; Anylogic, etc., using the services and services of the TSI LabSim laboratory.

Graduates of Msc program specialized in the field of optimised management, structure and repair system research of transport companies/fleet, improvement of sustainable interaction of intermodal transport and business development.

Graduates perform analysis, theoretical and experimental research of the object corresponding to their research interests and based on knowledges and competences obtained in courses Research Methodology, Study Project in Transport/Logistics Systems and others.

The master's study program "Intelligent Transport and Smart Logistics" is implemented in two versions with a duration of 1.5 years 60 CP (90 ECTS) or 2 years 80 CP (120 ECTS), corresponding to the volume of previously acquired education programs. The 60 CP (90 ECTS) variant of the program admits graduates of relevant professional first-cycle education programs and academic program graduates with professional work experience in the field of transport and logistics.

The 80 KP (120 ECTS)variant of the program admits graduates without previous professional experience or acquired programs in the field of transport and logistics, so they are provided with an additional first semester in the amount of 20 KP (30 ECTS). This semester includes study courses aimed at providing fundamental knowledge on topics and areas necessary for students to master the basic part of the study program, namely Data Analysis Methods and Business Forecasting, Information Systems and Technologies, Geography of Transport Systems, Logistics, and Supply Chain Management, Freight and Passenger Transportation. It should be noted that foreign students

mostly pursue the 80 KP (120 ECTS) variant of the program because their previous education is typically obtained in 3-year-long studies.

The analysis of the program structure (see the map) indicates that both the short and long study program implementation options allow achieving certain study outcomes.

Similarly, the master's program complies with the requirement of the Academic Education Standard that in the mandatory part of master's studies, excluding the development of the master's thesis, there must be at least 18 ECTS in the relevant scientific field research in theoretical knowledge, and the approval of theoretical knowledge in the aspect of current issues in the chosen field or subfield of at least 18 ECTS if the master's study program is 60 ECTS (according to TSI program 60 KP (90 ECTS) variant - 22KP (33 ECTS)), and at least 36 ECTS if the master's study program is 120 ECTS (according to TSI program 80 KP (120 ECTS) variant - 30 KP (45 ECTS)).

The study programme offers free-choice study courses (Part C), of which 4 credits are required to fulfil the programme requirements. The aim of these courses is to provide students with the opportunity to acquire additional knowledge in a field of science or to acquire skills useful for their professional activity. Several elective courses are offered each year: Innovation Project Management, Business psychology and intercultural communication, Green Logistics, Risk Management in Supply Chains, Urban Data Analytics, Artificial Intelligence in Urban Mobility, International Business.

New study courses developed by the lecturers in the field of study of the programme are also offered in Block C. After such courses have been run, student feedback is collected on how interesting and useful the course has been, and if the feedback is positive, the course is included as a stand-alone course in Part B of the programme.

Considering the wide range of C block courses at TSI, students have not been provided with the opportunity to take elective courses at other universities until now. Last year, a Cooperation Agreement was signed with the University of Economics and Culture, which envisions the possibility for students to choose elective courses (Block C) at partner universities.

In accordance with Article 56 (point 7) of the Law on Higher Educational Institutions, foreign students learn "Latvian language for foreign students" in the amount of 2 CP (3 (ECTS). In the higher level programmes, foreign students learn the mandatory study course "Latvian language for foreign students" in the amount of 2 CP (3 ECTS) instead of free choice (block C) courses. For these students, the C block is reduced, so that for foreign students in the programme the C block is 2 CP (3 ECTS), but the amount of the compulsory part of the programme is increased by 2 CP (3 ECTS).

In accordance with the requirements of the "Environmental Protection Law" and the " Civil Protection and Disaster Management Law ", if the previously acquired education has not covered the requirements set out in the Environmental Protection Law and the Civil Defense Law, students additionally learn the mandatory (Block A) study course " Labour Safety, Civil Defence and Environment Protection" in the amount of 2 CP (3 ECTS) (paragraph 4.3 of TSI Admission Rules)

The content and relevance of courses, including course descriptions, are reviewed annually during the annual self-evaluation of study programmes and fields of study in December-January, in accordance with the Course Management Regulations. As a result of the self-assessment, a programme development plan is drawn up, which includes the necessary updating of study courses, including course descriptions, in accordance with the trends in the field, the labour market and scientific developments. Feedback from students in course evaluation questionnaires and from graduates and employers is taken into account, providing input on the latest developments and current trends in the labour market. Updated courses of study are coordinated, approved and included in the Register of Study Programmes and uploaded to the e-learning environment Moodle

before the start of the new academic year.

The assessment of the relationship between the objectives and the outcomes of the study programme and the objectives and outcomes of the study courses leads to the conclusion that the content of the study programme and the study courses allow the achievement of the overall objective of the programme and the learning outcomes.

3.2.2. In the case of master's and doctoral study programmes, specify and provide the justification as to whether the degrees are awarded in view of the developments and findings in the field of science or artistic creation. In the case of a doctoral study programme, provide a description of the main research roadmaps and the impact of the study programme on research and other education levels (if applicable).

In the implementation and development of the study program, a direct connection with scientific trends is ensured (see more in criteria 2.4.1 - 2.4.5 of the description of the study field)

The Master programme closely follows the development trends of the industry. The ideas for improving the study process are provided by the employers and professional organisations during the seminars, conferences, round tables or personal contacts of the academic staff, addressing a range of questions about the students' competences, as well as solving the issues related to the students' employment opportunities in the modern labour market. Therefore, the content of the study courses is developed in a sequential manner, in line with the development trends of the industry. The industry experts and guest lecturers involved in the study process also make an important contribution to the education of the Master students by providing feedback on the need to improve the study process and by pointing out the relevant aspects of the business environment. Therefore, the students have the opportunity to acquire the practical skills that will be needed in the labour market.

The relevance of the course content to the new trends is promoted by the active practical, scientific and research activities of the programme's academic staff – participation in conferences, preparation of publications, presentation of reports, participation in research, scientific and experience exchange projects and activities. The faculty members of the TTI involved in the implementation of the study programme (Prof. Irina Jackiva (Yatskiv), Igors Kabaškins, Mihails Savrasovs, Jurijs Tolujevs, Dmitry Pavlyuk, Nadežda Spiridovska) are recognised scientists and active researchers who are constantly involved in the implementation of the research projects, participate in international conferences and publish in leading scientific journals.

The relevance of the study courses is also ensured by a proportion of faculty members recruited from the industry who are elected to academic positions at TTI or are invited to conduct individual courses. For example, Associate Professor Vaira Gromule is the Chairwoman of the Board of one of Latvia's largest transport companies, "Rīgas starptautiskā autoosta" (Riga International Coach Terminal), and the General Secretary of the Association of Paneuropean Coach Terminals (APC). She also teaches courses in Transport Economics and Multimodal Transport Interchange. Associate Professor Evelīna Budiloviča is the Head of the Development Planning Department at the Mobility Management of the City Development Department of the Riga City Council. She teaches courses in Urban Mobility and Smart Cities, as well as Geography of Transport Systems.

TSI has a strong alumni community that also provides the most recent advances to students of the

master study programme and contributes to the study course content. For example, TSI alumni Ilya Jackson who currently holds the position of postdoctoral fellow at Massachusetts Institute of Technology (MIT) and provide some lectures in courses "Smart Warehouse" and "Risk Management in Supply Chains".

Another valuable source of information about recent trends in cooperation projects of the TSI Data Analytics and Artificial Intelligence research cluster. The cluster conducts data-based research, consultancy and training, including big data analytics, statistical modelling, natural language processing, and major aspects of artificial intelligence, filling the gap between cutting-edge research and businesses across industries and sectors. For example, the recent projects of the cluster were conducted for the Mediterranean Shipping Company (in the area of logistics) and My3D.Cloud (3D scanning). TSI professors, who participated in these projects, utilize the identified business requirements for designing the study courses and the programme.

The aim of the study program is to provide students with knowledge and practical experience of the latest information in transportation area and the content of the study program is designed in such a way that each course emphasises applied research. The master's program focuses on planning and management of both traffic systems and logistics system, and on mathematical modelling of these systems using optimization and simulation techniques. Master students can develop their knowledge and skills in R2B projects in the LabSim laboratory, headed by Prof.M.Savrasovs and in which researchers can use modern software products of professional modelling: AnyLogic. PTV Vision VISUM, VISIM etc. Students use these software in study courses "Transport and Logistics Process Modelling", "Study Project" and in master thesis. All study courses use modern software, which allows students to get an idea of modern technologies, for example, in the study course " Methods of Data Analysis and Business Forecasting " students use SPSS software, in the optional study course "Information Systems and Technologies in Business"- ERP and CRM information systems.

The scientific and research activity of the academic staff makes a significant contribution to the development of the study programme and improvement of the study content. Lecturers participate in local and international scientific conferences and seminars, publish research results in scientific publications, develop teaching aids. Through research, lecturers bring the most up-to-date innovations and scientific trends into their study courses by including new study courses or topics into the study programme, e.g. the study course Multimodal Transport Interchange and Decision Making in Transport and Logistics based on issues of project Alliance, the study course Intelligent Transport System is developed mulrinarional team of researchers in frame of project IntelTrans etc.

In general, the content of the Master's program of Intelligent Transport and Smart Logistics is updated according to the trends of the industry, labour market and scientific development, providing opportunities to acquire in-depth knowledge of transportation systems engineering, as well as the use of these technologies in different contexts, thus ensuring the interdisciplinary approach that is so necessary nowadays.

The degree is awarded after the defence of Master's thesis, independently prepared and publicly defended under the supervision of an experienced researcher, which contains original research results and provides new insights into the relevant field of science. For each Master's thesis, students carry out quantitative or qualitative research, justifying the novelty of the research and contributing to the development of science.

3.2.3. Assessment of the study programme including the study course/ module implementation methods by indicating what the methods are, and how they contribute to

the achievement of the learning outcomes of the study courses and the aims of the study programme. In the case of a joint study programme, or in case the study programme is implemented in a foreign language or in the form of distance learning, describe in detail the methods used to deliver such a study programme. Provide an explanation of how the student-centred principles are taken into account in the implementation of the study process.

The programme is taught full-time, part-time (organised on Saturdays) and part-time distance learning

The study programme is implemented in accordance with the study plan, which is available to students in the TSI information system. For learning study courses, according to the specifics of the study course, lectures, practical works, laboratory works and students' independent work are planned. In master's level courses, 40 hours per credit point (1.5 ECTS) are provided, including contact hours and students' independent work. Out of 40 hours in master's level courses, 12 hours per 1 credit point (1.5 ECTS)) are intended for contact hours, the rest is independent work. In the form of distance learning, 1 contact hour is provided for 1 credit point (1.5 ECTS), which is used for introductory lectures and consultations. Proportion between lectures and practical lessons (including laboratory classes) is specific for each study course and is determined by the teaching lecturer, depending on the study results of the course and the methodological aspects of the course. The mentioned contact hours for full-time and part-time study forms do not include consultations for students. According to TSI regulatory documents, during the semester the lecturer 1 load, it is necessary to provide 32 hours of consultations for students (the amount of consultations decreases proportionally with the lecturer's workload). The consultations are scheduled and visible in the schedule of lectures. During the consultations, the lecturer both answers the students' questions and additionally explains the course material.

The study process is mainly implemented in the format of interactive lectures, seminars, workshops and student independent work. Courses include workshops, often discussions, role-plays, teamwork, project work, in-basket professional tasks or solving specific practical problems. The choice of a method depends on the learning outcomes that a lecturer is planning to achieve. The applied methods are geared to the development of the students' abilities, specifically, to learning, creative use of knowledge, cooperation, self-evaluation, offering of alternative solutions to problems, to critical thinking and making responsible decisions.

The principles of student-centred education are taken into account in the process of implementation of the study programme - the students' representatives have participated in the programme development and discussion process as representatives of the Study Direction Council and the Senate. The timetable of the classes and the times of examinations are designed taking into account the possibilities of students as employed persons. The organisation of the research work (selection of topics for study projects and final theses) respects the students' field of interest, the specificity of practical work and experience. Students are informed about examination methods, criteria and the procedure for appealing against assessment. The expected results and the form of the report for each course, as well as the examination papers, are communicated to students at the beginning of the course. The course content, expected outcomes, recommended readings and other key information are given in the course description for each course.

The basic principles and procedure for the assessment of the acquisition of the study program comply with the requirements of Article 40 of the National Academic Education Standard. Pursuant to the regulations adopted by the TTI Senate, the results of the academic Master's study program

are evaluated according to two evaluation criteria: a quality criterion based on the 10-point marking system and a quantitative criterion - a credit point based on the total number of hours in the course. The complex method is used to assess the results of study courses. It includes assessment of students' practical work, individual or group work, mid-term assessment and final examinations (a test or exam). In order to facilitate students' independent work, it is stipulated that the final assessment (a test or exam) should not exceed 50% of the final mark for the course. In the beginning of a semester, students are informed about the components of the final mark and their assessment.

In practice, the evaluation process takes place regularly throughout the course of studies. The final assessment of students' learning outcomes is completed at the end of a semester after all stages of assessment are completed, such as practical assignments, seminars, independent work, mid-term assessment and examination. Teaching staff develop an assessment methodology, which indicates the percentage of each assessment criterion in the composition of the total mark.

Students' independent study plays an important role. The description of their progress and how this takes place is included in the study course description as a compulsory part. Students' ability to study independently is purposefully developed in all study courses. The students acquire research skills by working regularly with literature and the Internet resources in order to perform successfully the various independent assignments and the Master thesis. This work promotes students' scientific research activity and work with international scientific databases available at the TTI library.

At the end of the Master studies the student chooses a topic of interest and, in cooperation with a supervisor of his/her choice, develops and defends the Master thesis.

When studying via distance learning, the student learns the study content and takes the examinations using digital and online study tools, with no or minimal in-person attendance at the TTI. The procedure for the organisation of the distance learning mode of the study is described in the Regulations on the Organisation of the Distance Learning Mode of Study .

Distance learning studies at TTI are provided by 2 distance learning study process organisation specialists who are directly responsible for the organisation of the study process for distance learning students, while the senior specialist of the Digitisation and Innovation Training Centre is responsible for the compliance of the technical design of study courses with the requirements set by TTI, in accordance with the content of the teaching-methodical materials of distance learning study courses (approved on 3.05.2019, Order No. 01-12.1/52, available in the TTI Record-keeping System). In order to ensure quality implementation of studies in distance education, TTI organises the methodological seminars and individual consultations for academic staff for the improvement of their pedagogical and digital competence and the acquisition of the targeted use of IT tools.

Each study course implemented in the study programme has a corresponding distance e-learning course. Each e-course provides students with the information on the organisation and communication of studies (contact details of lecturers and support staff, information on the study course, technical and organisational information, etc.), digital study materials (presentations and other materials developed by lecturers, video recordings of introductory lectures, links to articles and books in online databases, etc.) etc.), interactive learning materials (knowledge tests, etc.), opportunities for mutual communication and communication with the lecturer (forums, chat rooms, etc.) and the functionality of submitting and evaluating independent work (submission of independent work, electronic tests).

Distance learning study courses are assessed by mid-term and end-of-course examinations.

Intermediate test:

- Self-assessment tests - self-assessment questions are available in the e-learning environment in the form of a test with automatic answers, allowing students to assess their readiness for an intermediate test or a final test.
- Testing (with a grade) in the form of a test, as well as in the form of offline and online written or oral assignments as defined in each course.
- After obtaining a certain assessment in the intermediate examinations (the number of which corresponds to the number of credit points in the respective study course), the student shall be admitted to the final examination of the study course.

The test or exam is taken orally using the Moodle resource Big Blue Button. In addition, the course author may set a written test. The grade is entered into the Schools' unified grade database in each student's personal card, which the student can access remotely.

According to Clause 2.7 of the Regulations on the Organization of Distance Learning, the defense of final theses for distance learning students, including foreign students, takes place in person, in the presence of the state examination commission. As a mandatory procedure at the university to determine the level of readiness for the final thesis, there is a pre-defense of the final thesis. The pre-defense for distance learning students is organized remotely, but students located in Latvia have the option to attend the pre-defense in person.

The study methods used in the study programme contribute to the achievement of the course and programme goals and learning outcomes, provide student - centred education to encourage students to take an active part in the learning process and to ensure the appropriate assessment of students' performance.

3.2.4. If the study programme envisages an internship, describe the internship opportunities offered to students, provision and work organization, including whether the higher education institution/ college helps students to find an internship place. If the study programme is implemented in a foreign language, provide information on how internship opportunities are provided in a foreign language, including for foreign students. To provide analysis and evaluation of the connection of the tasks set for students during the internship included in the study programme with the learning outcomes of the study programme (if applicable).

3.2.5. Evaluation and description of the promotion opportunities and the promotion process provided to the students of the doctoral study programme (if applicable).

3.2.6. Analysis and assessment of the topics of the final theses of the students, their relevance in the respective field, including the labour market, and the marks of the final theses.

More than 100 Master students have graduated from the study programme since the previous accreditation. Many of the students of the program have already been employed in companies in the industry during their studies; therefore, the student's current field of employment and interests are taken into account when the topics of the master thesis are formulated.

In the last lesson of each course, the lecturer introduces the students to the problem situations relevant to the course of study, thus enabling the students to develop their Master's thesis research in this direction.

All Master's programmes include a compulsory (Block A) course "Research Methodology" of 4 credit points (6 ECTS), which focuses on an active discussion of the possible topic of the Master's thesis. During the course the student prepares a master's thesis application; prepares the first part of the master's thesis by analysing the current situation in the research area (state of the art); students are provided with information on the topics of the master's thesis, which are offered both by the faculty members of TSI and TSI cooperation partners - MSC, Kreiss, RIX, Riga International Coach Terminal, Deloitte Latvia and others.

Each year, in the months of September and October, the partner companies present the possible topics of the Master thesis to the students, and at the same time suggesting the possible topics to the advisors from their company. The topics offered by the companies are chosen by relatively few students - about 5%. This is due to the fact that students often choose their Master thesis topics in relation to their current workplace. The representative of the company is often the official advisor of the Master thesis (indicated on the title page of the Master thesis).

Master thesis topics are often related to extending existing methodologies/approaches or proposing new methodologies/approaches. Examples of such master thesis titles

- Concept development of smart Technologies for parking Monitoring in cCity cCenter (2018)
- Development the decision-making model for alternative choice of cargo transportation (2018)
- Information Services as a tool to iIncrease Customer Satisfaction in passenger terminals (2019)
- Development of models of transshipment points in the multimodal supply chain (2019)
- Analysis of the transition to electric transport for international trucking in Europe (2020)
- Research on trip generation rates for different land use categories (2020)
- Development of a system of measures for reducing the congestion level of the transport system in the Riga city (2020)
- Digitalization in road transport: innovative solutions in transport management (2021)
- Free Public Transport: modelling of and conditions for successful implementation (2021)
- Study the prospects of using hydrogen fuel in rail transport (2021)
- Impact of the Arctic Sea Lines on the international maritime cargo flow (2022)
- Evaluation of fleet electrification possibilities in the freight transport sector (2022)
- Increasing warehouse management efficiency in the army tactical level unit (2022)
- Electric cars for private mobility and small business as part of Green Deal (2023)

Participation in a scientific conference is a prerequisite for the defence of the Master's thesis, for the in-depth approbation of the Master's thesis topic. Students of all master's study programmes implemented by the TSI present the results of their research work at the students' scientific conference "Research and Technology - a Step into the Future" - RatSif, which is held twice a year at the University - in December and April. The aim of the conference is to promote students' professional development in parallel with the acquisition of theoretical material of study courses, acquiring scientific research skills in research methodology, selection of research methods, summarising theoretical findings of science, practical research execution, ability to conduct research data acquisition, analysis and interpretation, as well as to express the obtained research

results in justified and understandable conclusions; to promote students' scientific creativity, thus strengthening the link between studies, practice and scientific research activity. This will assess the novelty of the research results and their relevance to the field of study. After the conference, students are given recommendations for further work.

Also, a some of research-oriented IS students present their researches at international conferences "Reliability and Statistics in Transportation and Communication" and publish their articles in Springer:

- Yatskiv, I., Budilovich, E., Blodniece, I., Nathanail, E. and G. Adamos. (2019) A Cross-case Analysis of Riga Interchanges' Information Services and Technologies, In book: "Reliability and Statistics in Transportation and Communication. RelStat 2018". I. Kabashkin, I. Yatskiv and O. Prentkovskis eds. Springer, Cham. 2019. pp. 582-592. https://doi.org/10.1007/978-3-030-12450-2_56 (Scopus)

- Yatskiv, I., Pticina I., Romanovska K. (2018) The Riga Public Transport Service Reliability Investigation Based on Traffic Flow Modelling. In. Kabashkin I., Yatskiv I., Prentkovskis O. (eds) Reliability and Statistics in Transportation and Communication. RelStat 2017. Lecture Notes in Networks and Systems, vol.36. Springer, pp. 252-261 DOI https://doi.org/10.1007/978-3-319-74454-4_24
- Voronin Y., Yatskiv I. (2022) Free Public Transport Policy: Modelling of Implementation in Riga. In: Kabashkin I., Yatskiv I., Prentkovskis O. (eds) Reliability and Statistics in Transportation and Communication. RelStat 2021. Lecture Notes in Networks and Systems, vol 410. Springer, Cham. pp.421-431 https://doi.org/10.1007/978-3-030-96196-1_39

For the Master's thesis prepared and uploaded to the TSI Thesis Portal, the supervisor prepares a review, which evaluates the thesis and provides comments on the development of the thesis itself. The supervisor evaluates the thesis according to the following criteria: relevance of the thesis content to the set aim and objectives; relevance of the conclusions to the set objectives; degree of use of literature and other sources of information; compliance with the thesis development schedule; presentation of the final thesis text according to the requirements; compliance with the supervisor's instructions.

Master's theses are reviewed. The reviewer is usually a senior lecturer of the Engineering Faculty who has practical or scientific experience in the subject area. The reviewer assesses the thesis against the following criteria: the aim and hypothesis/objectives of the thesis; the degree of use of literature and other sources of information; research methods; analysis of results; conclusions; organisation and style of the thesis; and the overall assessment of the thesis. To reduce the subjectivity of the evaluation and to ensure that students understand the evaluations given in the supervisor's feedback or review, performance evaluation scales with textual descriptions are used.

The defence of the final thesis shall be assessed by a Committee chaired by a representative of the employers with a PhD degree. The Master's thesis and the defence itself are evaluated individually by each member of the committee, with the committee voting on the final evaluation at the end of the defence. The committee evaluates the following criteria: the relevance of the thesis to the chosen topic (in terms of scope and content); the ability to apply the knowledge, skills and competences acquired during the studies to solve the tasks set in the thesis; the ability to present the thesis in accordance with the requirements; the ability to present the thesis results; the ability to discuss and answer the questions. The student has 3 days to appeal against the defence

procedure. The final grade is communicated to the student individually.

Figure 1 below shows the distribution of grades from 2014 to 2023. As can be seen in the graph 24% of the students received a grade 7 (good), 26% - 8 (very good), 23% - 9 (excellent). The average rating in the last academic year is 7.33.
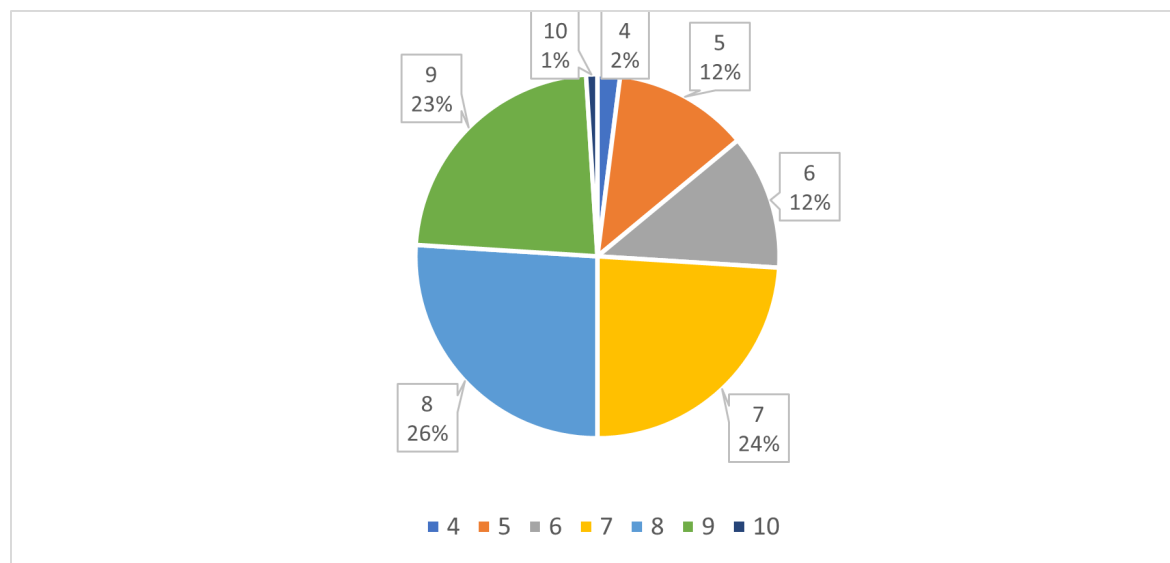

Figure 1. Master thesis evaluations during the reporting period (2014.-2023..)

The positive evaluations reflect the high scientific quality of the Master's theses, the ability to defend the research results convincingly and argumentatively, as well as the graduates' preparedness and suitability for the labour market.

The highest mark of "excellent" is awarded only for outstanding performance and if the student has presented at an international or national conference, produced a scientific publication, etc. Only one final thesis in 2014 was awarded with "excellent". According to the data collected and taking into account that no appeals have been received, we believe that the theses have been assessed objectively and the final grade fully reflects the level and quality of the thesis.

3.3. Resources and Provision of the Study Programme

3.3.1. Assessment of the compliance of the resources and provision (study provision, scientific support (if applicable), informative provision (including libraries), material and technical provision, and financial provision) with the conditions for the implementation of the study programme and the learning outcomes to be achieved by providing the respective examples.

In the study direction report in sections 2.3.2. - 2.3.4 the full information on these issues is provided. This paragraph only provides additional and separate information on the study programme.

The study process is mainly provided by the staff of the Faculty of Engineering and the Faculty of Transport and Management Sciences.

The Faculties of the TSI provides teaching and methodological work: creates and updates course descriptions, provides teaching of relevant study courses (including practical, laboratory and seminar classes), conducts and defends bachelor theses and carries out other activities related to teaching, methodological and scientific work. The Digitisation and Innovation Learning Centre is responsible for the development and deployment of teaching methodological materials for distance learning courses on the TSI Learning Management System platforms.

The TSI library is available for use by students. Collection – 28,546 documents, of which:

books – 23,863 copies. 1 900 titles of the books (2 890 copies in total) are intended for the specific needs of the Transport services direction, which is ~ 12% of the entire collection. Of these, about 55% of the books are in English.

e-books – 2 780 copies, and several hundred titles of e-books specific for the needs of the Transport services sector. For instance:

- Kern, J. Mac S. 2021. *The Digital Transformation of Logistics : Demystifying Impacts of the Fourth Industrial Revolution, John Wiley & Sons, Incorporated;*
- *Hossain,I Ullah, N., 2023. Data Analytics for Supply Chain Networks,;*
- *Kramarz, M., Dohn, K., Przybylska, E., Jonek-Kowalska, I. Urban Logistics in a Digital World : Smart Cities and Innovation; Springer International;*
- *Vandeput, N., Data Science for Supply Chain Forecasting, Walter de Gruyter GmbH..*

The students of the field of the study *Transportation Services* have access to scientific journals in the Library, both in printed and electronic form (part of the journals), using the Library electronic catalogue, as well as the University website. For example: *Transport Journal; IEEE Inteligent Transportation Systems; Reliability and Statistics in Transportation and Communication (Abstracts of International Conference); Transport and Telecommunication; Harward Business revie; Academy of Management.*

The TSI library provides access to the Academic Complete database, which is available online for both students and faculty. The Academic Complete database is a database of scholarly e-books created by ProQuest, containing more than 180 000 titles in all major fields of science, including more than 750 specific scientific books in the Transport and Logistics collection. For example

- *Miller, T, & Liberatore, MJ (2020). Logistics Management : An Analytics-Based Approach, Business Expert Press, New York. Available from: ProQuest Ebook Central;*
- *Elbert, R., Friedrich, C., Manfred Boltze and Hans-Christian Pfohl (2020). Urban freight transportation systems. Amsterdam, Netherlands ; Cambridge, Ma: Elsevier;*
- *Zsidisin, GA, & Henke, M (eds) 2019, Revisiting Supply Chain Risk, Springer International Publishing AG, Cham. Available from: ProQuest Ebook Centra;*
- *Attard, M. and Yoram Shiftan (2015). Sustainable urban transport. Bingley: Emerald,*

Science Direct. Multidisciplinary database from the publishing house Elsevier. Contains full texts from 4 604 titles of journals published by Elsevier, several of which are thematically relevant to the Transport Services field, which allows TTI academic staff, researchers and students to use high quality and reliable scientific information in the process of development and research of their study papers. For example: *Transportation Geotechnics;Transportation Research; The Asian Journal of Shipping and Logistics;European Management Journal; Journal of Digital Economy; European Journal of Political Economy; Advances in Accounting*

The SCOPUS database, which focuses more on scholarly publications, is also available to students. The library staff organises regular sessions to inform students about the latest library news and how to use the library resources.

The electronically purchased books in the Appendix 2.9. were acquired at the end of 2023, after the study program had already been prepared for evaluation by the AIKA.

Software provided by TSI is used in the study process. The range of software is quite wide, e.g. Microsoft Dynamics AX, Microsoft Dynamics CRM, SPSS, STATISTICS/Win, AnyLogic, ExtendSim, PTV Visum/Visim, Microsoft Project, Microsoft VISIO, also using the online resources such as JIRA, LucidChart, etc. Practical classes for full-time and part-time students take place in computer labs. Distance learning students have access via a remote server to which students can log in and use the software remotely.

A contract with Coursera was signed in 2022. The aim of the agreement is to develop cooperation and to provide both faculty and students with the opportunity to obtain specific courses from the Coursera catalogue. It is an opportunity for the teaching staff to both improve their qualifications and to use Coursera courses in their studies. This agreement also provides the opportunity to develop courses using Coursera tools. This aspect is very important for the development of the distance learning form of study.

The common study, scientific, informational (including library), material-technical and financial base of the TSI and the Faculties creates the preconditions for the achievement of the study results and demonstrates the possibility of ensuring a quality study process in the study programme

3.3.2. Assessment of the study provision and scientific base support, including the resources provided within the framework of cooperation with other science institutes and higher education institutions (applicable to doctoral study programmes) (if applicable).

3.3.3. Indicate data on the available funding for the corresponding study programme, its funding sources and their use for the development of the study programme. Provide information on the costs per one student within this study programme, indicating the items included in the cost calculation and the percentage distribution of funding between the specified items. The minimum number of students in the study programme in order to ensure the profitability of the study programme (indicating separately the information on each language, type and form of the study programme implementation).

Since the programme's inception, tuition fee income has been the main source of funding for the study process. The programme is financed from the financial resources of natural and legal persons.

In the academic year 2022/2023, the tuition fee per one full-time and part-time student is EUR 4 500 per year, and in distance education - EUR 2 000 per year

The amount of tuition fees for each academic year shall be determined and approved by an order of the Rector. The tuition fee payment procedure is laid down in the Regulation of the tuition fee payment procedure, which provides the possibility to pay tuition fees for the whole study programme, for one academic year, for one academic semester or as a monthly payment (starting from the 2nd semester).

The average cost of the study programme in the academic year 2022/2023 is shown in Table 1.

"Intelligent Transport and Smart Logistics" Mg	2023.
Average number of students	37
Average revenue per 1 student, EUR	2 073,90
Average expenses per 1 student, EUR	674,85
Profit/loss per 1 student, EUR	1 399,05

There is no difference in the cost of studies in Latvian and English, as the studies are provided at a high quality level without a breakdown by language of study, and therefore no difference in tuition fees.

The cost structure of the study programme in the last academic year 2022/2023 includes salaries and taxes (including costs of scientific publications, etc., including fees for teaching staff in accordance with the TSI Teaching Staff Remuneration Regulations) 57%, study programme development and implementation costs 8%, teaching materials and other similar costs 9%, distance learning- 18%, scientific infrastructure costs and other similar costs 14%, advertising and marketing costs 2% , infrastructure costs (including IT costs) 7%, depreciation and amortisation 1%, other administrative costs 2% .

Each year, TSI provides students with the opportunity to receive personalised discounts of 50%, 75% and 100% on full-time tuition fees, which are awarded on a competitive basis.

Full-time on-site programmes in the amount of 82 credit points have higher study costs, so to be cost-effective the programme must have at least 7 students, and part-time on-site programme - 5 students. The language of instruction has no impact on the amount of costs. In the part-time distance education, the minimum number of students is 1.

It is taken into account that the programmes of the field of study respect the continuity of study courses, as well as the study plans of each programme are mutually coordinated - the courses included in the plan and their sequence by semesters. For example, all the programmes of the Master level include the study course on "Research Methods" oriented on the development of the research skills and critical thinking. This saves money and makes the programmes cost-effective even with fewer students.

3.4. Teaching Staff

3.4.1. Assessment of the compliance of the qualification of the teaching staff members (academic staff members, visiting professors, visiting associate professors, visiting docents, visiting lecturers, and visiting assistants) involved in the implementation of the study programme with the conditions for the implementation of the study programme and the provisions set out in the respective regulatory enactments. Provide information on how the qualification of the teaching staff members contributes to the achievement of the learning outcomes.

The teaching of the study programme is provided by 19 teaching staff with relevant academic experience and qualifications, 12 of whom are elected lecturers.

The Academic Master programme "Intelligent Transport and Smart Logistics" has 7 professors and 2 associate professors from TTI, all with doctoral degrees, involved in the implementation of the compulsory and limited elective parts: Dr.sc.ing. I. Jackiva (Yatskiv), Dr.sc.ing., D. Pavlyuk, Dr.hab.sc.ing I. Kabaškins, Dr.sc.ing. A. Medvedevs, Dr.sc.ing. I. Pticina, Dr.sc.ing. M. Savrasovs, Dr.oec. I. Stecenko, as well as assoc. Prof. Dr.sc.ing. V. Gromule and assoc. Prof. PhD E. Budiloviča.

Therefore, it can be concluded that the qualifications of the teaching staff involved in the implementation of the study programme fully comply with the Law of the Republic of Lithuania "Law on Higher Education Institutions", Section 55 (1), which stipulates that not less than five professors and associate professors who have been elected to academic positions at the respective higher education institution participate in the implementation of the compulsory and restricted elective part of the academic study programme.

In addition to the above-mentioned professors, 1 assistant professor and 1 emeritus professor are involved in the implementation of the programme.

At the time of submitting the application for accreditation, one of the faculty members involved in the programme does not hold a Doctor of Science degree, namely A. Kotļars, the Director of the Professional Bachelor Degree Programme in Transport and Logistics and an employee of the BALTIC CEVA LOGISTICS company, the defense of the doctoral thesis at TSI is scheduled in the field's doctoral council in the spring of 2024.

The choice of lecturers is determined by the content of the study programme, which is continuously improved in line with the rapid development of ICT and the transport and logistics sector. The programme includes the study courses that provide future competences, inviting the teaching staff who specialise in the specific field, including the faculty members from the professional environment, to teach these courses.

Doctors of Science who work in transport and logistics companies and implement the related research projects are invited to work as lecturers: PhD E. Budiloviča, the Head of the Development Planning Department of the Mobility Department of the City Development Department of Riga City Council; Dr.sc.ing., PhD. Vaira Gromule is the Chairman of the Board of "Riga International Bus Station", one of the largest transport companies in Latvia, Association of Paneuropean Coach Terminals (APC), a highly qualified specialist in the field of transport economics and passenger terminal management.

The programme is implemented with the participation of foreign guest lecturers. Dr. Eftihia Nathanail, PhD (University of Thessaly, Greece) is teaching independently the study course of 2 credit points "Decision Making in Transport and Logistics" for the fifth year, Dr. Ilya Jackson - postdoc researcher in MIT (Smart Warehouse) and Prof. Dr. Gunnar Prause from Wismar University of Applied Sciences (Germany) provides partly lectures in courses Green Logistics and Logistics and Supply Chain Management.

Some study courses have several lecturers, or the main course is taught by the programme director, but it is already foreseen that for some topics industry representatives will be invited as guest lecturers, thus ensuring both the quality and topicality of the course content

To enhance the quality of the programme, lecturers teach courses in one of the two languages only. Lecturers carry out scientific research and participate in the education of students. The Transport

and Telecommunication Institute ensures the professional development of its staff as far as possible and provides incentives with remuneration competitive in Latvia.

Foreign teaching staff teaches in English only in study programmes for both students studying the programme in English and students studying the programme in Latvian, taking into account that the university is entitled to no more than one-fifth of the credit points of the study program in a foreign language (Article 56, paragraph three of the Law on Higher Education Institutions, TSI study contract, paragraph 5.1.2).

The knowledge of the state language of the teaching staff involved in the programme complies with the Cabinet of Ministers' Regulation No 733 of 07.07.2008 "Regulations on the scope of knowledge of the state language and the procedure for testing the knowledge of the state language for the performance of professional and official duties, for obtaining a permanent residence permit and the status of permanent resident of the European Union and the state fee for testing the knowledge of the state language". The TSI Human Resources Department verifies national language skills at the time of recruitment.

In order to verify the English language proficiency of the teaching staff, periodic English language proficiency tests and, if necessary, additional training are organised at the TSI, e.g. in the academic year 2019/2020, several of the teaching staff did improve their English language proficiency in the courses organised in the framework of the project 8.2.2, and repeated English language courses are planned in the future from the funding of the University itself.

The qualifications of the teaching staff involved in the implementation of the study programme meet the conditions for the implementation of the study programme and the requirements of the regulatory enactments, ensure the achievement of the objectives and study outcomes of the study programme and the corresponding study courses

3.4.2. Analysis and assessment of the changes to the composition of the teaching staff over the reporting period and their impact on the study quality.

During the period since the previous accreditation, there have been changes in the teaching staff involved in the master's program "Intelligent Transport and Smart Logistics."

Position	2012 /2013 academic year			2022 /2023 academic year		
Education	Doctor Degree	Master Degree	Total	Doctor Degree	Master Degree	Total
Professors	6		6	7		7
Associate Professors	2		2	2		2
Assistant Professor	6		6	2		2
Lecturers		3	3			-

Emerituss Prof.		1		1
Guest lecturers	3	3	6	1	7
Total		20		19

The total number of lecturers has remained almost unchanged; the professors who also participated in the previous accreditation - I. Jackiva, I. Kabaškins, J. Tolujevs, A. Medvedevs, V. Gromule continuing to teach the core courses of the programme. During the reporting period, the programme has attracted a number of new (elected in TTI) lecturers who teach a specific study course or a part of it. Visiting lecturer and Ph.D. candidate A. Kotlars has already submitted his doctoral thesis to the TSI field's doctoral council, and it is planned that he will obtain the Ph.D. degree in the spring of 2024.

Guest lecturer and the scientific degree applicant A. Kotlar has already submitted his PhD thesis to the RTU industrial Promotion Council and it is expected that he will receive the scientific doctoral degree at the end of 2023.

Several faculty members have upgraded their academic work experience and have been elected to higher positions. For example, Prof. M. Savrasov who was a co-lecturer with Prof. J. Toluyev during the previous accreditation, I. Pticina taught in the programme as a co-lecturer with Prof. I. Jackiva in during the previous reporting period.

Several factors have influenced the changes in the composition of the teaching staff. Taking into account the rapid development of the field, over the past eleven years the Intelligent Transport and Smart Logistics programme has both naturally included new courses and changed the subject matter of the existing courses (more details are presented in the description of Criterion 3.1.1) and recruited appropriate teaching members for teaching the courses. Several of the faculty members of the programme have been awarded Doctor of Science degree and were elected to the position of professors or associate professors in the reporting period: I. Pticina, D. Pavlyuk, M. Savrasovs, V. Gromule. In his turn, Professor Emeritus J. Toluyev is currently teaching in collaboration with young (also in terms of age) faculty member I. Jackson; for the succession the leading professors are teaching in collaboration with doctoral students of the doctoral programme "Telematics and Logistics" of TTI (A. Sidorec and F. M. Turno).

During the reporting period, the University made a purposeful effort to improve the composition of the teaching staff in order to ensure the quality of study programmes in the best way. More representatives of companies from the industry and foreign guest lecturers were recruited, which has a positive impact on the quality of the programme itself.

Overall, it can be concluded that the changes in the structure of the teaching staff involved in the study programme are positive, that the relevant qualifications and experience of the teaching staff in academic work ensure a high quality of education and that it is appropriate for the achievement of the overall results of the study courses and the programme.

3.4.3. Information on the number of the scientific publications of the academic staff members, involved in the implementation of doctoral study programme, as published during the reporting period by listing the most significant publications published in Scopus or WoS CC indexed journals. As for the social sciences, humanitarian sciences, and the science of art, the scientific publications published in ERIH+ indexed journals or peer-reviewed monographs may be additionally specified. Information on the teaching staff

included in the database of experts of the Latvian Council of Science in the relevant field of science (total number, name of the lecturer, field of science in which the teaching staff has the status of an expert and expiration date of the Latvian Council of Science expert) (if applicable).

3.4.4. Information on the participation of the academic staff, involved in the implementation of the doctoral study programme, in scientific projects as project managers or prime contractors/ subproject managers/ leading researchers by specifying the name of the relevant project, as well as the source and the amount of the funding. Provide information on the reporting period (if applicable).

3.4.5. Assessment of the cooperation between the teaching staff members by specifying the mechanisms used to promote the cooperation and ensure the interrelation between the study programme and study courses/ modules. Specify also the proportion of the number of the students and the teaching staff within the study programme (at the moment of the submission of the Self-Assessment Report).

Cooperation between teaching staff members is implemented at four levels: within a course/set of courses, within the study programme, within the faculty and university-wide.

The within-course cooperation is organised between teaching staff members, leading or implementing the same course or a set of related courses in English or Latvian. This cooperation is usually managed by the leading academic staff (assigned according to TSI regulations to each course) and focused on the improvement of course actuality, learning outcomes and teaching approaches. Course-related group meetings are organised and allow the development of a unified approach to the course implementation for students of English/Latvian language and full-time/part-time forms of the programme. This cooperation is important for the career development of young teaching staff members, who serve as teaching assistants in practical and computer classes under the direct supervision of the leading academic staff.

The within-programme cooperation is implemented in a form of faculty seminars, where interrelations between the programme's study courses and their learning outcomes are discussed and potential improvements are proposed. This cooperation was intensively used during the preparation of the new programme structure and this report. The important within-programme cooperation events are preliminary and final defences of master theses. The preliminary defences are organised with the participation of a committee of faculty members, where the recommendations are collectively made to improve the master theses. Consequently, cooperation between teaching staff members of different fields is ensured and allows developing the unified understanding of the programme's learning outcomes. The same cooperation is observed during and after the final defence of master theses when the Final Examination Commission gives its evaluation as a result of the discussion. The committee is composed of leading faculty members.

Internal and inter-faculty cooperation provides links between study programs of the same level (e.g., Intelligent Transport and Smart Logistics, Business and Management, and Information System Management).

This cooperation allows the development of a common understanding of overall industry trends and is extremely important in a long run. A special form of this cooperation is meetings of the Faculty Dome and study direction board, which invite teaching staff members, TSI business partners (e.g. MSC, Kreiss, RIX, Riga International Coach Terminal, Deloitte Latvia and others), professional organizations and associations (ECTRI, LIKTA, LETERA etc.) and representatives of student self-government to open discussions. The proposal and opinions are carefully documented and used as a base for future changes of the study programme.

The university-wide cooperation is used for supporting a unified interdisciplinary approach to the implementation of the study programmes. This cooperation is implemented via seminars, organised by TSI management, with presentations of novel teaching approaches and open discussion on the study programmes' learning outcomes. Additionally, the self-assessment boards are organised at the university level, where programme directors present potential improvements to the study programme and cooperate with other directors on their synchronisation.

Experienced TSI researchers, including those involved in the implementation of this study programme, also intensively cooperate in the scope of TSI research projects and activities funded by the Latvian Council of Sciences, the European Commission and other international funding sources and foundations in cooperation with partners in universities and research institutions in Latvia, European Union Member States and worldwide. Examples :

- Enhanced Physical Internet-Compatible Earth-friendly freight Transportation ansWer (ePIcenter), Projekta vadītāja profesore I.Jackiva, galvenais izpildītājs profesors J.Tolujevs.
- Workforce Europe – Transformation agenda for transport automation (We-Transform), Projekta vadītāja profesore I.Jackiva, izpildītājs - profesors M.Savrasovs.
- Fundamentals of Design Competence for Our Digital Future. Projekta vadītāja profesore I.Jackiva, galvenais izpildītājs PhD candidate Francesco M Turno.
- Intelligent Transport and Transport Management study module (INTELTRANS). Projekta vadītājs profesors I.Kabaškins, galvenais izpildītājs profesors J.Tolujevs
- Enhancing excellence and innovation capacity in sustainable transport interchanges (ALLIANCE). Projekta vadītāja profesore I.Jackiva, galvenais izpildītājs I. Kabaškins, profesors Pavlyuk, profesors M.Savrasovs, profesore I.Pticina, profesors J.Tolujevs, assoc.professore Spiridovska

Practical research experience and cooperation within joint research play an important role in improving the learning outcomes of TSI study programmes and their interrelationships.

In average, 14 to 17 teaching staff are involved in the implementation of the study programme each year. It should be noted that the theoretical classes of the individual study courses are conducted by one lecturer, while the practical classes are conducted by another lecturer. Some study courses are taught in several programmes at the same time, for example, the study course "Information Systems and Technologies" and "Research Methodology" are taught simultaneously to the students of the programme "Information Systems Management", while the Latvian language is taught jointly to foreign students in all Master programmes of the University. The average ratio of the number of students to teaching staff within a study programme is 1 teaching staff member per 3 students.

Annexes

III - Description of the Study Programme - 3.1. Indicators Describing the Study Programme		
Sample of the diploma and its supplement to be issued for completing the study programme	Annex 2.6. Diplom Mg.zip	2.6. Diploma paraugs.zip
For academic study programmes - Opinion of the Council of Higher Education in accordance with Section 55, Paragraph two of the Law on Higher Education Institutions (if applicable)		
Compliance of the joint study programme with the provisions of the Law on Higher Education Institutions (table) (if applicable)		
Statistics on the students in the reporting period	Annex 2.1. S tatistics on the students 0103.docx	2.1.pielikums. Statistikas dati par studējošajiem pārskata periodā0103.docx
III - Description of the Study Programme - 3.2. The Content of Studies and Implementation Thereof		
Compliance with the study programme with the State Education Standard	Annex 2.2. Compliance with the State Education Standard 0103.docx	2.2.pielikums. Atbilstiba valsts akademiskajam standartam 0103.docx
Compliance of the qualification to be acquired upon completion of the study programme with the professional standard or the requirements for professional qualification (if applicable)		
Compliance of the study programme with the specific regulatory framework applicable to the relevant field (if applicable)		
Mapping of the study courses/ modules for the achievement of the learning outcomes of the study programme	Annex 2 3 Mapping 2201.xlsx	2.3. pielikums. Kartejums Transporta mag.xlsx
The curriculum of the study programme (for each type and form of the implementation of the study programme)	Annex 2.4. The curriculum of the study programme.zip	2.4.pielikums. Studiju plāns.zip
Descriptions of the study courses/ modules	Annex 2.5. Descriptions of the study courses modules.zip	2.5.pielikums. Studiju kursu apraksti.zip
Description of the organisation of the internship of the students (if applicable)		
III - Description of the Study Programme - 3.4. Teaching Staff		
Confirmation that the academic staff of the doctoral study programme includes not less than five doctors, of which at least three are experts approved by the Latvian Council of Science in the branch or sub-branch of science in which the study programme intends to award a scientific degree (if applicable)		
Confirmation that the academic staff of the academic study programme complies with the requirements specified in Section 55, Paragraph one, Clause 3 of the Law on Higher Education Institutions (if applicable)	Annex 2.8. Confirmation.docx	2.8.pielikums. Apliecinājums atbilstiba AL prasibām.edoc

Transport and Logistics (42840)

Study field	*Transport Services*
ProcedureStudyProgram.Name	*Transport and Logistics*
Education classification code	*42840*
Type of the study programme	*Professional bachelor study programme*
Name of the study programme director	*Aleksandrs*
Surname of the study programme director	*Kotļars*
E-mail of the study programme director	*Kotlars.A@tsi.lc*
Title of the study programme director	*Mg.oec.*
Phone of the study programme director	*27822068*
Goal of the study programme	*To provide the students with up-to-date studies of high-quality in accordance with the Latvian Logistics Manager Professional Standard and the recommendations of the European Logistics Association in order to meet their sustainable future needs and professional competitiveness in the international labour market*
Tasks of the study programme	*1. To provide students with up-to-date education of high quality in transport and logistics area, leading to the acquisition of a sixth-level professional qualification, and to enhance their competitiveness in a changing socio-economic environment and the international labour market.* *2. To provide students with up-to-date theoretical and practical knowledge and skills required in the modern national and international logistics and transport sector.* *3. To provide students with an interdisciplinary approach to the educational process in the field of transport and logistics, integrating the knowledge and skills in management science and information technology required by the sector.* *4. To provide students with the opportunity to acquire advanced specialised knowledge and skills in transport and logistics in accordance with the students' professional interests.* *5. To develop students' skills in independent acquisition and creative use of new knowledge, the need to constantly re-evaluate the accumulated experience, as well as analytical and critical thinking skills.* *6. To develop students' applied research skills and competences in the field of logistics and transport.* *7. To ensure the organisation of the study process using modern information technologies for the preparation of the future activities in the single European labour market.* *8. To provide students with opportunities for professional practice to improve and to supplement their knowledge acquired within the study courses.*

Results of the study programme	1. To demonstrate the ability to establish and to maintain the external relationships with the company's customers and suppliers in the field of transport and logistics, and to select the suitable external service providers and to evaluate the service tariffs.
	2. To be familiar with the current methods of logistics process management and supply chain process management, to be able to apply the information analysis techniques and to be able to assess risks associated with the logistics processes in the enterprise.
	3. To demonstrate knowledge of the laws and regulatory acts governing the operation of the logistics market and to plan the application of taxation to logistics services.
	4. To be able to apply modern information technology and software to analyse and to improve the transport and logistics processes.
	5. To be able to independently develop and acquire new knowledge by searching for and using appropriate modern sources of information.
	6. To be able to define and forecast the economic and performance indicators of a company or structural unit in the field of transport and logistics , and to carry out research work in the field of transport and logistics.
	7. To demonstrate knowledge of smart logistics systems and sustainable transport solutions, and to contribute to the implementation of sustainable logistics solutions in the company.
	8. To be able to analyse the supply chain flows in the company, to organise cost and revenue calculations, and to choose transport modes appropriate to the needs of the company.
	9. To be able to apply professional knowledge in the field of transport and logistics, performing work both individually and either as a part of a team or in an interdisciplinary team.
Final examination upon the completion of the study programme	Diploma Paper

Study programme forms

Full time studies - 4 years - latvian

Study type and form	Full time studies
Duration in full years	4
Duration in month	0
Language	latvian
Amount (CP)	160
Admission requirements (in English)	Secondary education
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	Professional Bachelor of Transport and Logistics
Qualification to be obtained (in english)	Logistics Manager

Places of implementation

Place name	City	Address
Transport and Telecommunication Institute	RĪGA	LAUVAS IELA 2, LATGALES PRIEKŠPILSĒTA, RĪGA, LV-1019

Full time studies - 4 years - english

Study type and form	Full time studies
Duration in full years	4
Duration in month	0
Language	english
Amount (CP)	160
Admission requirements (in English)	Secondary education Studies in English require English language skills at least at B2 level
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	Professional Bachelor of Transport and Logistics
Qualification to be obtained (in english)	Logistics Manager

Places of implementation

Place name	City	Address
Transport and Telecommunication Institute	RĪGA	LAUVAS IELA 2, LATGALES PRIEKŠPILSĒTA, RĪGA, LV-1019

Part time extramural studies - 4 years, 6 months - latvian

Study type and form	Part time extramural studies
Duration in full years	4
Duration in month	6
Language	latvian
Amount (CP)	160
Admission requirements (in English)	Secondary education
Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	Professional Bachelor of Transport and Logistics
Qualification to be obtained (in english)	Logistics Manager

Places of implementation

Place name	City	Address
Transport and Telecommunication Institute	RĪGA	LAUVAS IELA 2, LATGALES PRIEKŠPILSĒTA, RĪGA, LV-1019

Part time extramural studies - 4 years, 6 months - english

Study type and form	Part time extramural studies
Duration in full years	4
Duration in month	6
Language	english
Amount (CP)	160
Admission requirements (in English)	Secondary education Studies in English require English language skills at least at B2 level

Degree to be acquired or professional qualification, or degree to be acquired and professional qualification (in english)	*Professional Bachelor of Transport and Logistics*
Qualification to be obtained (in english)	*Logistics Manager*

Places of implementation

Place name	City	Address
Transport and Telecommunication Institute	RĪGA	LAUVAS IELA 2, LATGALES PRIEKŠPILSĒTA, RĪGA, LV-1019

3.1. Indicators Describing the Study Programme

3.1.1. Description and analysis of changes in the parameters of the study programme made since the issuance of the previous accreditation form of the study field or issuance of the study programme license, if the study programme is not included on the accreditation form of the study field, including changes planned within the evaluation procedure of the study field evaluation procedure.

The Professional Bachelor's program has been implemented for almost 25 years, licensed on 13.10.1999, and last evaluated and accredited on 12.06.2013.

Changes in the name of the programme

The title of the programme has been changed from "Transport and Business Logistics" to "Transport and Logistics". The change is justified by the fact that, firstly, that this name is more recognisable in the international environment and more accurately reflects the nature and the main idea of the programme and secondly that it differentiates the programme from general management programmes.

Changes to the degree and qualifications to be awarded

In accordance with the current professional standard, the qualification to be awarded awarded has been changed to Logistics Manager (available only in Latvian) the professional standard was approved at the meeting of the Tripartite Cooperation Sub-Council for Vocational Education and Employment on October 16, 2019.

Changes in the form of the program implementation and language of instruction

The programme was accredited in 3 languages – Latvian, English and Russian. In accordance with Article 49 of the Transitional Regulations of the Law on Higher Education Institutions, according to which after January 1, 2019 it is prohibited to enrol students for studies in Russian, no more students were enrolled to study in Russian and the last students studying in Russian will graduate from the programme in June 2024. The programme has been submitted for accreditation in 2 languages: Latvian and English. The distance learning study form of the programme is not being continued since the distance learning programme was delivered only in Russian, mostly to foreign students. According to the conducted market analysis of education services, and taking into account the feedback from the industry experts and company representatives, it is considered that there will be no demand for distance learning in the English or Latvian languages. In addition, it is considered that in order to achieve the outcomes of the study programme, the studies should be implemented in full time or part time form.

Changes in the programme structure

In order to improve the quality of the study programme, several changes have been made to the study programme after listening to the opinions of the students and graduates and taking into account the changes in the labour market demand and current developments in the transport and storage sector. Two specialisations have been added to the programme: "Sustainable Transport Solutions" and "Smart Logistics Systems". The "Sustainable Transport Solutions" specialisation focuses on the development of knowledge and skills which are mainly related to the analysis, organisation and management of the transport processes in companies. Particular attention is paid

to the sustainability aspects and current issues in the field of transport that will be in demand in the future. The specialisation is characterised by the study courses "Intelligent Transport Solutions" (4CP, 6ECTS) and "Modern Solutions and Technologies in Distribution Logistics" (4CP, 6ECTS). The specialisation "Smart Logistics Systems" focuses on the development of knowledge and skills which are mainly related to the organisation and management of the internal logistics processes of companies and organisations. Special attention is paid to the sustainability aspects and topical issues in the management of logistics systems. The courses of study characterising the specialisation are "Smart Warehouse Management" (4CP, 6ECTS) and "Project and Multimodal Transport' (4CP, 6ECTS)". The programme includes new courses (including the joint courses) aimed at the development of professional knowledge in transport and logistics, in the amount of 36 CP (54ECTS). Within the program, special attention is paid to the development of students' digital, data processing and analysis, and analytical skills. Therefore, the following study courses are implemented: "Introduction to Logistics and Digital Skills" (4CP, 6ECTS), "Information Technologies" (2CP, 3 ECTS), "Information Systems" (2 CP, 3 ECTS) and "Digital Transformation in Business" (4 CP, 6ECTS). In the programme the amount of internships is reduced to 24 CP (36ECTS). Two internships are implemented in the program: "General Internship" (8 CP, 12ECTS) and "Specialised Internship" (16 CP, 24ECTS).

Taking into account market trends, demand, and the professional experience of part-time students, the program has undergone the following changes: part-time distance studies will be implemented over 4 years and 6 months.

3.1.2. Analysis and assessment of the study programme compliance with the study field. Analysis of the interrelation between the code of the study programme, the degree, professional qualification/professional qualification requirements or the degree and professional qualification to be acquired, the aims, objectives, learning outcomes, and the admission requirements. Description of the duration and scope of the implementation of the study programme (including different options of the study programme implementation) and evaluation of its usefulness.

The study programme "Transport and Logistics" is a professional study programme at the 6th level of higher education, graduates of which obtain the qualification of Logistics Manager and a professional bachelor's degree in Transport and Logistics. The content of the programme corresponds to the thematic area of education "Transport Services", code 840, specified in the Cabinet of Ministers Regulation No 322 "Regulations on the Classification of Latvian Education".

Study program tasks:

- To provide students with up-to-date education of high quality in transport and logistics area, leading to the acquisition of a sixth-level professional qualification, and to enhance their competitiveness in a changing socio-economic environment and the international labour market.
- To provide students with up-to-date theoretical and practical knowledge and skills required in the modern national and international logistics and transport sector.
- To provide students with an interdisciplinary approach to the educational process in the field of transport and logistics, integrating the knowledge and skills in management science and information technology required by the sector.
- To provide students with the opportunity to acquire advanced specialised knowledge and

skills in transport and logistics in accordance with the students' professional interests.

- To develop students' skills in independent acquisition and creative use of new knowledge, the need to constantly re-evaluate the accumulated experience, as well as analytical and critical thinking skills.
- To develop students' applied research skills and competences in the field of logistics and transport.
- To ensure the organisation of the study process using modern information technologies for the preparation of the future activities in the single European labour market.
- To provide students with opportunities for professional practice to improve and to supplement their knowledge acquired within the study courses.

The tasks defined in the study programme are aimed at achieving the programme objective "to provide students with quality studies in accordance with the Latvian Logistics Manager Professional Standard and European Logistics Association recommendations, with a view to ensure students' competitiveness in the international labour market and meeting the society sustainable current and future needs for qualified transport and logistics specialists" and ensuring the study results.

The achievable study outcomes of the study programme are formulated using a student-centred approach, defining in a structured and detailed manner the knowledge, skills, competences that the student possesses and which the student is able to use and implement after graduation. The study programme "Transport and Logistics" is aimed at training the supply chain professionals, with advanced digital skills, for companies engaged in the following economic activities:

- Transport service providers, including road, sea, air, rail and multimodal transport, as well as large-scale logistics service providers, including freight forwarding companies and brokers. This is reinforced by the following groups of the courses of studies: "Geography of Transport Systems", "Freight and Passenger Transport", "Logistics service providers ", "Intelligent transport solutions", "Project and multimodal transport";
- Management of the supply chain in the industrial, wholesale and retail companies. This is reinforced by the following groups of the courses of studies: "Supply Chain Management and Planning", "External Economic Activities in Logistics", "Modern Solutions and Technologies in Distribution Logistics", "Project and Quality Management in Logistics'.
- Warehousing and terminal service providers. In the course of studies, this is reinforced by the following groups of the courses of study: "Procurement Management and Reserves in Logistics", "Smart Warehouse Management", "Freight and Cargo Handling".

In order to provide the students with in-depth knowledge and practical experience in the specific areas of the supply chain management, two specialisations are created within the study programme. "Sustainable Transport Solutions", which focuses on the development of knowledge and skills which are mainly related to the analysis, organisation and management of transport processes in companies. "Smart Logistics Systems", which focuses on the development of knowledge and skills which are mainly related to the organisation and management of internal logistics processes in companies and organisations.

The link between the program's goal, tasks, study outcomes, and its content that provides the knowledge and skills specified in the Logistics Manager's professional standard for planning, organizing, leading, analyzing logistics processes, and implementing control measures, considering that logistics is directly related to transportation and its modes, establishes the program's affiliation with the educational thematic area and the program group "840 Transport Services." Meanwhile, the study program with the educational classification code 840 most directly corresponds to the study direction "Transport Services" since the content of the study program focuses on organizing logistics process policies in a company and includes knowledge and skills that align with logistics,

management science, and information technology.

The admission requirements are set out in the TTI Admission Rules and are based on the following regulatory enactments: Articles 46 and 47 of the Law on Higher Education Institutions, as well as Regulation of the Cabinet of Ministers No. 846 of October 10, 2006 "On Requirements, Criteria and Procedures for Admission to the Study Programmes". The admission requirements are aligned with the aim, objectives and learning outcomes of the study programme, since studies may be started if the applicant has general secondary or vocational secondary education, as well as if the applicant meets other TTI requirements formulated in the TTI Admission Rules. A student who has passed grades in a document certifying secondary education, who demonstrates the proficiency in the national language and in the foreign language and in Mathematics (for example, by successfully passing the centralised examinations) is eligible to study in the higher education programme.

The study programme is delivered in Latvian and English, full-time on-site and part-time off-site.

The Professional Bachelor's program is taught in English for several reasons:

- Graduates of the program are proficient in both logistics principles and communication in English, enhancing their employment opportunities not only in Latvia but also internationally, as they can easily integrate into international companies and global supply chains.
- Industry requirements and trends: Many international logistics companies operating in Latvia use English. By offering the program in English, we ensure that graduates are well-prepared to meet the language requirements of these companies, facilitating their integration into the job market.
- Attracting foreign students: Attracting students from different backgrounds and countries promotes an integrated learning environment.
- Competitiveness of the university and the country. Studies in English give Latvia competitive edge in the international education market, positioning it as a destination for quality education in logistics and attracting foreign students.
- Collaboration projects and research. The program in English facilitates collaboration with international universities and research institutions (joint research projects, academic exchanges, and internship programs).

Part-time distance learning studies, organized by TSI on Saturdays, make education more accessible to a broader audience, including working professionals and individuals with various work schedules, which is highly relevant to the field of logistics. Part-time studies allow students to continue working while obtaining a degree. Additionally, it provides an opportunity for working professionals to advance their careers in the field of logistics without interrupting their employment and to enhance their academic qualifications. Part-time studies enable individuals already working in the logistics sector to acquire new skills, stay abreast of industry trends, and meet the changing demands of the field. Graduates are prepared for career advancement, career changes, or higher positions within their organizations.

For studies in English in the first-cycle programs, applicants who have obtained their education in Latvia are evaluated based on the CE certificate in English, or the English language assessment in their previous educational documents, or the evaluation from an internationally recognized testing institution of at least B2. TSI entrance examination in English is applied to applicants whose previous education was not evaluated on a 10-point scale or who have significantly improved their proficiency in the English language compared to the evaluation in their previous educational documents. This is to ensure that the student can successfully study and master the course material in English, according to Admission Regulations 4.8.1.

 Foreign applicants are matriculated according to the requirements of the Regulation of the Cabinet

of Ministers No. 846 Regulations on Requirements, Criteria and Procedures for Admission to the Study Programmes on the basis of the examination score of an internationally recognised testing institution at least at B2 level, except in cases where the previous education was acquired in English.

The study programme shall be implemented in the amount of 160 credit points (240 ECTS), the duration of the full time studies is 4 years, and part time studies is 4 years 6 months. The study courses included in the programme in the amount of 160 credit points enable the achievement of the learning outcomes of the programme (see Map in Appendix 1.3) and the programme's objective. The programme is of an appropriate size for accomplishing, so after 4 years or 4 years and 6 months of the study, the top-class professionals in the area of logistics and transport with advanced knowledge in one of two specialisations - sustainable transport solutions or intelligent logistics systems - graduate from the programme.

The applicants' preparation in previous education, motivation to obtain the higher education and the organisation of the study process at TTI are able to ensure the achievement of the learning outcomes of the programme and to award the Professional Bachelor Degree in Transport and Logistics and the qualification of Logistics Manager upon completion of the programme.

3.1.3. Economic and/ or social substantiation of the study programme, analysis of graduates' employment.

The relevance of the study is based on the most trends and developments in Latvia and the European Union economy. In recent years, **the transport sector has witnessed significant changes both in terms of technology, cooperation and business processes**. Taking into account the important role of the industry in the economy of Latvia, there is a need to introduce the changes in the study process that will contribute to the future development of the industry and will prepare the specialists in line with future demand and the latest global trends in transport and logistics.

Today, the logistics industry is closely interlinked with various other sectors, and this interdependence is becoming more and more important increasingly important in Latvia. The examples include such industries as e-commerce and retail, healthcare and construction. The rapid growth of e-commerce in Latvia has contributed significantly to the development of the logistics sector. Efficient supply chain management, inventory control and last mile delivery are essential to ensure the timely and accurate delivery. Since e-commerce continues to develop in Latvia and in the EU continues, logistics services need to adapt to meet the demands of online retailing. In addition, the timely and safe transportation of medical supplies, medicines and equipment is also crucial for the healthcare sector. The correct organisation of logistics services plays a vital role in ensuring the availability of medical resources and the delivery of healthcare services. Finally, the construction industry also relies on logistics for the timely delivery of construction materials and equipment to the project sites, including private and public projects in Latvia, such as Rail Baltica.

In Latvia, the transport sector is one of the most strategically important sectors of the national economy. Transport infrastructure and transport and logistics services have a direct impact on the competitiveness and economic growth, creating the prerequisites for the development of other sectors and attracting investment, generating significant revenues from the export services, and therefore positively influencing the development of the country as a whole. According to the data published by the Ministry of Transport, the transport logistics sector accounts for around 31% of the

export services in the national economy of Latvia. The transport and storage sector accounts for approximately 7% of GDP (according to 2022 data). The transport and storage sector employs around 70 thousand people, and therefore receives special attention both at the national and company level and the largest investments in transport infrastructure. Analysis of the **forecast of demand and supply for labour** in the transport and logistics sector shows that an average annual growth rate of 1.5% for the period from 2020 to 2027 and 2.5% from 2028 to 2040 are expected. Consequently, the labour market demand for middle and high level logistics workers is predicted.

In addition to the labour supply and demand forecasts for the transport and logistics sector, it is necessary to mention the fact that the labour market will be increasingly influenced by the trends towards **digitalisation of the economy and automation of workplaces**. Digitalisation has transformed logistics and supply chain management, improving the efficiency and transparency in complex logistics operations. The global nature of the contemporary supply chains makes digitisation essential, since it enables real-time tracking, data analysis and automation, resulting in better decision making and cost reduction. Teaching digital logistics skills at university is essential to prepare students for the digital age labour market. It ensures the relevance to the industry, competitive advantage and fosters innovation and problem-solving skills. In addition, it promotes a global perspective, which is essential for managing the international supply chains, and emphasises sustainability, enabling students to tackle the environmental challenges.

Today we are observing the active integration of "green" and environmentally friendly solutions in the logistics and transport sector, significantly reducing the carbon emissions, improving energy efficiency and contributing to resource saving. In addition, **the "green course"** of companies increases their competitiveness in the market and stimulates innovation. The shift towards environmentally friendly alternatives ensures the overall long term viability of the industry . The inclusion of environmentally friendly and "green" transport solutions in the content of the study programme is important to prepare the future leaders and professionals capable of tackling the pressing global challenges, promoting innovation and sustainability. Universities have a crucial role to play in raising awareness, preparing students to acquire the skills needed for new "green" job opportunities and in policy making. By prioritising green education in transport services, universities must demonstrate the leadership and to contribute to a more sustainable future for both students and society.

In the coming years, the Latvian transport and logistics industry is set to undergo significant changes. "The European Green Deal" highlights the increasing demand for automation and digitalisation to provide sustainable mobility and logistics solutions. Latvia's involvement in **the "Rail Baltica"** project and the modernisation of the railway infrastructure and equipment will bring the state -of- the -art technologies to the country, opening up many prospects for the growth in the industry. These achievements also create challenges and opportunities in the field of education. There will be a significant demand for qualified professionals in a wide range of fields and specialities, in particular for logistics experts with competitive expertise in transport, logistics technology and multimodal supply chains.

Strategic location of Latvia on the Baltic Sea and its proximity to Scandinavia make it an important hub for transport and logistics services. The Port of Riga, Latvia's largest port, serves as the main maritime gateway to Northern Europe, offering efficient transhipment facilities and deep-water access. Latvia's well-maintained road and rail networks further facilitate the movement of goods to and from Scandinavia and the wider European market. Cooperation with the neighbouring Baltic states strengthens **Latvia's position in the region** by improving connectivity and trade links. The continued investment in the infrastructure and technology demonstrates Latvia's commitment to maintaining its central role in the transport and logistics sector.

In general, it should be concluded that the study programme "Transport and Logistics" meets the needs of both Latvia's smart specialisation and the national economy. The analysis of the development plans of the Republic of Latvia, the needs of the economy and society in the age of digitalization clearly points to the need to continue and expand the training of specialists in the study programme "Transport and Logistics".

Employment of graduates is an important indicator that reflects the demand for specialists prepared by the study program in the labor market. In the "Transport and Logistics" study program, nearly half of the students are part-time, attending TSI and studying on Saturdays, indicating that they are employed during their studies. Many students, after completing internships in companies, return to those companies for permanent employment after graduation.

According to the data from the Ministry of Education and Science for graduates in 2017 and 2018, about 70% of graduates are employed in higher qualification professions two years after graduation. These indicators are not verifiable because they do not take into account foreign students, who have always been relatively numerous at TSI, and Latvian residents who live or work abroad and study at TSI remotely. According to the same data, graduates of professional bachelor's programs, in comparison with other TSI study directions and programs, have founded the most companies – 14.95% (2017 graduates who founded companies in 2021).

According to the latest survey data, it can be seen that in 95% of cases, graduates work in the field of study as managers or specialists in logistics in companies related to transportation, logistics, wholesale, manufacturing, etc. Graduates of the program work at companies such as AS AIR BALTIC CORPORATION, Helmut Schmidt Universität, MFIS, MSC, SIA LDZ CARGO, SIA LIDL, SIA SEVERSTAL DISTRIBUTION, SIA Verex, SIA Mono, SIA VERVO, UNICO LOGISTICS, and others.

3.1.4. Statistical data on the students of the respective study programme, the dynamics of the number of the students, and the factors affecting the changes to the number of the students. The analysis shall be broken down into different study forms, types, and languages.

The study programme "Transport and Logistics" (former name "Transport and Business Logistics") is licensed and accredited for full-time in person and part-time in absentia study in Latvian, Russian and English, part-time distance learning - in Russian.

In the graphs provided in the Appendix, until the academic year 2016/2017, when the number of students reached 871, a stable overall increase in the number of students is visible. After that, the number of students in the program decreases, reaching 332 by the academic year 2023/2024. The decrease in the number of students is observed both in full-time attendance and part-time distance learning.

The changes in the number of students can be explained by the demographic indicators and the overall decrease in the number of students in the country, another factor is that, in accordance with the Amendments to the Law on Higher Education Institutions and the own policy implemented by the university, after January 1, 2019 the students are no longer admitted to study in Russian, which led to a decrease in the total number of students, and the number of foreign students decreases.

Students from foreign countries were admitted to study in English and Russian until 2019, and many foreign students, mostly from former post-Soviet countries, took the opportunity to study in Russian.

The academic year 2022/2023 is the last year in which the study programme will continue to be conducted in Russian. Students have been informed of this, and if for any reason they do not graduate from the programme, they will be offered the opportunity to continue their studies in Latvian or English.

Evaluating the number of students in the program based on the language of study and excluding students studying in Russian, a completely different picture emerges. The number of students is stable and shows an increasing trend both in Latvian and English throughout the period since the previous accreditation.

As a private educational institution, TTI provides the studies based on the fee only. While at the time of the previous accreditation a similar logistics programme was implemented only by Riga Technical University, where students had access to study places funded from the state budget, then now almost all private higher education institutions implement the similar logistics programmes. Despite this, students continue to show interest in the TTI study programme. Students are particularly attracted by the opportunity to to get part-time education, when classes are held on Saturdays. This allows them to combine their studies with full-time work. This is also the reason why the number of students studying in Latvian has remained almost unchanged at 155-175 students throughout the entire review period.

The distribution of international students by home country is provided below in the review period

	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024
Azerbaijan	1					
Republic of Belarus	3	2	3	3	2	2
India	26	35	33	23	18	10
Kazakhstan	31	19	8	5	3	3
Kyrgyzstan	1				1	1
The Russian Federation	20	19	15	12	5	3
Lithuania	2	1	1			
Pakistan	1	3	1			
Finland	1	1				
Switzerland	1	1				
Turkey	1	2			1	1

Turkmenistan	1	1				
Ukraine	2	1	3	3	4	4
Uzbekistan	60	43	28	16	13	13
Cyprus		1				
Austria			1	1	1	
Egypt					1	2
Sri Lanka						1

To make the programme even more attractive, TTI offers the final years (study semesters 6 [th], 7 [th] and 8 [th]) to be studied in the Netherlands, in cooperation with the Hogeschool Zeeland (HZ) University of Applied Sciences. As part of the cooperation programme, students will undertake an additional specialisation in the field of "Maritime Logistics" as well as undergo a specialized internship in the Netherlands. The collaboration with the University of the Netherlands was initiated in April 2023. It is planned that TSI students will start using this opportunity in the academic year 2024/2025.

The drop-off varies from 20% to 9% depending on the year. Statistical data show that students drop out their studies for reasons of non-success (this is the main reason for foreign students), or because they owe tuition fees, or in some cases due to their own choice. In these situations, the head of the programme meets with the student to find out the exact reason. Often these are private reasons unrelated to the quality of the study programme. Statistical data indicate that it is common case when a person does not resume the studies after an academic leave.

3.1.5. Substantiation of the development of the joint study programme and description and evaluation of the choice of partner universities, including information on the development and implementation of the joint study programme (if applicable).

3.2. The Content of Studies and Implementation Thereof

3.2.1. Analysis of the content of the study programme. Assessment of the interrelation between the information included in the study courses/ modules, the intended learning outcomes, the set aims and other indicators with the aims of the study course/ module and the aims and intended outcomes of the study programme. Assessment of the relevance of the content of the study courses/ modules and compliance with the needs of the relevant industry, labour market and with the trends in science on how and whether the content of the study courses/ modules is updated in line with the development trends

of the relevant industry, labour market, and science.

The structure of the professional study programme "Transport and Logistics" of the second cycle complies with the requirements of the Cabinet of Ministers Regulation No. 305 of June 13, 2023 "Regulations on the State Standard for Vocational Higher Education", the compliance with which can be seen in Appendix 1.2, and with the professional standard for logistics manager(available only in Latvian). The compliance is shown in Appendix 1.3.

The study direction and the study programs included in it have been developed taking into account the mutual connection and sequence of study courses. This enables to achieve the goal of the study program and provide a set of knowledge, skills and competences in accordance Level 6 of the European Qualifications Framework of Latvian Education Classification.

In order to ensure the attainment of the aim of the study program, the study program contains nine elements of knowledge, skills and competencies to be acquired. Considering the achievement of learning outcomes, there have been identified specific study courses and the amount of knowledge, skills and competencies to be acquired (see the mapping of the study program in Appendix 1.4.).

The correlation of the aims and learning outcomes of the study program with the learning outcomes of specific study courses can be found in each study course description, which provides a description of the course content, course plan, study requirements, learning outcomes, study methods, literature and other sources.

The content of the study programme and the two specialisations offered are designed to achieve goal of the programme "To provide students with quality studies in accordance with the Latvian Logistics manager Professional Standard and the recommendations of the European Logistics Association, in order to ensure the competitiveness of the students in the international labour market and to meet the sustainable current and future needs of the society for qualified transport and logistics professionals". The study programme includes the specialisations "Sustainable Transport Solutions" and " Smart Logistics Systems". ". The included specializations in the program provide additional in-depth knowledge in a narrower field without limiting or excluding students from achieving the goals of the study program and fulfilling the requirements set out in the professional standard. As seen in the evaluation of the correspondence of study courses to the professional standard, each of the knowledge and skills specified in the standard is acquired in several study courses. Both specialization study courses provide professional knowledge in planning and organizing logistics processes as indicated in the professional standard. The specialization "Sustainable Transport Solutions" is focused on the development of knowledge and skills primarily related to the analysis, organization, and management of transportation processes in companies. It involves additional knowledge acquisition in the study courses "Smart Transport Solutions" - knowledge about intelligent transport systems, logistics platforms, digital tools, and smart city planning, and "Modern Solutions and Technologies in Distribution Logistics" - knowledge about "high chain" logistics, the latest technologies in distribution, and last-mile distribution. The specialization "Smart Logistics Systems" is focused on the development of knowledge and skills mainly related to the organization and management of internal logistics processes in companies and organizations. It involves additional knowledge acquisition in the study courses "Smart Warehouse Management" - knowledge about warehouse automation possibilities, and "Project and Multimodal Transport" - knowledge about the essence of project logistics and the organization of large-scale transportation.

The study programme offers free choice study courses (part C), from which 8 credit points (12

ECTS) must be obtained to fulfill the programme requirements. The purpose of these study courses is to provide students with the opportunity to acquire additional knowledge in a field of science or to acquire skills useful for professional activity. Several elective courses are offered each year, such as Philosophy, Digital Marketing, etc.. Block C also offers new study courses developed by the lecturers in the field of study of the programme. After the completion of such courses, student feedback is collected on how interesting and useful the course was, and if the feedback is positive, the study course is included as an independent course in Part B of the programme.

Considering the extensive offering of C block courses at TSI, until now, students have not been provided with the opportunity to take elective courses at other universities. Last year, a Cooperation Agreement was signed with the University of Economics and Culture, which envisions the possibility for students to take elective courses (C block) at partner universities.

The study programme also includes the content requirements of the study courses specified in the Law on Environmental Protection and the Law on Civil Protection (Occupational Safety, Civil and Environmental Protection - 2 CP (3 ECTS)).

The basis for quality assurance of the study programme is cooperation with potential employers by organising meetings and discussing issues related to current labour market developments, labour market demand, listening to suggestions in the Study Programme Council, reviewing the annual self-assessment reports of the programme.

The study programme regularly includes the guest lectures and excursions with industry representatives and key cooperation partners. During the last two years (2022 - 2023), seminars, guest lectures and visits to the following companies were organised: MSC, CMA CGM, Containerships, CEVA Logistics, Baltic Express, Mile Logistics, Inchcape Latvija, Food Union, Baltic Container Terminal, and the others

Since 2021, an annual round table discussions are organised; within the framework of these round tables the discussion with the representatives of the industry and logistics partners from foreign universities are held. In 2023, the event was held on 11.05.2023 under the title "Revolutionizing Logistics" with the participation of industry representatives from "MSC Shared Service Center Riga", "Containerships Latvia", "CEVA Logistics", as well as partners from "Tallinn Tehnikakõrgkool" and " HZ University of Applied Sciences" . The main opinions on the topics to be discussed received from the industry are as follows:

"MSC Shared Service Center Riga" was represented by Rodions Širjajevs. The topic of the presentation was related to human resources in logistics, employment and the importance of education. In general, Rodions Širjajevs emphasised the value of soft skills and the proactive activity of professionals working in this industry. These are key criteria for being recruited and continuing a career. The company expects newcomers to have a curiosity to learn, commitment, a positive personal attitude and, of course, basic professional and technical skills in logistics. Rodions Širjajevs advised students to choose an international company as their first practical experience, where they would have the opportunity to try their hand in different areas such as planning, operations, sales, accounting and others.

"Containerships Latvia" company was represented by Liana Karpušina. The topic of the presentation was related to green logistics solutions and sustainability. Liana Karpušina shared the company's experience in containerised freight transport using environmentally friendly solutions, including modern container vessels carrying cargo with liquefied natural gas, a special approach to planning the logistics processes, and also highlighted the current market trends in the field of short haul and multimodal transportation in Europe. Liana Karpušina emphasized the importance of studying logistics provided by TTI, as well as the self-development of young logistics professionals. Liana

Karpušina also shared her professional experience when she applied for the position of the Intermodal Freight Manager at a company (Containership) with no clear technical experience in the field, but with a clear willingness to learn, and eventually succeeded in the recruitment process.

"CEVA Logistics" company was represented by Kristofers Baskevics. The topic of the presentation was related to project logistics. Kristofers Baskevics presented to the students the current trends in the field of 3PL in general, such as service diversification, market specialisation, customer requirements, mergers and acquisitions in the global logistics market today. Christopher Baskevics shared business case examples of international project logistics (IPC), such as the transportation of the world's largest construction crane, where the total logistics costs exceeded 1 million euros. Christopher Baskevics also emphasised the importance of internships in logistics and advised students to take advantage of this opportunity already at the stage of their studies at university, since it provides the real opportunities to enter the logistics market and to gain the professional experience in an international company, just as Christopher Baskevics did after his Bachelor degree obtaining.

The relevance of the study course is also ensured by the teaching faculty members recruited from the industry, elected to academic positions at TTI or invited to teach individual courses, and their vision of the development trends in transport and logistics in the subject of the relevant study course. Moreover, the Programme Director's main place of work is the Baltic branch of "CEVA Logistics".

The correspondence of the study course content to the development trends in the field and science is also facilitated by the active practical, scientific and research activity of the programme academic staff - participation in conferences, preparation of publications, presentation of reports, participation in research, scientific and experience exchange projects and activities.

Study courses, including the contents of the course descriptions, are reviewed annually during the study programme and study direction self-assessment procedure, held in December and January in accordance with the course management regulations. As a result of such self-assessment, a programme development plan is drawn up, which comprises various aspects of the study course including updating of course descriptions following the specific field, labor market and science development trends.

There taken into account the feedback from the students in the study course evaluation questionnaires and the opinion of graduates and employers, providing input on the latest developments and current trends in the labour market. The updated courses are coordinated, approved and included in the study programme register and published in the e-learning environment Moodle by the beginning of the new academic year.

The assessment of the relationship between the aims and the achievable outcomes of the study programme and the aims and outcomes of the study courses shows that the content of the study programme and the study courses allows the achievement of the overall aims and outcomes of the study programme. The content of the study courses included in the programme is up-to-date and relevant to the needs of the industry, the labour market and the scientific trends. By successfully completing the programme, the students achieve the expected results of the programme and acquire knowledge, skills and competences that are in high demand in the labour market. The content of the programme courses ensures the continuity for studies in the higher level programmes.

3.2.2. In the case of master's and doctoral study programmes, specify and provide the

justification as to whether the degrees are awarded in view of the developments and findings in the field of science or artistic creation. In the case of a doctoral study programme, provide a description of the main research roadmaps and the impact of the study programme on research and other education levels (if applicable).

3.2.3. Assessment of the study programme including the study course/ module implementation methods by indicating what the methods are, and how they contribute to the achievement of the learning outcomes of the study courses and the aims of the study programme. In the case of a joint study programme, or in case the study programme is implemented in a foreign language or in the form of distance learning, describe in detail the methods used to deliver such a study programme. Provide an explanation of how the student-centred principles are taken into account in the implementation of the study process.

The study implementation methods, assessment methods, types and requirements are included in the description of each course available to students in the e-learning environment Moodle.

The study programme is implemented in accordance with the study plan, which is available to students in the TSI information system. For learning study courses, according to the specifics of the study course, lectures, practical works, laboratory works and students' independent work are planned. In bachelor's level courses, 40 hours per credit point (1.5 ECTS) are provided, including contact hours and students' independent work. Out of 40 hours in bachelor's level courses, 16 hours per 1 credit point (1.5 ECTS)) are intended for contact hours, the rest is independent work. Proportion between lectures and practical lessons (including laboratory classes) is specific for each study course and is determined by the teaching lecturer, depending on the study results of the course and the methodological aspects of the course. The mentioned contact hours for full-time and part-time study forms do not include consultations for students. According to TSI regulatory documents, during the semester the lecturer 1 load, it is necessary to provide 32 hours of consultations for students (the amount of consultations decreases proportionally with the lecturer's workload). The consultations are scheduled and visible in the schedule of lectures. During the consultations, the lecturer both answers the students' questions and additionally explains the course material.

The study process is mainly implemented in the format of interactive lectures, seminars, workshops and student independent work. Courses include workshops, often discussions, role-plays, teamwork, project work, in-basket professional tasks or solving specific practical problems. The choice of a method depends on the learning outcomes that a lecturer is planning to achieve. The applied methods are geared to the development of the students' abilities, specifically, to learning, creative use of knowledge, cooperatation, self-evaluation, offering of alternative solutions to problems, to critical thinking and making responsible decisions.

The programme is taught full-time in person and part-time (organised on Saturdays) in Latvian and English. The timetable for full-time and part-time studies is attached as Appendix 1.4. For foreign students, the only dependencies in the study plan are related to the inclusion of the course "The Latvian language for foreign students" in Part A, 2 credit points (3 ECTS), in the second semester. As a result, the share of free elective part is reduced by 2 credit points (3 ECTS) for foreign

students.

The basic principles and procedure of evaluation of the study programme completion comply with the requirements of Paragraph 58 of the State Standard for Vocational Higher Education Pursuant to the regulations adopted by the TTI Senate, the results of the professional bachelor's study program are evaluated according to two evaluation criteria: a quality criterion based on the 10-point marking system and a quantitative criterion - a credit point based on the total number of hours in the course. The complex method is used to assess the results of study courses. It includes assessment of students' practical work, individual or group work, mid-term assessment and final examinations (a test or exam). In order to facilitate students' independent work, it is stipulated that the final assessment (a test or exam) should not exceed 50% of the final mark for the course. In the beginning of a semester, students are informed about the components of the final mark and their assessment.

In practice, the evaluation process takes place regularly throughout the course of studies. The final assessment of students' learning outcomes is completed at the end of a semester after all stages of assessment are completed, such as practical assignments, seminars, independent work, mid-term assessment and examination. Teaching staff develop an assessment methodology, which indicates the percentage of each assessment criterion in the composition of the total mark

Students' independent study plays an important role. A description of how this takes place is included in the description of the study course as a compulsory component. Students' ability to study independently is purposefully developed in all study courses. Students acquire the skills of research work by working regularly with literature and internet resources in order to produce successfully various coursework and a bachelor thesis. This encourages students to work on scientific research and to work with international scientific databases available in the TTI library.

In the process of study, in accordance with the study programme the student is required to develop three course works in the study courses Cargo Studies, Logistics Service Providers, Project and Quality Management in Logistics.

Course work is necessary for the successful acquisition of knowledge and skills. The development of course work provides students with the opportunity to work independently with the proposed scientific literature and to apply the knowledge acquired in the lectures in practice. In the course work, students carry out the following activities: collecting and analysing industry data; application of various practical methods to solve problems in transport and logistics sphere (including transport flow planning, freight picking, warehouse flow planning, commodity procurement planning, multi-criteria decision making); working with specialised software.

The study programme includes an internship of students in a company related to the transport and logistics industry. The internship is 24 credit points (36ECTS) in total and forms an essential part of the student's acquisition of skills and competences. The internship within the framework of the study programme "Transport and Logistics" is implemented in 2 parts: "General Internship" (8 credit points, 12ECTS) and "Specialised Internship" (16 credit points, 24ECTS). The aim of the internship is to systematise, strengthen and extend the theoretical knowledge of the student and to acquire the practical skills and competences in the field of the chosen specialisation, in accordance with the requirements of the professional standard. During the internship the student acquires practical skills, the ability to detect and analyse the current practical problems, to collect the necessary information and to process it, formulating judgements to improve the efficiency of the chosen field of activity. For a more detailed description of the traineeship, see the description of criterion 2.4.

At the end of the studies, the student chooses a topic of his/her interest, according to the aim and

objectives of the study programme, as well as according to the tasks within the specialised internship, and develops and defends a diploma thesis in cooperation with a designated supervisor. As part of the specialised internship, students collect, compile and systematise company data and information and apply it to the development of their diploma thesis. The tasks of the internship are partly aligned with the tasks of the diploma thesis.

The study methods used in the study programme contribute to the achievement of the course and programme goals and learning outcomes, provide student - centred education to encourage students to take an active part in the learning process and to ensure the appropriate assessment of students' performance.

The principles of student - centred education and an individual approach to students are provided in the study programme:

- Learning outcomes. The evaluations of the study courses of the programme and the number of credit points are related to the learning outcomes. Students are informed about the results of each study course. The lecturers relate the results of the course to the results of the study programme, and also argue the necessity of studying the specific courses in order to become a computer science specialist in software engineering or artificial intelligence;
- Students are involved in the improvement of the content of the study programmes and study process through the students' surveys, as well as through involvement in the collegiate bodies of TTI and the Student Self-Government. Therefore, the students are provided with the opportunity to influence their own study process. Student representation in collegiate bodies is discussed in criterion 1.2 of the study field, the results of the student survey are shown in Appendix 6.
- Access to education and personalization of studies. When students study in the programme, a flexible study process is provided - various forms of study (on-site full time, part time, distance learning), the opportunity to create an individual study plan, which gives students the opportunity to combine work with studies already from the second year. Also, students of the day department have the opportunity to change the form of studying to part-time studies or distance learning in order to combine studies and work. Access to education is ensured by a digitized study process (e-library), discounts, social support (for foreign students, students who come to the university as part of mobility).
- Development of academic staff competencies. Pedagogical methods, study course structure and evaluation methods are chosen by the teaching staff responsible for the study course, according to the specification of the course content and programme, as well as the needs of the students. Courses and seminars on the latest teaching and pedagogical methods are organised for academic staff, as well as the attendance of qualification improvement courses is encouraged, both at internal faculty events, at the level of TTI, and internationally. More details are in the description of criterion 2.3.6 of the study field.
- In the organization of research work (in the selection of topics of study projects and final theses), the field of interest of the students, the specificity of the practical work and experience are respected.
- Assessment is consistent, applied equally to all students and is carried out in accordance with the approved procedures, and learning outcomes are assessed in accordance with the Regulations on the Charter of Studies. The assessment criteria for each course of study must be communicated to the students by the teaching staff in the first lecture, and they are published in the TTI e-study environment. The description of each course specifies the connection of the study course evaluation criteria and methods with the learning outcomes of the study course, as well as specified conditions for taking exams. (See Appendix 1.5, descriptions of the study courses of the study programme "Transports un loģistika")

- Procedures for examining the student appeals are in place and have been communicated to the students.
- Admission procedures and criteria are open. Admission rules with a detailed description of each programme are published on the TTI website in Latvian and in English.
- An information system has been created to ensure that the students can progress in their studies. More details are available in the description of criterion 2.3.4 of the study field.

3.2.4. If the study programme envisages an internship, describe the internship opportunities offered to students, provision and work organization, including whether the higher education institution/ college helps students to find an internship place. If the study programme is implemented in a foreign language, provide information on how internship opportunities are provided in a foreign language, including for foreign students. To provide analysis and evaluation of the connection of the tasks set for students during the internship included in the study programme with the learning outcomes of the study programme (if applicable).

The study programme "Transport and Logistics", in accordance with the Regulations on the Standard of Second Level Professional Education, includes an internship of 24 credit points (36ECTS).

The aim of the internship is to systematise, strengthen and extend the theoretical knowledge of the student and to acquire the practical skills and competences in the field of the chosen specialisation, in accordance with the requirements of the professional standard.

Practice objectives:

- To develop the student's ability to work independently in a business or professional environment;
- To make independently economically sound, practically applicable decisions to solve the problems and/or topical issues;
- To develop and strengthen communication skills.

The internship is organised in accordance with the study plan and the internship calendar plan, based on the agreements concluded between TTI, the students and the companies where the students are interning.

The study internship is organised for all students in 2 parts. The first one is "General Internship" (8 credit points, 12ECTS), which takes place in the 6th semester for full-time students (in the 7th semester for part-time students) and the second one is "Specialist Internship" (16 credit points, 24ECTS), which takes place in the 7th and 8th semesters (in the 8th and 9th semesters for part-time students).

The internship is implemented in accordance with the internship programme, which is developed by the faculty responsible for the implementation of the internship, coordinated by the director of the study programme and approved by the dean. The aims and objectives of the internship are set out in the internship programme, and the students are familiarised with this internship programme at the beginning of their studies. The objectives of the internship are related to the expected results of the study programme (see the programme mapping in Appendix 1.4. and the programme compliance with the professional standard in Appendix 1.3.).

During the internship the students: acquire the skills defined in the professional standard, which would promote the professional competence and the ability to apply knowledge relevant to the field; develop the ability to formulate analytically and to solve the current issues and/or problems of the industry; acquire the ability to work independently and in a team; learn to navigate in the regulatory enactments related to the professional activity.

In the general practice, the students get to know and study the basic principles of the operations of the company and the industry. Students demonstrate the ability to collect, process, systematise information, draw conclusions, understand the activities within the industry, development trends, as well as competition and other factors. In the general practice report, students provide information on: general characteristics of the company; marketing activities in the enterprise; organisational structure; business processes of the enterprise; information systems and personnel management. In addition, an analysis of the company's business activities is carried out.

As a part of the specialised internship, students solve the tasks that are agreed with the supervisor of the qualification work. Before the beginning of the specialised internship, the students agree on the topic of the diploma thesis with the scientific supervisor, after the selection of the topic the student together with the supervisor creates a list of literature, develops a work plan and on the basis of the internship performs the collection and compilation of statistical data necessary for the development of the final examination paper. At this stage, students are required to study the following areas of logistics management processes in an enterprise: the specific features of the internal (with regard to the organisation of the supply of raw materials (goods)) and external (with regard to the organisation of storage, sales and transport of finished products) logistics organisation peculiarities of a manufacturing enterprise or a commercial network; the specific features of an enterprise providing storage services; the specific features and current problems of companies that provide transport, forwarding and transport-forwarding services.

The provision of the study program with internships is stipulated in cooperation agreements between TTI and the major transport and logistics companies. Some separate cooperation agreements on the provision of internships for students of the Transport and Logistics programme have been concluded with MSC, K+N, Food Union, Kreiss, etc. (see Appendix xx), which engage their employees as internship supervisors.

The procedure for organising the internships in the professional study programmes of the Institute of Transport and Telecommunications is determined by *the Regulations of TTI on the Procedure for Organising the TTI Internships* (Appendix 2 of the study direction), which also describes the parties involved in organisation of internships and their responsibilities.

The Corporate Clients Department coordinates the activities of the structural departments of the Institute in organising the internships by collecting information on partner companies providing the internships. The Faculty provides students with internships in the form of a list of companies with the number of internships available, according to the requirements of the programme. Students are given the right to choose their internship placement independently by submitting to the University a document confirming that the company agrees to organise the given student's internship in that company in accordance with the TTI internship programme.

At the end of the internship, the student shall prepare a report on the results of the internship in accordance with the Methodological Guidelines of the Internship ((Appendix 1.9), accompanied by the internship diary and the feedback from the internship supervisor of the company. The internship documents are available to the student in the TTI e-learning environment in Moodle.

There are no administrative or practical differences in organizing internships between the languages of instruction, and it also does not differ between full-time and part-time study forms.

Students have a common internship regulation and process.

3.2.5. Evaluation and description of the promotion opportunities and the promotion process provided to the students of the doctoral study programme (if applicable).

3.2.6. Analysis and assessment of the topics of the final theses of the students, their relevance in the respective field, including the labour market, and the marks of the final theses.

At the Transport and Telecommunication Institute, students of all study programs, regardless of their study type and form, study language, or country of residence, develop, defend, and receive evaluations for their final theses based on uniform criteria and procedures outlined in the Regulations on the professional Bachelor's Degree, professional Master's Degree, and granting of professional qualifications and in the Regulations of the Final Examination .

Students choose themes of their Bachelor's theses independently from the list of research directions for Bachelor's theses offered by the Faculty. The offered themes are broad and comprehensive. Together with the supervisor of the final Bachelor's thesis, a student can make corrections and specify the theme. The student can also propose his or her own research theme. This is usually the case when the student is already working and the chosen research topic will help him or her to acquire professional competences in a specific field.

The student can make adjustments and clarify the topic together with the thesis supervisor. The student may also propose a topic for his/her own research. This usually happens in the case when the student is already working and the chosen research topic will help him/her to better acquire the professional competences in a particular field of knowledge.

Appendix 1.8 provides a list of examples of final thesis topics that have been defended in recent years.

The final theses of the students of the Transport and Logistics programme are relevant both to the specific company in question and to the industry as a whole. The dissertation is based on the material collected during the specialised internship and on the tasks to be solved.

During specialized internships, students receive a specific task related to their thesis topic from their thesis supervisor. Upon completion of the internship, the student is required to address this task and integrate their solution into the thesis, substantiating the research issues and providing proposals. In this way, specialized internships are linked to the thesis and the final evaluation.

Diploma theses are peer-reviewed. The reviewer is usually a senior lecturer at the university who has practical or scientific experience in the subject area. The reviewer assesses the compliance of the thesis against the following criteria: The aim and hypothesis/objectives of the work; the degree of use of literature and other sources of information; research methods; analysis of results; conclusions; organisation and style of the work; and the overall evaluation of the work. In order to reduce the subjectivity of the assessment and to ensure that students understand the evaluations

given in the supervisor's feedback or review, the performance evaluation scales with the textual descriptions are used.

The final theses of the programme are assessed by the State Examination Board, which is composed of at least half of the representatives of the professional organisations and the employers in the field (including the Chairman of the Commission), and which assesses both the relevance of the work and the student's knowledge and presentation skills.
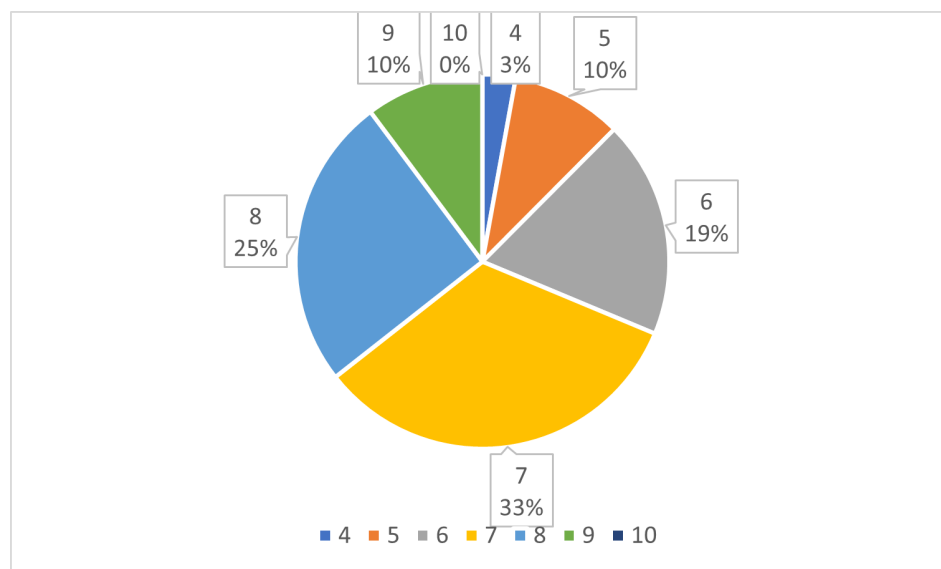

Fig. 1. The distribution of final theses evaluations in the 6-year period from 2018 is provided. until 2023

As shown in the graph in Figure x., 33% of students received a grade of 7 (good), 25% - 8 (very good) and 10% - 9 (excellent).

The grades of the final papers vary, but this indicates not only the level of knowledge, but also the ability to concentrate when speaking in front of the public, the ability to argue, to motivate and to defend one's opinion and proposals. The average score in the last reporting year was 6.9. The highest mark of "excellent" is awarded only for the outstanding performance and if the student has presented at an international or national conference, produced a scientific publication, etc. No final thesis has been awarded an "excellent" grade in the programme during the reporting period. This only confirms the serious attitude of the final examination commission in assessing the work of each student.

3.3. Resources and Provision of the Study Programme

3.3.1. Assessment of the compliance of the resources and provision (study provision, scientific support (if applicable), informative provision (including libraries), material and technical provision, and financial provision) with the conditions for the implementation of the study programme and the learning outcomes to be achieved by providing the

respective examples.

In the study direction report in sections 2.3.2. - 2.3.4 the full information on these issues is provided. considering that there are only two related programs in the field of study. This paragraph only provides additional and separate information on the study programme. The electronically purchased books in the Appendix 1.10. were acquired at the end of 2023, after the study program had already been prepared for evaluation by the AIKA.

The study process is mainly provided by the staff of the Faculty of Engineering of the TSI. In addition, the humanities and social studies part of the course involves staff from the Faculty of Transport and Management Sciences.

The Faculty of Engineering of the TSI provides teaching and methodological work: creates and updates course descriptions, provides teaching of relevant study courses (including practical, laboratory and seminar classes), conducts and defends bachelor theses and carries out other activities related to teaching, methodological and scientific work. The Digitisation and Innovation Learning Centre is responsible for the development and deployment of teaching methodological materials for distance learning courses on the TSI Learning Management System platforms.

The TSI library is available for use by students. The TSI library provides access to the Academic Complete database, which is available online for both students and faculty. The Academic Complete database is a database of scholarly e-books created by ProQuest, containing more than 180 000 titles in all major fields of science. The SCOPUS database, which focuses more on scholarly publications, is also available to students. The library staff organises regular sessions to inform students about the latest library news and how to use the library resources.

Software provided by TSI is used in the study process. The range of software is quite wide, e.g. Microsoft Dynamics AX, Microsoft Dynamics CRM, SPSS, STATISTIKA, Microsoft Project, Microsoft VISIO, etc. JIRA, LucidChart, etc. Practical classes for full-time and part-time students take place in computer labs. Distance learning students have access via a remote server to which students can log in and use the software remotely.

A contract with Coursera was signed in 2022. The aim of the agreement is to develop cooperation and to provide both faculty and students with the opportunity to obtain specific courses from the Coursera catalogue. It is an opportunity for the teaching staff to both improve their qualifications and to use Coursera courses in their studies. This agreement also provides the opportunity to develop courses using Coursera tools. This aspect is very important for the development of the distance learning form of study.

The common study, scientific, informational (including library), material-technical and financial base of the TSI and the Faculty of Engineering creates the preconditions for the achievement of the study results and demonstrates the possibility of ensuring a quality study process in the study programme " Transports un loģistika ".

3.3.2. Assessment of the study provision and scientific base support, including the resources provided within the framework of cooperation with other science institutes and higher education institutions (applicable to doctoral study programmes) (if applicable).

3.3.3. Indicate data on the available funding for the corresponding study programme, its funding sources and their use for the development of the study programme. Provide information on the costs per one student within this study programme, indicating the items included in the cost calculation and the percentage distribution of funding between the specified items. The minimum number of students in the study programme in order to ensure the profitability of the study programme (indicating separately the information on each language, type and form of the study programme implementation).

Since the programme's inception, tuition fee income has been the main source of funding for the study process. The programme is financed from the financial resources of natural and legal persons.

The amount of tuition fees for each academic year shall be determined and approved by an order of the Rector. The tuition fee payment procedure is laid down in the Regulation of the tuition fee payment procedure, which provides the possibility to pay tuition fees for the whole study programme, for one academic year, for one academic semester or as a monthly payment (starting from the 2nd semester). In the academic year 2022/2023, the tuition fee is EUR 3500.00.

The tuition fee for full-time on-site and part-time remote studies is the same.

The average costs for the study programmes are shown in Table 1.

"Transport and Logistics"	2023./2024.
Average number of students	332
Average revenue per 1 student, EUR	1 483,61
Average expenses per 1 student, EUR	476,24
Profit/loss per 1 student, EUR	1 007,37

There is no difference in the cost of studying in Latvian and English, since the studies are delivered at a high quality level without a breakdown by language of study, so there are no different tuition fees..

The cost structure of the study programme in the last academic year 2022/2023 includes salaries and taxes (including costs of scientific publications, etc.) (including the payment of the costs of publications and other similar costs, in accordance with the TTI academic staff remuneration regulations) in the amount of 56%, study programme development and implementation costs in the amount of 5%, teaching materials and other similar costs in the amount of 7%, scientific infrastructure costs and other similar costs amounting to 8% of the volume, advertising and marketing costs amounting to 8% of the volume, infrastructure costs (including IT costs) amounting to 7% of the volume, depreciation and amortisation 1%, other administrative costs 5%.

Every year TTI offers to the students the opportunity to receive personalised discounts of 50%, 75% and 100% on full-time tuition fees, which are awarded on a competitive basis. Applicants are evaluated on the basis of the results of the national centralised examinations, the average grade of the certificate, motivation and other additional achievements.

The programmes of the relevant cycle implemented at the Faculty of Transport and Management Sciences follow the sequence of the study courses, and the study plans of each programme are mutually coordinated - the study courses included in the plan and their sequence by semesters. These include the general education courses such as Occupational Safety, Civil and Environmental Protection, Mathematics for Business, Microeconomics, Macroeconomics, Taxes and Taxation, etc. This fact allows saving money and makes the programmes cost-effective even with fewer students. In full-time face-to-face studies the costs are higher, so to be cost-effective the programme needs a higher number of students – at least 12 students, and in part-time face-to-face – 8 students. The language of instruction does not affect the amount of costs.

3.4. Teaching Staff

3.4.1. Assessment of the compliance of the qualification of the teaching staff members (academic staff members, visiting professors, visiting associate professors, visiting docents, visiting lecturers, and visiting assistants) involved in the implementation of the study programme with the conditions for the implementation of the study programme and the provisions set out in the respective regulatory enactments. Provide information on how the qualification of the teaching staff members contributes to the achievement of the learning outcomes.

The teaching of the study programme is provided by 25teaching staff with relevant academic experience and qualifications, 16 of whom are elected lecturers.

Five TTI professors are involved in the implementation of the compulsory and limited elective part of the study programme "Transport and Logistics": Dr.sc.ing. I. Jackiva, Dr.oec. and Dr.sc.ing., D. Pavlyuk, Dr.sc.ing. M. Savrasovs, Dr.sc.ing. A. Medvedevs and Dr.sc.admin. Y. Stukalina; and four associate professors : Dr.sc.ing. N. Spiridovska, Dr.sc.ing. E. Budiloviča, Dr.oec. J. Popova and Dr. sc.admin. I. Sproģe.

In addition to the above-mentioned team of professors, an emeritus professor, 4 assistant professors and 2 lecturers are also involved in the implementation of the programme .

A total of 14 or 88% of the academic staff involved in the programme have the Doctoral degrees - 9 in engineering, the rest in social sciences, and the programme director is a candidate for a scientific doctoral degree whose doctoral thesis is expected to be defended at the end of the year.

The study process involves not only the academic staff of the study direction, but also a number of specialists in the field, including foreign lecturers, who with their professional experience not only deepen the students' practical knowledge and skills within the study course, but also increase the

students' employability after graduation from the programme.

In 2019, within the framework of the project "Strengthening the Academic Staff of the Transport and Telecommunication Institute in Strategic Specialization Areas," No. 8.2.2.0/18/A/011, a foreign lecturer Berdymyrat Ovezmyradov Omar Youssef Yasser Moustafa Kamal Abdelmonem started the cooperation with TTI; he continues the cooperation and currently, several professional industry courses are taught in the programme in English.

Five of the guest lecturers have the degree of Doctor of Science, and the rest have Master degrees.

Some study courses have several lecturers, or the main course is taught by the programme director, but it is already foreseen that the representatives of the industry will be invited as guest lecturers, thus ensuring both the quality and relevance of the study course content. It should be noted that the main place of work of the Programme Director is the Baltic branch of "CEVA Logistics".

The knowledge of the state language of the teaching staff involved in the programme complies with the Cabinet of Ministers' Regulation No 733 of 07.07.2008 "Regulations on the scope of knowledge of the state language and the procedure for testing the knowledge of the state language for the performance of professional and official duties, for obtaining a permanent residence permit and the status of permanent resident of the European Union and the state fee for testing the knowledge of the state language". The TSI Human Resources Department verifies national language skills at the time of recruitment.

In order to verify the English language proficiency of the teaching staff, periodic English language proficiency tests and, if necessary, additional training are organised at the TSI, e.g. in the academic year 2019/2020, several of the teaching staff did improve their English language proficiency in the courses organised in the framework of the project 8.2.2, and repeated English language courses are planned in the future from the funding of the University itself.

The qualifications of the teaching staff involved in the implementation of the study programme meet the conditions for the implementation of the study programme and the requirements of the regulatory enactments, ensure the achievement of the objectives and study outcomes of the study programme and the corresponding study courses

3.4.2. Analysis and assessment of the changes to the composition of the teaching staff over the reporting period and their impact on the study quality.

In the period of time since the previous accreditation, which took place more than 10 years ago, there have been changes in the faculty members involved in the study programme "Transport and Logistics".

Position	2012./2013. academic year			2022./2023. academic year		
Education	Doctor Degree	Master Degree	Total	Doctor Degree	Master Degree	Total
Professors	2		2	5		5

Associate Professors	4		4	4		4
Assistant Professor	8	2	10	4		4
Lecturers	16	16	16	2	2	2
Asistenti	1	1	1			
Emeritus profesors				1		1
Guest lecturers	3		3	5	4	9
Total			35			25

The total number of the faculty members has decreased significantly, but it should also be noted that the number of students in the programme has also decreased significantly over the 10-year period. In the academic year 2012/2013 there were 901 students in the programme, and in the academic year 2022/2023 – only 380. Only 6 lecturers currently teaching in the programme were also working at the time of the previous accreditation.

Several factors influence the changes in the composition of the teaching staff. One of them is the generational change, since many lecturers were in the pre-retirement age group at the time of the previous accreditation. Currently, a large number of younger lecturers (under 45 years of age) joined the programme. A number of faculty members have upgraded their academic experience and have been elected to the senior positions. Two of the lecturers from the last accreditation period have obtained a Doctor of Science degree and hold the positions of Professor and Associate Professor: Y. Stukalina, D. Pavlyuk, N. Spiridovska, J. Popova. Currently, O.Skorobogatova and A.Kotlyar are studying in the doctoral programme and are expected to defend their doctoral theses at the end of 2023).

The choice of the academic staff is determined by the content of the study programme, which is continuously improved in line with the rapid development of the industry. The programme includes the study courses that provide future competences, and invites the faculty members specialising in the specific field, including from the professional world to teach these courses.

This allows the programme to be linked to practical activities, as information is obtained directly from professionals in the field themselves, and generates greater interest among students.

The reduction in the total number of the teaching staff has no impact on the quality of the programme. Taking into account the rapid development of the field, the Transport and Logistics programme has, over the past eleven years, naturally included new courses as well as changes in the subject matter of the existing courses (more details are in the description of criterion 3.1.). The number of TTI professors and guest lecturers from the industry has increased, which has a positive impact on the quality of the programme.

Overall, it can be concluded that the changes in the structure of the teaching staff involved in the study programme are positive, that the relevant qualifications and experience of the teaching staff in academic work ensure a high quality of education and that it is appropriate for the achievement of the overall results of the study courses and the programme.

3.4.3. Information on the number of the scientific publications of the academic staff

members, involved in the implementation of doctoral study programme, as published during the reporting period by listing the most significant publications published in Scopus or WoS CC indexed journals. As for the social sciences, humanitarian sciences, and the science of art, the scientific publications published in ERIH+ indexed journals or peer-reviewed monographs may be additionally specified. Information on the teaching staff included in the database of experts of the Latvian Council of Science in the relevant field of science (total number, name of the lecturer, field of science in which the teaching staff has the status of an expert and expiration date of the Latvian Council of Science expert) (if applicable).

3.4.4. Information on the participation of the academic staff, involved in the implementation of the doctoral study programme, in scientific projects as project managers or prime contractors/ subproject managers/ leading researchers by specifying the name of the relevant project, as well as the source and the amount of the funding. Provide information on the reporting period (if applicable).

3.4.5. Assessment of the cooperation between the teaching staff members by specifying the mechanisms used to promote the cooperation and ensure the interrelation between the study programme and study courses/ modules. Specify also the proportion of the number of the students and the teaching staff within the study programme (at the moment of the submission of the Self-Assessment Report).

The study programme has a mechanism for mutual cooperation between academic staff, which promotes the development and interconnection of the study courses. The improvement of the study courses is carried out on a regular basis, based on suggestions made by students, industry development trends, and the latest results ofthe research, scientific activities and innovations.

During the implementation of the study courses and scientific work, regular meetings of teaching staff take place, in which they exchange experience on the study course topics, results of scientific work, new developments in the research, etc. Discussions are used to develop and improve the content of studies, with mutual agreement on topics, emphases, responsibilities and compliance with regulatory requirements.

The knowledge acquired in other study courses is taken into account in the design or development of the content of the study courses, indicating it as the required prior knowledge.

For example, in preparation for the programme evaluation, the content of the programme was reviewed and faculty members mutually agreed on the extension of some courses of study to reduce the number of small 2 CP courses in the programme as much as possible.

Taking into account that the study programmes are taught in several languages, and, to improve the quality, the same courses are often taught in Latvian, English (and Russian until summer 2023) by different faculty members, all faculty members related to a particular course are involved in the

process of course coordination in order to harmonise the topics to be covered during the classes and to ensure common requirements. This ensures that the topics covered in the study programme are continuously developed and updated in close mutual cooperation.

Within the framework of the study programme, cooperation with employers and professional organisations is carried out through seminars, conferences, as well as through personal contacts of lecturers, analysing the competence of students and graduates, and addressing issues of graduates' future employability.

As part of the study process, the preliminary defences are organised with the participation of a committee of faculty members, where the recommendations are collectively made to improve the bachelor theses. Consequently, mutual cooperation between lecturers of different fields is ensured and allows comprehensive recommendations for the development of bachelor's theses. The same cooperation is observed after the defence of the bachelor theses, when the Final Examination Board gives its evaluation as a result of the discussion, based on the evaluations proposed by the members of the Board. The State Examination Commission consists of the leading faculty members and the representatives of the employers.

Experienced researchers working at the Faculty of Engineering participate in the research projects and activities funded by the Latvian Council of Sciences, the European Commission and other international funding sources and foundations in cooperation with partners in universities and research institutions in Latvia, European Union Member States and worldwide: I.Jackiva, M.Savrasovs, D.Pavlyuk.

The total number of lecturers involved in the implementation of the programme is 25, while the total number of full-time face-to-face and part-time on-site students on October 1, 2023 was 313; therefore, the student to lecturer ratio of 1:13. Distance learning students who will graduate from the university in the summer of 2024 are not taken into account here.

Annexes

III - Description of the Study Programme - 3.1. Indicators Describing the Study Programme		
Sample of the diploma and its supplement to be issued for completing the study programme	Annex 1.7. Diplom Bc.zip	1.7.pielikums. Diploma paraugs.zip
For academic study programmes - Opinion of the Council of Higher Education in accordance with Section 55, Paragraph two of the Law on Higher Education Institutions (if applicable)		
Compliance of the joint study programme with the provisions of the Law on Higher Education Institutions (table) (if applicable)		
Statistics on the students in the reporting period	Annex 1.1 Statistics on the students 0103.docx	1.1.pielikums. Statistikas dati par studējošajiem pārskata periodā 0103.docx
III - Description of the Study Programme - 3.2. The Content of Studies and Implementation Thereof		
Compliance with the study programme with the State Education Standard	Annex 1.2. Compliance with the State Education Standard 0103.docx	1.2.pielikums. Atbilstiba izglitibas standartam 0103.docx
Compliance of the qualification to be acquired upon completion of the study programme with the professional standard or the requirements for professional qualification (if applicable)	Annex 1.3. Compliance with the professional standard.docx	1.3.pielikums. Atbilstība profesijas standartam.docx
Compliance of the study programme with the specific regulatory framework applicable to the relevant field (if applicable)		
Mapping of the study courses/ modules for the achievement of the learning outcomes of the study programme	Annex 1.4. Mapping 0103.xlsx	1.4.Pielikums. Kartejums 0103.xlsx
The curriculum of the study programme (for each type and form of the implementation of the study programme)	Annex 1.5. The curriculum of the study programme.zip	1.5.pielikums. Studiju plans.zip
Descriptions of the study courses/ modules	Annex 1.6. Descriptions of the study courses modules.zip	1.6.pielikums. Studiju kursu apraksti.zip
Description of the organisation of the internship of the students (if applicable)	Annex 1.9. Internship Methodological Guidelines.docx	1.9.pielikums. Praksees metodiskie noradijumi.pdf
III - Description of the Study Programme - 3.4. Teaching Staff		
Confirmation that the academic staff of the doctoral study programme includes not less than five doctors, of which at least three are experts approved by the Latvian Council of Science in the branch or sub-branch of science in which the study programme intends to award a scientific degree (if applicable)		
Confirmation that the academic staff of the academic study programme complies with the requirements specified in Section 55, Paragraph one, Clause 3 of the Law on Higher Education Institutions (if applicable)		