

THE TRANSPORTATION RESEARCH AND CONSULTING CENTRE AT THE UNIVERSITY POLITEHNICA OF BUCHAREST: THE ACHIEVEMENTS OF THE TRANSPORT RESEARCH AND ITS INVOLVEMENT IN ACTUAL SOCIO-ECONOMIC ENVIRONMENT

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Abstract:

The paper presents the main mission of the Transportation Research and Consulting Centre at University POLITEHNICA of Bucharest (in short UPB-CCPCT), the categories of the projects' themes and the main results during the last decade of activity.

An introductory section briefly presents the research frame of the University POLITEHNICA of Bucharest and the distinctive mission and role of the Transportation Research and Consulting Centre.

A second section is dedicated to the most important research directions, the source of the researches' funds, and the main achievements.

The next part describes the involvements of the UPB-CCPCT in the actual transport problems of the socio-economic environment during the recent projects which are funded by the Romanian private economic actors.

We describe also the UPB-CCPCT research activities for a very new international project on the freight intermodal transport - FLAVIA.

A final part of the paper is dedicated to the short list of some conclusive remarks.

1. Introduction. Short presentation

University POLITEHNICA of Bucharest (UPB) is the most important technical university in Romania. The UPB roots are going down to the first higher technical school from Romania, established in 1818, formerly known as the "National School of Bridges and Roads", following the lead of the famous French academic school.

With more than 180 years of existence, UPB represents the main source of technical specialists of Romania. Illustrious personalities, world-wide known by the scientific community, have been professors at the "POLITEHNICA".

In 1948 it was established the ***Transport Techniques Department*** inside of the Railway Faculty, that was later transformed in the Railway Institute and then, in 1958, in Transport Faculty. All these years, the Transport Faculty has preserved almost the same structure, providing technical academic education in the following main fields: Automotive Engineering; Railway Vehicles; Transport and Traffic Engineering; Remote Control and Electronics in Transports.

In this frame, the Chair of **Transport, Traffic and Logistics** (the actual name of the Transport Techniques Department) has responsibilities for, and manages the following academic programs:

- Transport and Traffic Engineering (B.Sc. - 4 years with 8 semesters),
- Transport Logistics (M.Sc. - 2 years with 4 semesters),
- Urban Transport and Traffic (M.Sc. 2 years with 4 semesters),
- Transport Management (M.Sc. 2 years with 4 semesters),
- Logistics (long life training - 6 months per year),
- Transport Engineering - doctoral program

and coordinates the research activity into the **Transportation Research and Consulting Centre (UPB-CCPCT)**.

The Chair of TRANSPORT, TRAFFIC AND LOGISTICS, from Transport Faculty provides to its graduates the main competences, as follows, but not only:

- Transport and traffic activities management for goods and people
- Integrated logistic systems, city logistics
- IT technologies assisting transport and traffic processes
- Technical, economic and financial assessment of transport systems development projects
- Transport marketing and competition studies

We provide the academic courses, practical activities and, carry out research works in our laboratory:

- Laboratory of Transport Systems
- Laboratory of Transport Technologies
- Laboratory of Computer Programming and Transport Informatics
- Laboratory of GIS/GPS Systems
- Laboratory of Logistics and Multimodal Transport

In 2007, the B.Sc. program “Transport and Traffic Engineering” was examined by the Romanian Agency for Quality Assurance in Higher Education – ARACIS, regarding to rank the all the Romanian universities and their offered academic programs, and the result was the highest possible.

Research activities in University POLITEHNICA of Bucharest is coordinated under the Faculty and Chairs/Departments Authority (having their own financial accounting system) but under the University legal authority. There are also large international projects involving the majority of the departments and chairs of our university. UPB academic community (about 1500 teachers) carries out many scientific research programs and projects that confer it not only appreciation and professional reputation, but also the quality of its teaching steps and the premise of its participation in realizing an information society within the higher education European space through knowledge creation. Since 2000, UPB research activity was carried out for 126 international projects. UPB has clearly demonstrated its ability to participate in research projects regarding transport systems sustainable development and better servicing communities' interests. By developing multidisciplinary research and training in the transportation field, UPB plays an

important role in scientific and technological transfers from the academic community to industry and public organizations.

The Transport Faculty coordinates the following three research centers:

- Transportation Research and Consulting Centre – UPB-CCPCT,
- Research, Design, Service & Consulting Centre in Automotive Engineering Domain,
- Research, Design, Service & Consulting Centre in Transport Electronics Domain

The **Transportation Research and Consulting Centre (UPB-CCPCT)** is a research unit under the University POLITEHNICA of Bucharest jurisdiction, and under the Chair of Transport, Traffic and Logistics scientific and administrative control. All the teaching staff is involved into the research activities under the UPB-CCPCT.

Fundamental mission of the UPB-CCPCT research activities is to obtain the sustainable solutions for the transport systems development according to the increasing quality needs (safety, security, time, commodity, comfort, punctuality, flexibility, etc.), taking into consideration the actual and provisional technological alternatives, the various restrictions (in terms of materials, energy consumption, human resources, financial resources, environmental protection, non-renewable resources), and the integration and cohesion needs of the socio-economic increasing space to the European and global level.

2. Research directions at UPB-CCPCT

According to the above mentioned mission, our researches are structured into the thematic direction, as follows:

- **Land-use and transport integration** according to the sustainable development requests (the impact of the interaction between transportation and the land-use planning/ urbanism on the social mobility and mobility pattern; strategically decision making of the transport infrastructure development/ modernization taking into consideration the pluri-relations specificities of the technical infrastructure of the society),
- **Multimodal transport solutions** in order to reduce the resources consumption, to limit the external effects of the transport services (in terms of: infrastructures, vehicles, equipments, technologies) and to assure the inter-operability of the regional, national and European networks,
- **Increasing of the traffic safety and transport security** (technical solutions for the active and passive safety, adequate to the behavioral particularities; assessments of the risk, accident costs, and lost of goods quality),
- **Car traffic congestion diminishing** in dense urban areas and assessment of the external effects of the car congestion, in relation with the following direction:
- **Improving of the urban public transport** to increase the attractivity of the public transport services for a easy modal shift from car to mass-transit in large urban areas,
- **Promoting of the quality management system** to have a good and equitable competitive environment on the transportation market. An important part of this direction is devoted to the assessment of the transport service quality.

In order to accomplish its mission, UPB-CCPCT uses new technologic and scientific achievements as follows: GIS/GPS systems for the logistics – of supply and distribution; mathematical and computer simulation models, techniques of artificial intelligence etc;

The Romanian national budget supports (or supported) several of the UPB-CCPCT research projects, in a competitive way, using funding programs as follows:

- Romanian National Frame Program of Research, Development and Innovation (PNCDI),
- Romanian National University Research Council program (CNCSIS),
- Romanian National Program of the Excellency Research (CeEx) especially set up to prepare the Romanian researchers for the European research into the FP7.

Apart from the UPB-CCPCT research activities, the teaching staff of the Transportation, Traffic and Logistics Chair is involved into large international projects, by side with other faculties in energy, mechanical, automation & computer science engineering domains solving some of the actual transport problems.

Moreover, important actors of the Romanian business environment use and financially support the researches results of the UPB-CCPCT research team.

UPB-CCPCT promotes an **interdisciplinary approach** to find adequate solutions and, as a consequence, it has some special relationships with partners, as follows:

- “Ion Mincu” University of Architecture and Urbanism,
- University of Bucharest, Geography Faculty,
- “URBANPROIECT” Research and Urban Planning Institute,
- Romanian Academy of Technical Science,
- Bucharest Municipality,
- Romanian Transport Ministry and Infrastructure,
- National Railway Operators,
- Bucharest Surface Transport Operator (RATB),
- Bucharest Subway Operator (Metrorex),
- Romanian Railway Authority –AFER,
- Romanian Police- Traffic Police Directorate.

In the above paragraph we present a selective list of the research grants and projects accomplished in last years in the **surface transport domain**, funded especially by the Romanian public funds:

- **ECOSSED** - *Civic education for selective waste collection in univerities* –, funded National Frame Programme of Research, Development and Innovation PNCDI, 2008-2011;
- **TRANSINDEV** – Strategically decisions modeling of the transport infrastructure development – grant from the Romanian National University Research Council program - CNCSIS, 2006-2008;
- **TRANSILF** – *Planning and design of the passengers public transport in Ilfov County and Bucharest suburbs*, beneficiary: Ilfov County Prefecture, 2007
- **TERITRANS** – *Interdisciplinary and convergent solutions for land use and transport system structuring toward sustainable development and life quality improvement* – beneficiary: the Romanian Ministry of Research by the National Program of Excellency Research – CeEx, 2006-2007;

- **MODUR** – *Promoting sustainable mobility in Bucharest metropolitan area* - beneficiary: the Romanian Ministry of Research by the National Program of Excellency Research – CeEx, 2006-2007
- **DANUBE** – *Encouraging modal shift and decongesting transport corridors by inter-modality improvement of the Danube Rivers* - beneficiary: the Romanian Ministry of Research by the National Program of Excellency Research – CeEx, 2006-2007
- **COPALOVA** – *Correlations between the structure and the number of locomotive and wagons active fleet in the rail freight transport* - beneficiary: the Romanian Ministry of Research by the National Program of Excellency Research – CeEx and the Ministry of Transport, 2005-2006
- **VIRTLOG** – *Researches on a virtual logistic platform for structuring Romanian logistics* - beneficiary: the Romanian Ministry of Research by the National Frame Program of Research, Development and Innovation –PNCIDI, 2005-2006
- **TRANSATTRACT** – *Solutions to increase urban transit attractiveness. The Bucharest case* – beneficiary: the Romanian Ministry of Research by the National Frame Program of Research, Development and Innovation –PNCIDI, 2005-2006
- **TRANSURBAN** – *Urban transport system for uncovered spaces in Bucharest area* - beneficiary: the Romanian Ministry of Research by the National Frame Program of Research, Development and Innovation –PNCIDI, 2005-2006
- **TRANSNETREL** – *Researches on transport network reliability* - grant from the Romanian National University Research Council program – CNCSIS, 2004-2006
- **CONURB** – *Convergent solution for decreasing congestion and pollutant effects of the traffic in large urban areas*, beneficiary: the Romanian Ministry of Research, priority project in Land Use and Transportation National Research Program (AMTRANS), 2002-2004
- **TRANSLOG** – *From integrating transport means according to the socio – economic environment to the logistics* – World Bank Grant, 2000
- **TRIBUSE** – *Public transport development in Ilfov County correlated with public transport in Bucharest Municipality and with socio-economic environment features*, Romanian National Agency for Science and Technology, 1999-2000.

From the *social perspective*, the **main achievements** of the UPB-CCPCT research activities are:

- important support for the decision makers at different decision levels, especially for the transport administration,
- support for the regulatory framework in transport fields,
- knowledge improvement in transport field,
- actual applied solutions in traffic and transportation,
- improvements of the several university syllabuses of the existing curricula in transport engineering,
- new transport curricula development (Transport Management, M.Sc. as complementary program – 4 semesters-120 ECTS),
- improvement of the authorities' confidence related to the transport university research,
- authorities' warning about the contemporary problems in traffic and transportation.

Another list (non-exhaustive one) of the main achievements, *from the very individual perspective*, in relation with each of the UPB-CCPCT's staff, can be the following:

- understanding the actual needs of the graduates on the employment market,
- valuable improvements of the didactical materials for students,

- new research ideas and new projects proposals and as a consequence, financial gains for researchers,
- new valuable articles and books (according to the Romanian law, obtaining the full-professor title imply four articles published by the most prestigious International Magazines or Journals, indexed into ISI Thompson databases or another famous indexed internationala databases).

3. University researches and private business

UPB-CCPCT collaborates (or collaborated) with several important economic actors in order to solve their transport problems, but also in order to facilitate the take-over process for the some suburban or rural passengers transport services.

In this respect we mention here some selected projects as follows:

- *Arad county transport lines for passengers, 2010* (consulting project for take-over process for some inter-cities transport lines),
- *Improving car traffic access to the large hypermarkets plaza located in Southern area of Bucharest, 2010*
- *Sustainable transport services for the all PETROM-OMV operative staff giving the new Head Quarter location, 2009* (solutions for the employees daily commuting from around Bucharest area and for the Ploiesti-Bucharest commuting line),
- *Solutions for the passenger transport services in Dolj County/Region, 2009* (consulting project for take-over process for some inter-cities transport lines)
- *Contract for Consultants' Services on Management Assistance and Institutional Development Requirement for the Railway Modernization Project of Bucharest-Constanta Line, for Oak Leaf International, Inc., agent al PADECO CO. Ltd.,2004.*

The involvement of the UPB-CCPCT in the actual business environment revealed some difficulties related to the following aspects:

- the missing precise databases with new and confident information in respect to the socio-economic characteristics of the activities,
- difficult access to the real financial data of the economic actor (some secret data),
- sometimes, lack of confidence for scientific solutions
- some pressures from the economic actor side for a certain solution, even if it is not valuable and provided by the study,
- economic actors' magnified opinion about the advantages of the car usage and difficult understanding of the sustainable transport solutions, for example: underground or mass-transit lines, car-sharing or car-pooling, etc.

The main conclusion of the UPB-CCPCT analyses of those difficulties was that: *we have to make a hard and aggressive promotion of our projects and the finding solution, in order to improve economic actors' attitude about the scientific solutions provided by the experts.*

4. FLAVIA project or the UPB-CCPCT's involvement on the transport business

Freight and Logistics Advancement in Central/South-East Europe - Validation of trade and transport processes, Implementation of improvement actions, Application of co-coordinated structures – in short - FLAVIA project (funded by the European Regional Development Fund) addresses the following problems in freight transport (<http://www.flavia-online.de/>):

- Modal split of rail and inland waterway dropped down despite of increased volumes
- Increasing road congestions

- Big delays of freight trains at border crossings
- Obsolete terminal technique
- Mental barriers of market players against intermodal transport

The approach of the project is *logistic process oriented with the aim to improve intermodal cargo flows instead of the building of new infrastructure*. This can avoid or concentrate investment funds. Through the logistical approach and instruments being used (like e.g. benchmarking, accessibility analyses, running time and bottleneck analyses, implementation of quality standards) new and innovative measures for a better interconnectivity of the regions will be developed and implemented. Also the exchange of knowledge and the promotion of best-practice are elements of the project.

The FLAVIA logistic corridor project involves partners from Austria, the Czech Republic, Germany, Hungary, Poland, Romania and Slovakia. From Romania the only partner is our UPB-CCPCT centre. Improving logistic flows among the involved regions will contribute to the integration of markets in the enlarged European Union.

FLAVIA contributes to the three INTERREG CENTRAL programme goals:

1. Strengthening territorial cohesion, by:
 - Reducing of organizational, technical and administrative barriers in the intermodal logistic channels
 - Further development of the logistic and trade relations between CE and SEE and the Black Sea/TRACECA countries
2. Promoting internal integration, by:
 - Reducing of organizational, technical and administrative obstacles of intermodal logistic chains to facilitate the free transport of goods
 - Establishing different national and trans-national alliances regions, transport and terminal operators
3. Enhancing the competitiveness, by:
 - Supporting the harbor development at the Black Sea
 - Improved accessibility by reducing bottlenecks
 - Elaborating concepts for the intermodal security enhancement
 - Elaboration of ways to green logistics

Concrete results will be:

- Establishment of a ministry group economy, environment and transport for communicating the project results in form of policy papers
- Intermodal Wiki
- FLAVIA Road Show
- IT Tool to analyze accessibility
- Measures to overcome the existing problems and TEN-T recommendations in form of evaluated lists for ministry group
- Brochure “From Truck to Train”
- Concept for rail and terminal alliances
- Findings in efficient increasing
- Pre-feasibility studies intermodal rail, inland waterway and intermodal terminal development
- Extension of the transport corridor Central-Southeast Towards Black Sea/ TRACECA countries

During the FLAVIA project (36 moth starting since March, 2010) the UPB-CCPCT have to interact with producers, exporters, transport operators, delivers, chambers of commerce etc. to accomplish it tasks, and as a consequences, our research centre will be more involved on the Romanian transport business market.

5. Conclusive remarks

- UPB as a largest and most qualitative technical university of Romania offers the adequate financial and administrative frame for an efficient involvement of our Transportation Research and Consulting Centre in transport business environment,
- UPB-CCPCT has large research experiences in transport research projects funded both national centralised fund and private funds,
- the results of the research activities are valuable for social and individual perspectives,
- there are still important difficulties to solve the actual transport business problems,
- the new project FLAVIA will contribute to the strengthening of the connection between university research activities and the actual transport business environment,
- the improving the research collaboration among the universities and research units from the Balkan region countries may contribute to the new business opportunities on the transport market but also for the new transport research projects funded by the European Union's research or development funds (in the frame of the actual running programs, for example : *Romania-Bulgaria 2007-2013 Cross Border Cooperation Operational Program* ; *SouthEast Europe 2007-2013 Transnational Cooperation Operational Program*; *Interregional Cooperation Programme INTERREG IV C*, etc.).