TADIRAM project: Organizational and technical proposals for Freight Distribution in the Sustainable City

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The current configuration of freight distribution systems in urban areas is reaching unsustainable levels of negative impact on quality of life and economic efficiency.

In the TADIRAM project (“Advanced Technologies and Innovative Sw Tools for Freight Distribution in the Sustainable City”), co-funded by the Italian Ministry of Research and Universities and the Consortium TRAIN, recently closed, research activities have been carried out aimed at identifying new organizational and technological solutions for the optimization of freight distribution process, to improve the quality and the efficiency of logistic services in urban areas and to contribute to the sustainability in terms of traffic and air pollution.

Train is a consortium for RTD on INnovative TRAnsport, it is a no-profit organization promoted by ENEA - Italian National Agency on New Technologies, Energy and Environment. The partners involved in Tadiram are: Ansaldobreda, Bertolotti, D’Appolonia, ENEA (ENETEC and BIOTEC department) and Uniontrasporti.

The Tadiram Project has studied and designed all the elements of a new organization of delivery based on logistic bases and transit-points:

- software for service management;
- telematics for gate procedures;
- ecological small vehicles for capillary distribution;
- innovative use of non-road transport vehicle (cargotram);
- new loading units specifically designed for the project
- new equipment for load unit handling

The Tadiram City Logistics concept is that freight hubs are established in a suburban areas for receiving goods coming from outside and distributing them in the inner town using ecological transport vehicles (road and rail) and optimising the delivery tours.

The “last mile” service can be operated either by single private operators or operators cooperative or public/private partnerships.

The location sites are defined on the basis of town configuration and the freight hubs are equipped with a computerized control center (CCC) both for communications and elaborations.
The Tadiram partners have developed an IT system to manage delivery orders coming from hubs customers (haulage operators); this system allows to filter demand and to easy delivery optimisation, even though the hubs operational scheme provides also the possibility of using the “last mile” service” without any previous announcement.

The TADIRAM system for order management is connected with an optimisation software that elaborates the best transport solution (schedules and routes) for a given set of deliveries with certain time constraints.

As for ecological vehicles, the project analyses have concluded that road vehicle technologies are already mature for an extensive use also for a “clean and low-energy consuming freight transport” in urban areas: in particular CNG vehicles are already available on the market and hybrid electric vehicles seem to be very promising in a near future.

Regarding Cargo tram, other experience have been conducted in some European realities (Vienna, Dresda, etc.); the TADIRAM project partners carried out a new prototype particularly designed for goods assembled into load units, which use can minimise the economics and time impacts due to loading/unloading operations.

In Tadiram, a new version of SIRIO Cargo Tram (AnsaldoBreda) has been studied. This tram is suitable to run on both tram and railways tracks, can be composed in different ways according to the demand requests and be coupled also with passenger tram. Moreover the tram has a fully lowered flatcar: 350 mm from the rail plane and a wide (more than 6 meters) hatch to facilitate the handling operations.

In order to allow vehicles access into areas where security drawbacks (hub and Transit points) and/or environmental impact don’t allow the use of cables (historic centers), either an alternative energy supply system (STRAM) or batteries can be used on the tram. STRAM is based on an under system of electrical supply placed at the centre of the wagon and a centrally positioned sliding block below the carriage which is flexibly connected to the supply.

According to the TADIRAM results, cargo tram is particularly suitable for fruits and vegetables distribution from general market to local markets, in the first morning, when passenger traffic is low and tram tracks can be easier occupied by freight vehicles; another possible application of cargo tram is hospitals goods supplying by night; more generally, cargo tram can be usefully used when big amounts of goods have a unique origin or a unique destination.

The new load units have been designed and realised as demonstrators by TRAIN partners; they are two types: one to carry pallets and the other one to carry small load units o single parcels, also to be delivered to different destinations.

An innovative equipment for load units handling - carried out within the TADIRAM project - allows a semi-automatic loading and unloading of tram and lorries and helps short trips as well.

At the conclusion of the project, a study of application of the innovative logistic schema in an Italian southern town (Cosenza) has been carried out and technological and computing prototypes have been tested.

The goal of the TADIRAM project has been basically the demonstration of the feasibility of the new distribution scheme at a multi-level framework i.e. at technological level, at operative and
operation management level, at users level, at administration and sociality level, at economical level.

These results will constitute the necessary basis for implementing in real contexts operative systems in their final complete configuration and for establishing a permanent staff to perform the service.