SF 63: Intelligent traffic management based on real-time information

Fr	B	C	NY	S	T	Total
0	6	4	8	10	8	36

Example:
The VICS (Vehicle Information and Communication System) system implemented in **Tokyo** can be regarded as a model of intelligent traffic control thanks to the use of real-time information.
Since the system started in 1996, it has spread to almost half of all streets in Japan and 2/3 of all private vehicles and can, therefore, be regarded as a nationally established form of intelligent traffic management.
Real-time data from the police, the Japanese Road Traffic Information Centre and the actual volume of traffic all flow together into the so-called VICS Centre, which, as a central control centre, collects and processes all the data and distributes the corresponding traffic information. Thus, the latter data, which are captured by infrared and radio waves in receivers or sensors installed on roads, contribute towards forecasting calculations that relate to actual traffic movements.
The traffic flow optimisation results are communicated via display boards or even via navigation devices located in vehicles.
This has all been shown to significantly reduce travel times and limit traffic disturbance. In addition, the traffic density in Tokyo has not increased since 1990, even though the volume of traffic has grown by 50% over the same period.

1. Differentiated description of the key field

These days, traffic management is called „intelligent" if real-time information is used to make traffic-related management decisions and the management of the road users also occurs in real time via an appropriate system.
This includes the management of private transport as well as control systems in local public transport.
Initial manifestations with respect to this key field can be detected in all cities. Thus real-time displays regarding free parking, including the respective location, can now be considered as standard.

With regard to the flow of traffic. However, it must be noted that in most cases there is a one-sided channel of information between the traffic management centre and road users. This means that information regarding existing diversions or traffic disruptions is usually transmitted to the road users via digital information signs or navigation devices.
The development that has been noted in this regard in recent years lies in the inclusion of real-time information regarding the volume of traffic and in the management of the traffic itself.

2. Reference to sustainability:

It can be confirmed that the key field is of relevance to all factors of sustainability.
From a social perspective, reducing the time required for completing journeys (to work, to see to daily needs, etc.) leads to an increase in the quality of life.
Given the large potential to save energy and emissions, the key field complies with ecological and economic sustainability requirements. In addition, reducing the time spent in traffic jams can also reduce economic costs.
Furthermore, the resilience of the urban system is increased. Thus, in the event of an accident or disaster, the crisis management can use the traffic management options to indicate or signal, for example, available escape and evacuation routes.

3. Relevance to industrial sectors?

Mobility:	High
Energy:	Low
Production & logistics:	Medium
Security:	Low
ICT:	High
Water infrastructure:	None
Buildings:	None
Governance:	Low

Brief description of the high level of importance:
For companies in the mobility sector, this key field is of central significance, since they can act as important partners for cities in this context. Furthermore, they can also significantly strengthen their market position and benefit from the synergies of joint marketing and strategy development through the support of similar concepts.
This key field is of great relevance to the ICT sector, too, since the acquisition, consolidation, processing and dissemination of traffic information is primarily ensured by the companies in this sector. The ongoing technical development of information and communication technologies also repeatedly leads to novel and attractive implementation possibilities and application fields, making the continuous integration of the sector something that is mandatory or advisable.

4. Impact:

Besides the already stated impact on sustainable urban development, the following positive effects can be expected:
- Proven time savings in road traffic.
- Lower traffic densities even at peak times.
- Chance for cities to manage traffic flows, also to respond to potential threats.

In addition, the following adverse effects can be expected:
- Increasing the appeal of private transport sends wrong

signals with regard to ecological sustainability goals such as the reduction in the emissions of harmful substances.

5. Implementation measures:

In order to successfully implement a traffic management system, the following factors are of high relevance:
• Creation of a cooperation network of urban actors and companies in the mobility and ICT sectors
• Development of a common strategy for the introduction and operation of such a system
Beyond that, the legal framework regarding the collection and processing of vehicle data must also be coordinated, as this issue relates to the sharing of personal information.

6. Actors: Who can shape things? With whom?

As already stated, besides urban actors (city administrations, scientific institutions, the police, etc.), it is mainly companies from the sectors of mobility (manufacturers of cars and navigation devices, etc.) and ICT (network operators, data centres, etc.) that are important when it comes to actively shaping strategies and their implementation in this key field.
The highest priority is thereby given to achieving close cooperation between all parties involved, both during the strategy development as well as during the implementation phases. The initiative to implement a similar approach can, theoretically, come from all the actors addressed.

7. Prerequisites:

The prerequisite for the implementation of similar systems is a societal willingness to engage with new technologies. Basically, it must be noted here that the requisite changes in everyday behaviour are more likely to be accepted if far-reaching and universally accepted values and goals are supported.
One good basic prerequisite with regard to this key field can also be seen in a certain historical psychological strain suffered by cities and residents. Citizens who live and work in cities that have been struggling with high traffic volumes and congestion for decades will be more willing to shift to new technologies in favour of spending less time on journeys.
In structural terms, broad and effective cooperation networks must be formed as set forth in detail above.
The necessary technologies have, as the example of Tokyo shows, become standard in the meantime. That is why they must be implemented only on a large scale, which will, however, be linked to huge expense because of the requisite coverage density.

8. Obstacles/barriers:

The barriers this key field faces are mainly due to private sector interests.
Thus, the willingness of people, for example, to pay to install the receiver units can be estimated as low. The low cost for end-users was classified as a key success factor in the example of the VICS system, too.
Furthermore, the private enterprise interests of companies may also represent an obstacle if, for example, their own products are in competition with these approaches (e.g. congestion indicators in GPS navigation devices).

9. Indicators:

One initial fundamental starting point for determining the state of play with regard to the implementation of intelligent traffic management systems can be seen in the existence of an urban strategy for dealing with this issue.
If a strategy is in place and initial implementation measures have been undertaken, the development status of a comparable system can also be measured on the basis of the coverage of roads with receivers. This indicator could also be differentiated by means of road size categories.
In addition, the acceptance and the success of traffic management systems can be measured via private user numbers (cars with built-in sensors and receivers).

10. Special features/remarks:

The implementation of solutions in the subject of this key field seems to promise greater success in conjunction with tolling systems, as both intelligent traffic control as well as toll systems can be run in parallel using the same technology. Benefits may include:

• Cost recovery for sensors, display panels and other software and hardware through toll revenue.
• With regard to environmentally oriented congestion charges (restriction of particularly harmful vehicles), further positive effects on the environment are anticipated.
• In this context, real-time-based traffic management systems can also be promoted or even regulated through legislation (cf. environmental badge).