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INNOVATION AND KNOW-HOW ACQUISITION IN TRANSPORT PLANNING CONSULTING FIRMS IN FRANCE

Gilles Debizet gilles.debizet@ujf-grenoble.fr
Laboratoire TERRITOIRES U.M.R. PACTE Grenoble University

1. SUMMARY ABSTRACT

The control of French local or regional transport networks is being partially (but continually since 1982) transferred from the state administration and from transport companies to local authorities. Since the mid nineties, the cities have increased their expertise request for a sustainable mobility. How does the French urban transport expertise renew itself? This paper focuses on the links between innovation and know-how acquisition among the most important private consulting companies. Some national semi-private and public organisations are also briefly described.

2. BACKGROUND

This paper essentially presents the results of a PhD thesis (Debizet 2004) focused on the evolution of the urban transport know-how in France. The initial ideas presented in this PhD work were actually developed as a contribution of a research program (PREDIT) driven by the ministry of Public Works, Transportation and Housing. The main outcome of this contribution is a comparison of the national system of expertise in France, England and Germany, including an analysis of the roles of private consulting companies (Baye and Debizet 2001).

When they assess a project, experts usually tend to use already known comparable projects and situational contexts. Whether the methods are based on modelling or not, the issuing of an expertise requires cumulative experiences. Besides personal experience, the expert also leans on his/her company, professional networks and publications. Globally, French expertise in urban transport planning could be considered as a system of players sharing knowledge and know-how like a National system of innovation (Johnson 1992) or an innovation network (Planque 1991).

The concept of sustainable mobility had spread in France during the 1990's. The idea is to reduce the transport demand instead of just developing the transport offer as it was done during the previous years (Duchene 1994, Dron 1997, Huntzinger 2001, Kaufmann 2001). A changing environment (DRAST 2001) requires knowledge and experts know-how to be renewed. Here, we focus on know-how acquisition by the French consulting companies.

3. METHODOLOGY

A dozen of French consulting companies among the most active in urban transport planning in the 1990s were interviewed in 2000. They were asked to describe how they develop some innovative know-how.

3.1. Transport consulting companies panel

Several professional and researcher lists were used to identify the ten most important transport planning consulting companies in France. In case the organisation is part of an engineering consulting firm, only the number of transport planning consultants has been taken into account. After referring the speaker lists of professional training organization, two firms were added to the panel because of their role in innovation diffusion (CODRA and SARECO). Table 1 presents the firms and their mother company holding in that case.

Firm	Department	Size[1] (2000)	Subsidiary of	Main activity of the group
Altermodal		17	Inddigo group	Engineering and consulting
Codra	Team transports et urbanisme[2]	6		
Isis	Villes et Départements	35	EGIS / Caisse des Dépôts	Transport operator
Iter Conseil		10		
MTI Conseil		40	Sncf Participations	Transport operator
Mva France		15	Mva Limited (Londres) / Systra (Paris)	Transport operator
Sareco		7		
Semaly	Etudes générales	20	EGIS (Caisse des Dépôts)	Transport operator (bank)
Setec	Setec international, Setec organisation, Setec Economie	25	Setec	Engineering and consulting
Systra	Planification des transports et exploitation ferroviaire	40	Sncf et RATP	Transport operator
Thalès I&C	Team « Etudes Générales » inside transport department	12	Thalès	Engineering and supplier
Transitec		10	Transitec/Lausanne	Consulting

Table 1: Main French Transport planning consulting companies (source: Debizet PhD thesis 2004)

Because of their size, it should be noted that the selected companies are not fully representative of the consulting business. On the other hand, the exact perimeter of this activity is difficult to define: the limit between transport planning and design varies from one organisation to the other.

Many consultants are civil servant working for the ministry of Public Works, Transportation and Housing. Since the 1982 decentralisation, their number regularly decreases; but they still play a significant role as we will see below.

3.2. Innovative know-how panel

After consulting some local transport planning (the "Plan de Déplacements Urbains" (GART-CERTU 2000) and several professional training programme, a dozen of new questions or fields for expertise have been identified. By a bibliographic exploration and the advices taken from several well known observers, six innovative know-how have been selected. Table 2 synthesizes the results.

Innovative know-how	Definition *or comments*
Microplanning	Simultaneous design of urban roads and traffic regulation according to local authority priorities (car drivers, cyclists, pedestrians, public transport users …).
This know-how is based on road design knowledge (which is usually learned in civil engineering schools) and new techniques of regulation (which are rather learned in electrical engineering schools in France). The way to approach the crossroad or any public space support of mobility is first ergonomic whatever the modes of transport (CETUR 1989, CERTU 1997, Transitec 1994 & 1997a).	
Intermodality planning	Defining the way to favour intermodality (especially to public transport), anticipating the traffic and forecasting the capacities.
The park and ride are the main objects of this know-how (Margail 1993, Reinhold 1995). This place had to be crossed by pedestrians and linked to two other kinds of territories: the car driving basin in suburban area and the central area or stations neighbourhoods leaded off by the public transport line (CETUR 1993, Systra & GART 1997, CODRA 2001, MTI 2002).	
Non motorized modes (developing the use of)	Writing the specifications of an urban space or road project and suggesting a package to develop the use of non motorized modes.
The local authorities start again to pay attention to walking and biking as means of mobility. They would like to offer safe, continue and attractive ways to pedestrians and cyclists without bothering too much other road users. They require expertise both to improve road projects or existing streets and to create a biking road network in the city. The design (especially for the crossroads) demands creativity and an ergonomic approach as well as the microplanning (see above). The package drawing up requires town planning conception, knowledge of technical feasibility and the sense of opportunity to avoid opposition or disrespect. (Héran 1995, Apul 1999, CERTU 2000a, Altermodal 2001)	
Car parking policies (developing a)	Diagnosing urban car parking offer and suggest arrangements to favour some kinds of use.
Car parking offer reduction can regulates trips peaks (Duchene 1994, Transitec 1997b), the pricing may favour residents and shop customers instead of commuting car drivers (Rennes & Orfeuil 1997, CERTU 1998, CERTU 1999). The experts make car parking survey (CERTU 2000b) and assess the impact of new arrangements to optimise the income (for operators) or to favour some users (Sareco 1999 & 2001).	
Road pricing	Defining the means to regulate the trips by pricing and assessing the incomes and the impacts according to the local transport policies.
Road pricing is well practised on inter-urban highways in France (Derycke 1997), but it is quite more complex in urban area (Raux & Andan 1995, Lauer 1996. Some experiments are conducted abroad (Isis 2002). Transport modelling is required.	

Transport modelling	Simulating new roads or transport lines (and other measures related to motorised transports offer or pricing) to forecast traffic and timing modifications and to assess the impacts. (LET 1995, Leurent 1996, Isis 1999, PTV-AURG 1999, GESMAD 2003)

Table 2: Urban transport planning innovative know-how (1995-2000) (Source: Debizet PhD thesis 2004)

3.3. Interview method

The interviewed staff was usually a team manager, sometimes a senior consultant. After a general discussion about innovation inside the firm, the interviewee chooses several innovative know-how among the list above. A sketch (see below) is presented for each know-how. The interviewee is asked to complete the topics around the triangle and to explain how does his/her company acquire the knowledge (“Savoirs” in French), the tools (“Outils”) and develop its own methodologies.

Sketch 1: “Intermodality” know-how backgrounds (Source: Debizet PhD thesis 2004)

3.4. First analysis: companies typology according to know-how

Table 3 shows three groups of companies according the chosen innovative know-how.

Know-how Consulting companies	Road pricing	Transport modelling	Inter-modality planning	Car parking policies	Micro-planning	Non motorised modes
The "general modelers"						
Isis	■	■	■	■	■	
Semaly		■	■		■	
Systra		■	■	■		
Mva France		■	■	■	■	■
Setec	■	■	■			
Thalès I&C		■	■		■	
The "qualitative generalists"						
Transitec			■	■	■	■
Codra			■	■	■	
Iter Conseil			■	■	■	
The "specialists"						
Altermodal					■	■
Mti Conseil			■			
Sareco				■		

Table 3: company typology according to chosen innovative know-how (Source: Debizet PhD thesis 2004)

The *general modelers* offer a diversity of know-how based on transport modelling. These firms arise out of engineering company usually developed by major transport operators.

The *qualitative generalists* offer at least three different innovative know-how. They prefer to be considered as consultant instead of expert. They study both road projects and package measures for a city or a metropolitan district. The largest company was created by the swiss consulting firm Transitec in the middle of 1990's.

The *specialists* master all the aspects of one or two innovative know-how. Their can tackle various missions: short expertise or consulting, training, feasibility study, market research… etc. Two of these three companies have been created after 1995.

4. RESULTS

Most of the results have been presented in a PhD thesis (Debizet 2004). Here, we only present the results related to know-how acquisition an developments. The first part describes companies internal organisation in

relation to innovation. The second part presents the different means to gather useful data; training session is one of them.

4.1. Innovation in French transport planning consulting companies

Before presenting companies internal organisation in relation to innovation, we briefly present which are the main factors driving innovation.

4.1.1. Reasons to innovate

Most of the firms are convinced that innovation can not be overlooked.

Client satisfaction appears to be a strong driver. Many consultants quote a client request to illustrate one of their recent know-how developments.

Getting ready for future demand is a recurrent concern. The companies have to anticipate future needs and consulting market; to do so, they identify the know-how which they think will be the most profitable for the company in the future. After development, they usually bring out such know-how to promote the company. An increasing part of enquired firms manage to obtain public funds (from the PREDIT mainly) to develop innovative methodology or knowledge; they are also interested in the recognition offered by the PREDIT.

Productivity improvement is often kept hidden by the firms. Most of these innovations depend on computed data processing. Databases, especially GIS (geographic information systems) provide a powerful and easy to use set of tools. If the storing is well designed, many figures and ratio can be reliably estimated, yielding time and cost savings for the next missions.

We have also noted that the founders (and managers) of small independent consultancies refer to social values to justify their R&D commitments. Finally, we have observed that when consultants like to innovate, companies seldom discourage them to do so[3] (companies known to be innovative should be more successful in attracting dynamic consultants). In some cases, companies partially unburden the consultant from usual business to favour these R&Dlike activities.

In a nutshell: for the companies, competitiveness is the main reason driving innovation. At an individual level, staffs are also motivated by social values and community recognition.

4.1.2. Internal organisation

The organization and the possible partnership vary according to company type.

General modellers companies

The modelling activity does not need spatial proximity with the client or the project location, except during the phases of contracting, area monitoring and results presentation. Transport modelling computations can be carried out independently from other studies related to the project (feasibility study, technical study, environmental impact assessment …).

The partnership is often driven by the mother company. The transverse exchanges between consultants are linked to one mission (combining the individual know-how is a way to improve quality and productivity).

The innovation process is mainly controlled by the company: training session schedule and content, devoted time to development are managed by the company. But raising R&D public funds helps the consultant to keep the ownership of the innovation process.

Qualitative generalists companies

These consultants usually interact a lot with local authorities. Their missions are not precisely predefined. They team up with other consulting firms to provide answer the local authorities demands. They sometimes participate in the public consultation. The consultants are relatively independents. The quality is guaranteed by the managing team sharing the know-how with all the consultants. In some companies, consultants meet periodically: some staff members expose one of their missions and collect advice from the other. In other companies, senior consultants manage both daily business and know-how transfer to juniors.

These two types of knowledge sharing seem to be effective for companies whose size stays below 20 staff members. In our panel, one company is about to exceed this limit. So far, they haven't found the optimal organisation, which is still a concern.

In term of R&D, most of the developments are devoted to internal productivity and to quality improvement. In that category, only one company participates in public R&D programs (in bringing new knowledge).

Specialists companies

These firms work on the national markets. They are often solicited for a well defined mission. Their activity depends on the knowledge rather on the know-how: one to three senior consultants usually play the main role inside the team. These seniors staff benefit from the recognition of professional networks. When the manager is not one of the seniors, he tries to organize a transverse know-how sharing.

These firms develop a professional network in which they play a central role. In fact their central role allows them to collect a significant amount of useful information which they transform into knowledge and innovative methods. They are usually ahead of the rest of professionals.

4.1.3. Consultants background and organisation

Transport modelling requires a high level in mathematics. Most of the consultants of *general modellers* companies are civil or polytechnic engineers, the rest are postgraduate in transports economics. Inside these firms, consultants are not very specialised in a field.

For other company types, consultants are usually specialised in fields corresponding to their background. The backgrounds are much more varied: civil engineer, town planner, transport economist, geographer, architect …etc.

Globally, we can observe two kinds of organisation and background recruitment policies as shown the table 4.

Companies	General modellers	Qualitative generalists or specialized
Main methodologies	modelling	various
Background consultants	engineer or economist	various
Consultants	interchangeable	specialized
Interactivity level	low	high
Organisation	hierarchical	transversal
Holding	transport operator or engineering company	independent consulting or engineering company
Main diffused innovations	model sophistications	knowledge improvements
Internal innovations	databases, tools and methodologies	databases and methodologies

Table 4: Organisation, staff and innovation according to company type (source: Debizet PhD thesis 2004)

4.2. Data gathering for innovation

Data gathering is a phase of know-how acquisition. We distinguish published data and data collected during interaction.

4.2.1. Technical surveillance

Some companies put in place a technical surveillance system. Semaly company have implemented a knowledge management system where each consultant is responsible of a topic; he reads the publications summaries which have been prepared by the archivist, selects the article(s) and eventually stores it/them in a database. In Transitec company, each consultant is in charge of reading one review; each selected article(s) is(are) then forwarded to the relevant expert in the company; this expert will decide whether or not these articles have to be store in a database. In three other consulting companies, surveillance is taken care of by one person (the technical manager or an archivist).

In the other companies, technical monitoring is handled on an individual basis according to personal skills. If the company (or the consultant) is specialised, then the surveillance is more based on the interpersonal network than on publication reading. We also note that the benchmarking and the commercial surveillance do not appear as priority.

4.2.2. Publication readings

Two kinds of publications reading have been observed. Several reviews are read to monitor contextual evolution, professional meetings and innovations. If any innovation appears to be interesting, the company (or the consultant if he is specialized and relatively independent) try to collect information about it. The professional network and the quality of interpersonal relation can be useful in such case. One weekly publication “Le Moniteur du Batiment et des Travaux Publics” and two monthly ones, « La vie du Rail » and « Transflash » (published by the CERTU, see below) are used for surveillance.

Other revues are used as data resources. Before its least issue[4] “Transports Urbains” was appreciated by the qualitative generalists companies. “Recherche Transports Sécurité” is published by the public research institute for transport (INRETS); it contains fundamental articles about transport systems and mobility. “Transport Environnement Circulation” published by ATEC (a professionals non-profit society) is the third review mentionned by the interviewees; articles are usually written by local authority or transport operator representatives and do not always appear objective. These reviews are generally only read by a few consultants in the company (see above). Some transport modelling consultants read English language reviews too.

Many books contain useful data or analysis for consultants. But the consultants usually read professionals guides, especially books published by the CERTU especially on intermodality, car parking policies or microplanning. Non-motorised modes specialised consultants use books coming from Germany, Netherlands or Denmark. Transport modellers use books written in English.

4.2.3. Professional interactions

Experiences feedback

Clients requests are not only a reason to innovate, but also information to drive the strategy. During their mission, consultants collect a lot of information. The polls are stored: it could be later processed to compute ratios. Some companies organise a database inside which each picture is located with GPS system and stored; some local observations are systematically stored. Once the mission is completed and the project implemented, consultants try to compare the new situation with what was targeted. Analysing the mismatch help to refine, improve or correct existing methodologies and tools. Interpersonal relationship between consultant and

client (a local authorities engineer for instance) can be used a long time after the mission is competed. Client can provide qualitative and quantitative feedback of other solutions implemented in his/her city.

Professionals conferences

We have identified the main organisations contributing to know-how interactive diffusion.

ATEC is the acronym of « Association pour le développement des techniques de Transport, d'Environnement et de Circulation ». ATEC gathers state administrations, private companies, few local authorities and some individual members. The board members are essentially senior civil servants, transport operator and supplier representatives. Several technical committees prepare reports on new topics. These reports generally present the French professionals network point of view; some reports also prepare new rules like governmental law regarding French or European norms. ATEC publish two reviews: "Transport Environnement Circulation" (see above) and TEC Its (intelligent transport system). The ATEC annual conference is the most important francophone transport congress. Several one-day seminars address new problematic or methodological innovation. Consultants are well represented among the speakers and the auditors.

Other national organisations offer conferences attracting consultants.

- The Groupement des Autorités Responsables des Transports (GART: local authorities association for transport) and the Union des Transports Publics (UTP: public transport operators association) organise congress and one-day seminars. In this kind of conferences, junior consultants can discover their professional environment and senior consultants can meet their clients.
- The Club des Villes Cyclables (local authorities association for biking cities) and the Fédération des Usagers de la bicyclette (FUBICY: local bikers groups national association) organise several one-day seminars during which consultants, user groups and local elected representatives debate about non-motorised development policies and technical solutions.

Except for the ATEC congress, French private company planners are generally not used to attend the international conferences. Nevertheless, transport modellers and non-motorised specialists monitor the innovation abroad. Several modellers belong to software users group and sometimes attend the international conferences. Several non-motorised specialists follow European seminars.

4.2.4. Training sessions

Ponts Formation Editions (PFE) is almost the only organisation offering training sessions (others are usually software vendors).

PFE is a company controlled by “Ecole Nationale des Ponts et Chaussées”. This postgraduate school depends on the ministry of Public Works, Transportation and Housing. PFE offers one to five days training sessions. Topics correspond to learning fields proposed by the school. In 2000, the “Transport and traffic” sessions represented 500 k€ (one tenth of the total training sessions incomes) and 1500 trainee days. Among the 800 trainees, 350 worked in one of the ministry offices, 250 for local authorities and 200 for transport operators or engineering and consulting companies. We estimate that consulting companies represent less than a quarter of these 200 trainees.

According PFE manager, Systra and Isis are by far the most important clients among the twelve enquired companies. Two kinds of generalist modellers consultants follow PFE training sessions:

- newly recruited consultants acquire basic skills and knowledge in one professional topic,
- senior consultants discover new developments on a topic they are not specialised in.

We presume that skilled consultants do not use the PFE training sessions to improve their own know-how.

4.2.5. Specific role of CERTU

A French technical agency under the ministry of Public Works, Transportation and Housing, the Centre d’Etudes sur les Réseaux, les Transports et l’Urbanisme (CERTU: Centre for the Study of Urban Planning, Transportation and Public Facilities) is an usual partner of the organisations mentioned in paragraph 4.2.3. and 4.2.4.. The main objective of CERTU is to build and increase the general body of shared knowledge available on a broad variety of urban issues.

Many PFE training sessions are defined and animated by CERTU consultants. CERTU representatives are board members of ATEC and Club des Villes Cyclables and contribute to define the topic of conferences. The GART and the Club des Villes Cyclables publish many books in partnership with CERTU.

In fact, local authorities national association and professionals organisations have few employees and they need the CERTU consultancy for a majority of their studies and publications. Meanwhile, CERTU has to cooperate with local authorities which have now got a major role to play on transport policies inside the urban areas.

5. CONCLUSION

How training can build the transport profession? That is the question today.

First, we have to keep in mind that:

- Transport professions change, especially urban transport planning. Modelling is not the essential methodology any more and the split between planning, design and operating is not as clear as before. This is demonstrated by the fast development of qualitative generalists and specialists consulting companies.
- Private company consultants attend the same conferences and training sessions as civil servants and local authorities staffs. CERTU plays an important role in the national innovation system.
- “Learning together” sessions appear on non-motorised modes. The Club des Villes Cyclables and FUBICY enable consultants to develop know-how in cooperation with users group and local elected representatives.
- International surveillance is mainly limited to transport modelling.

Know-how acquisition and development require various data gathering and learning means. Training sessions are one of them; they have to be considered as a complement to the others. “Learning together” sessions could be extended to other innovative know-how like microplanning or intermodality.

Training seems to be already well organised at the national scale in France. Nevertheless, skilled consultants do not find training sessions to improve their own know-how. European training sessions could be extended to other know-how than modelling. On the other hand, “Learning together” sessions could be targeted for players at the regional scale.

NOTES

1- This column gives the number of consultants declared by the interviewees to the researcher in 2000.
2- The other team of Codra Company deals with urbanism and habitat.
3- In some cases, companies partially unburden the consultant from usual business to favour these R&D like activities.
4- “Transports urbains” review was published by non-profit society whom members were researcher or transport users groups representatives. Publication had been interrupted for issue n° 103 in 2001.

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