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ICT-enabled system innovations in public services: Experiences from intelligent transport systems



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ABSTRACT

Public transport is confronted with major challenges such as climate change and congestion. This paper discusses how these major challenges are addressed by means of ICT-enabled system innovations in public services. Recent developments in ICT enable the realisation of novel solutions for public transport that can be subsumed under the headline of intelligent transport systems (ITS). However, while the advances in information and communication technology are very fast, the transformation of transport systems and infrastructures tends to take a long time. In parallel, public sector reforms of the past decade, often characterised by the introduction of New Public Management principles, have changed the organisational and institutional conditions for transport service provision and innovation, with the private sector playing an increasingly prominent role. Public–private innovation networks in services (ServPPINs) have been suggested as a concept to foster the realisation of system innovations.

This paper analyses the conditions, determinants and instruments for managing ServPPINs successfully, by comparing four cases of ServPPINs in intelligent transport systems, which all aim at establishing system innovations. The four cases are: ITS Vienna Region, a dynamic intermodal traffic information service; compano, a novel ride-sharing scheme in Austria; SIS, a real-time traffic information services, displays and management system in Oslo; and Flexus, an electronic ticket system for public transportation in Oslo.

The paper shows the importance of organisational and institutional conditions of ServPPINs for realising these system innovations, and the crucial role of entrepreneurial individuals, both in public and private sector organisations. It also points to the importance of making clear strategic choices at the right moments in time in the course of the life-cycle of ServPPINs.

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1. Introduction

Transport represents a grand challenge in our modern societies. Metropolitan areas are main hubs that attract economic activities, and as consequence require traffic to flow in and out of these areas to ensure access for people and provision of

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goods and materials. This implies that problem pressure is particularly high in urban areas, where high density of traffic leads to congestion, pollution and noise.

In western democracies, the public sector has traditionally played a special role in providing transport services in these metropolitan areas, but also in regulating the activities of the sector. Demand-side measures, such as stricter environmental regulations or zone access controls have been introduced to strike a better balance between economic and environmental requirements for transport systems. At the same time, there are many new opportunities arising for improving reliability and quality of transport services in metropolitan areas, both for public and private transport. Developments in telematics, electronic ticketing, etc. have been particularly important in recent years, and are expected to continue to do so. These are enabled by new advances in ICT for a better and more efficient provision of transport services. However, the technological advances are not enough; a greater magnitude of change is required which is not just technological in nature.

The notion of socio-technical regime (Geels, 2004a) stresses the importance of social and organisational rules and practices involved, beyond the technological ones. Building upon Nelson and Winter (1982), Rip and Kemp (1998: 340) define a technological regime as “the coherent complex of scientific knowledge, engineering practices, production process technologies, product characteristics, skills and procedures, established user needs, regulatory requirements, institutions and infrastructures that makes up the totality of a technology”.

Socio-technical regimes are transformed through simultaneous and qualitative change in technology, organisation and user behaviour. The simultaneous achievement of these different requirements can be realised with the help of system innovations. According to Konrad, Tischner, Hora, Scheer, and Verkuil (2005), system innovations can be defined as innovations that combine changes in knowledge, technology and organisation with changes in market-actor relations. For innovations to qualify as ‘systemic’, the changes along these two dimensions should be more than just incremental. Taking into account Henderson and Clark’s (1990) distinction between innovations at component level and innovations at architectural level, our understanding of system innovation also stresses that changes take place at both these levels. Applied to the transport sector, system innovations can thus be understood as novel forms of providing transport services that are innovative in terms of technology, organisation and user behaviour, and require both new components and system architecture. Realising and implementing system innovations is crucial for socio-technical regime shifts, and ultimately for long-term transitions of our transport and mobility systems towards sustainability. It is through the interaction of different types of actors and processes of collective learning, that system innovations can be realised in practice.

The need to embark on such a regime shift in transport happens against the background of a changing role of the public sector in how transport services are provided. In several countries the State has withdrawn from transport service provision. At the same time its regulatory and supervisory role has been reinforced while transport services are increasingly provided by private operators. There are two main reasons for this development. *First*, we have observed a general tendency of questioning the active engagement of the State in the provision of public services² since the 1980s. The liberalisation and privatisation of transport services has been fiercely debated in many European countries and led to new combinations of public–private arrangements. This diminishing role of the public sector in transport is part of a more fundamental shift towards the application of New Public Management principles. For more than twenty years we have seen a shift towards a stronger involvement of the private sector in the provision of transport services. Although the shift of responsibilities from the state to the private sector has been increasingly criticised, the configuration of our systems of public service provision has been changed significantly. *Secondly*, these new requirements and opportunities for innovation in transport systems need large investments which cannot be made by the public sector alone. The changed role of the state has also brought along new budgetary constraints for public sector services. This reconfiguration of the system of transport service provision, of the roles and functions played by different actors, has implications for innovation activities, for the incentives at play, and thus also for system change. The traditional model of top-down, state-led innovation and investment in new systems in the transport sector is challenged, but the alternative model is still in its infancy.

Public–private innovation networks in services (ServPPINs) is an alternative model for realising innovations in the public sector. ServPPINs can be defined as constellations of public, private and third sector actors engaging in a joint process of developing, producing and delivering new and improved services. They are flexible organisational platforms that allow merging and sharing of dispersed knowledge, sharing the risk of financial engagement in uncertain innovation processes, establish and enhance complementarities and synergies between public and private organisations, and jointly exploit the benefits of the service innovation.

The operation and the ways to set up ServPPINs effectively and efficiently have recently been addressed by research.³ It is against this background that we aim to explore the role that ServPPINs can play in enabling and realising system innovations in transport services. The key questions we want to address are as follows:

² It is obviously a matter of debate what counts as “public services”. Depending on national histories and political cultures, the answer may differ. We follow a rather pragmatic understanding and argue that public services comprise all those services which are or were traditionally provided by the State or for which the State has a particularly responsibility in ensuring their provision.

³ The EU-funded project *The Contribution of Public and Private Services to European Growth and Welfare, and the Role of Public–Private Innovation Networks (ServPPIN)* (<http://www.servppin.com/>) has been a major step forward in understanding how innovation in the public services takes place (Gallouj et al., 2013).

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