Public Value of Intelligent Transportation System

Ramona Blanes  Robert A Paton  Iain Docherty
University of Glasgow  University of Glasgow  University of Glasgow
r.blanes.1@research.gla.ac.uk  Robert.Paton@glasgow.ac.uk  Iain.Docherty@glasgow.ac.uk

Abstract

This paper explores the influence of public value on decision making through the lens of Intelligent Transportation System. To address the aim of the study we adopt an inductive cross-national comparative case-study approach in the Netherlands and the UK. The initial findings indicate that public value concept is practiced within transportation sector in these two countries. The extent of the adoptions is mainly in line with the respective theoretical regimes, i.e. New Public Service and New Public Management.

1. Introduction

Transportation technology has greatly evolved over time. Over the past decades public sectors in many countries have undergone major changes as governments try to respond to the challenges of technological change, globalisation, and international competitiveness [18]. Information and Communications Technology (ICT) such as Intelligent Transportation System (ITS) has the potential to contribute to environmentally sustainable and safe travel and mobility management [30; 31]. The underlying technologies required by ITS include satellite location, mobile telephony, and wireless networks.

ITS have been introduced in many countries to stimulate innovation within the transportation industry to give value to the public. This paper explores the notion that the extent to which ITS is adopted and embedded is dependent on where the country is within the public sector reform continuum. Thereby, the aim of the study is to examine whether the concept of public value (PV) is practiced in line with the theories through the lens of ITS.

To address the objective of this study we look to answer the following questions:

- Why was ITS adopted? What are the alternatives (if any)?
- How were the cost and benefit appraised / measured?
- What are the impacts?
- Whether and with whom public value has been shared / co-created / co-produced.

This study examines two countries at different stages of public sector reform. The Netherlands at the onset of New Public Service (NPS) [4; 16] and the United Kingdom at the end phase of New Public Management (NPM) [4; 5; 10].

This paper is organised as follows. Section 2 is a discussion on the concept of public value and its growing interest among public managers and citizens alike. Section 3 explores Intelligent Transportation System (ITS) and its use within the transportation industry. Section 4 gives an overview of study method and methodology employed. Section 5 is the analysis and initial findings of our study and Section 6 provides a summary of the influence of public value regimes on ITS adoption.

2. Public Value (PV)

Traditionally, public sector reforms follow a specific sequence. The first stage is normally Public Administration, which is influenced by political and naïve scientific management theories. The next stage is Public Management, typified by the merger of administration and general management theories, and possibly but not necessarily with a move to New Public Management; a sub-set of Public Management, with emphasis on economic theories. The final stage is a more progressive concept called New Public Service which is based on democratic theories. Table 1 summarises the different methods of governing.

<table>
<thead>
<tr>
<th>Primary theoretical and epistemological foundations</th>
<th>Public Administration</th>
<th>Public Management</th>
<th>New Public Management</th>
<th>New Public Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Political theory, social and political commentary augmented by naïve science</td>
<td>Merger of normative orientation of traditional public administration and general management theory</td>
<td>Economic theory, more sophisticated dialogue based on positivist social science</td>
<td>Democratic theory, varied approaches to knowledge including positive, interpretive, critical and postmodern</td>
<td></td>
</tr>
<tr>
<td>Public Administration</td>
<td>Public Management</td>
<td>New Public Management</td>
<td>New Public Service</td>
<td></td>
</tr>
<tr>
<td>-----------------------</td>
<td>-------------------</td>
<td>-----------------------</td>
<td>-------------------</td>
<td></td>
</tr>
<tr>
<td><strong>Prevailing rationality and models of human behaviour</strong></td>
<td>Synoptic rationality, ‘administrative man’</td>
<td>Theoretical and practical rationality, infused by value-laden choices and influenced by broader ideologies</td>
<td>Technical and economic rationality, ‘economic man’ or the self-interested decision maker</td>
<td>Strategic rationality, multiple tests of rationality (political, economic, organisational)</td>
</tr>
<tr>
<td><strong>Conception of the public interest</strong></td>
<td>Politically defined and expressed in law</td>
<td>Mixture of politically defined and aggregation of individual interests</td>
<td>Represents the aggregation of individual interests</td>
<td>Result of a dialogue about shared values</td>
</tr>
<tr>
<td><strong>To whom are public servants responsive?</strong></td>
<td>Clients and constituents</td>
<td>Consumers, and customers</td>
<td>Customers</td>
<td>Citizens</td>
</tr>
<tr>
<td><strong>Role of government</strong></td>
<td>Rowing (designing and implementing politics focusing on a single, politically defined objective)</td>
<td>Steering (acting as a means to an end, or multiple ends)</td>
<td>Steering (acting as a catalyst to unleash market forces)</td>
<td>Serving (negotiating and brokering interests among citizens and community groups, creating shared values)</td>
</tr>
<tr>
<td><strong>Mechanisms for achieving policy objectives</strong></td>
<td>Administering programmes through existing government agencies</td>
<td>Modernising and streamlining activities through various mechanisms</td>
<td>Create mechanisms and incentive structures to meet policy objectives through private and non-profit agencies</td>
<td>Building coalitions of public, non-profit and private agencies to meet mutually agreed needs</td>
</tr>
<tr>
<td><strong>Approach to accountability</strong></td>
<td>Hierarchical – administrators are responsible to democratically elected political leaders</td>
<td>Hierarchical or market-principals, depending on policies and programmes</td>
<td>Market-driven – the accumulation of self-interest will result in outcomes desired by broad groups of citizens (or customers)</td>
<td>Multi-faceted – public servants must attend to law, community values, political norms, professional standards and citizen interests</td>
</tr>
<tr>
<td><strong>Administrative discretion</strong></td>
<td>Administrative officials allowed limited discretion</td>
<td>Latitude to meeting policies and programmes objectives</td>
<td>Wide latitude to meeting entrepreneurial goals</td>
<td>Discretion needed, but constrained and accountable</td>
</tr>
<tr>
<td><strong>Assumed organisational structure</strong></td>
<td>Bureaucratic organisations marked by top-down authority in agencies and control or regulation of clients</td>
<td>Decentralised public organisations with primary control remaining with the agency</td>
<td>Decentralised public organisations with primary control remaining with the agency</td>
<td>Collaborative structures with leadership shared internally and externally</td>
</tr>
<tr>
<td><strong>Motivational basis of public servants and administration</strong></td>
<td>Pay and benefits, civil-service protection</td>
<td>Ideological desire for the best use of resources in pursuit of objectives subject to change</td>
<td>Entrepreneurial spirit, ideological desire to reduce size of government</td>
<td>Public service, desire to contribute to society</td>
</tr>
</tbody>
</table>

The summary table shows emphasis on citizens or society, i.e. public involvement and collaboration, grows as one move further along the continuum. Thus, theoretically, public managers to the right of the continuum embrace the PV concept more than their counterparts to the left of the continuum. Public sector managers of countries at the stage of New Public Service (NPS) should then put PV as the foremost objective in management decision-making.

Along the reform continuum, the notion of public interest shifts from one that is politically defined and expressed in law, to one which is a result of dialogue about shared values. These

Adapted from: Denhardt and Denhardt, 2000
shared values of individuals, groups and the society as a whole is called PV [23]. The PV concept has become an established approach to assessing the success (or otherwise) of public services and organisations in the UK, Australia and some other countries [36].

PV in the public sector is an analogue of the desire to maximise shareholder value in the private sector [8]. Except the shareholders are individuals, groups and society as a whole. PV encompasses both output and outcome of products and services [5]. The term is coined not because it is delivered or produced by the public sector, rather who consumes it [3]. This concept will influence the distribution of wealth to a wider community [34] as it asserts that public sector cannot be reduced to individual cost-benefit analysis, customer orientation or rational choice models.

Creating PV requires taking into consideration both individual and public-general levels [34]. Attention must be paid not only to individuals but also the value produced for a wider community, today & for future generations. As such this approach must locate and express public notions of value, and be viable and effective [6]. “PV is value for the public. Value for the public is a result of evaluations about how basic needs of individuals, groups and the society as a whole are influenced in the relationship involving the public. PV then is also value from the public, i.e., ‘drawn’ from the experience of the public. Any impact on shared experience about the quality of the relationship between the individual and society can be described as PV creation” [23]. Therefore, PV creation is about impact on how people think and feel about society.

PV as an approach requires us to take seriously the capacity of public managers at all levels to engage with citizens. It is a dynamic process between authorisation, creation, and measurement [6]. To deliver PV, there is a need for public managers to co-create value with the citizens; by listening to, engaging with the public, shape and inform the public’s preferences, rather than just give the public what it wants at a particular point of time [6]. This is an alternative view of service-dominant logic (SDL) where central to SDL is the proposition that the customer becomes a co-creator of value [27]. In this context, the consumers are the citizens which include individuals, groups and society as a whole. Engaging the citizens at all levels may also result in co-production of services; voluntary efforts by individual citizens to produce at least in part some of their own services [29]. Thus, there is a need to re-conceptualise the goal for public managers and institutions aiming to produce PV as one that seeks to improve ‘institutional responsiveness to the refined preferences of the public’ [6]. Refined preferences means engaging the public, not just through poll or surveys but be responsive to what they value and shape what the public needs [20].

The movement has been enabled, among others, through smarter thinking and underpinned by advances in smart technologies and smart solutions. Since the 1990s the use of Information & Communications Technology (ICTs) in government triggers unforeseen processes of change in government [1]. Smart technology is a key enabler as decisions on both sides are now more grounded in hard, almost real-time data [28; 32].

The legitimacy of using PV as management strategy for public organisations has been questioned [31]. However, public sector exists to create PV. Three key issues relating to PV are the role of government, public managers, and techniques used by these managers [25]. This study contends it is vital to explore and understand the process of PV co-creation and / or co-production as a basis for public managers’ decision making and actions. In their decisions about what services to provide and how to provide them, public service organisations create PV [20]. Given the recent developments due to the financial crisis, management scandals and externality issues, there is a shared interest in public value and the co-creation and / or co-production thereof between public, private and third sectors.

The PV concept in its simplest form is an instrument to draw value from the collective, which in turn emerges out of individual interactions. In practice, creating PV relies upon taking a pragmatic and non-ideological approach to the delivery of public services [8].

In the next section we will discuss Intelligent Transportation System, its common applications, and key success components.

3. Intelligent Transportation Systems (ITS)

The intellectualisation of the transportation system is deep rooted on the principles of system engineering where building blocks are conjugated for deliverance of optimal benefits [33]. The amalgamation of information technology with the communication and sensor network is termed as telematics. It becomes Intelligent Transportation System (ITS) when individual mobility related entities such as physical infrastructure, vehicles and controlling agencies are combined. Therefore, ITS is the application of information technology to transportation at the system, vehicle, and individual use level [18].

Trends toward an information-based mobility environment have been stimulated by the technology push factor [37]. Personal computers, the internet, and wireless mobile devices have
opened up endless possibilities for information management and sharing. The goal of ITS is to increase safety and efficiency of transport systems. ITS started off as a solution to traffic congestion management using advanced technology by efficiently managing capacity of existing transportation systems. Today ITS components are currently deployed to varying degrees in many areas around the world, for functions as diverse as traffic management and adaptive traffic signal control, electronic toll collection, and management of city bus fleets [37]. These systems can also warn of upcoming hazards or intervene to avoid them to prevent accidents. Common ITS applications include:

- Advanced Travel Information System (ATIS), designed to make travel more efficient and safer with information on congestion, navigation and location, weather and traffic conditions, and alternative routing.
- Advanced Traffic Management Systems (ATMS), designed for highway management and traffic control systems.
- Advanced Public Transportation System (APTS), designed to improve the operation of mass transit services.
- Advanced Vehicle Control and Safety System (AVCSS), designed to achieve efficiency and safety inside the vehicle.
- Commercial Vehicle Operation (CVO), designed to effectively manage taxi and truck fleet operations by controlling alternative routing and time of transport delivery system [18].

The keys to a successful ITS integration are [33]:

- Sensors; required for primary data collection. It could be road-based or in-vehicle.
- Communications; include data, voice, and video communications. They are transmitted from vehicle to road, vehicle to the central management and control unit, as well as vehicle to vehicle.
- Information Technologies; include hardware, software, telecommunications, and database management, to create, manage and use the information.

To evaluate a ITS project we need to consider a complex mix of public / private / quasi-governmental and individual behaviours which combine concerns for equity, efficiency and effectiveness [18].

The next section briefly explains the method and methodology used for this study.

4. Methods and Methodology

Public sector reforms are normally initiated at the more general central government level. They are then almost always mediated through networks of institutions or agencies which shapes what actually happens during the course of reform and therefore upon the final results and outcomes of the change process [30]. We recognise that the networks themselves can and do change, but normally not as quickly as reform rhetoric would lead us to believe. Consequently, those who have been directly affected by these reforms found practices may not correspond to promises. Thus, this study is concentrated at agency rather than central government level.

The authors take on interpretive and constructionist stances in developing the study design due to the complex, multiple, and unpredictable nature of what is perceived as reality. Hence, are open to new ideas throughout the study and lets it develops accordingly. The approach to theory is mainly inductive by using a cross-national comparative case study to provide insights and findings on the phenomenon of PV through the lens of smart technologies within the mobility sector.

This paper analyses land transportation ITS projects in the Netherlands and the United Kingdom managed by the relevant road and transport authorities. In particular smart technology used in Advanced Traffic Management System (ATMS), Advanced Public Transport System (APTS) and Advanced Traveller Information System (ATIS).

The process of data generation is divided into two phases:

- Literature review of published documents to develop themes, identify policies and programs, identify stakeholders, develop interview guide and sample framework, and identify potential interviewees, and
- Expert interview with representative of stakeholders, and review of unpublished documents collected from interviewees to extract factual information, interpret and detect commonalities or patterns of agreement / convergence.

Phase 1 of data gathering and analysis commenced in January 2014. Phase 2 started with interviews in the Delft and London in May 2014. The process of data generation is still ongoing and is expected to be completed by the end of 2014. To increase credibility and validity of the results, the study adopts two different data generating methods to triangulate findings from the various stakeholders.

The following are initial issues based on literature review of published documents, findings from the first wave of expert interviews with 12 stakeholders in the Netherlands and the United Kingdom conducted in May 2014, and issues from literature review of unpublished documents collected from these interviewees. The stakeholders are public managers in transport...
related agencies, private sector consultants and representatives of non-profit organisations who have been involved in ITS policy and / or projects.

5. Analysis and Initial Findings

These two countries were chosen as they are at different stages of public sector continuum. The Netherlands has moved into the New Public Service (NPS) stage, while the United Kingdom is at the end of New Public Management (NPM) stage. The following (Table 2) is a summary analysis of our initial findings.

<table>
<thead>
<tr>
<th>Research Questions</th>
<th>The Netherlands</th>
<th>The United Kingdom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Why was ITS adopted? What are the alternatives (if any)?</td>
<td>Initially to make best possible use of existing road network. No other alternative is possible due to their innovation requirements.</td>
<td>Most appropriate to take advantage of existing underlying technologies and future requirements.</td>
</tr>
<tr>
<td>How were the cost and benefit appraised / measured?</td>
<td>Several appraisal methods were used at different levels: OEEI, FESTA Handbook, and Sustainable Traffic Management Handbook. Require interpretations at operational levels.</td>
<td>All projects that require government approval use Transport Analysis Guidance. It is also used as a best-practice guide for other projects.</td>
</tr>
<tr>
<td>What are the impacts?</td>
<td>Focus move from customers to citizens. Impacts are mainly measured qualitatively with sustainability as the main goal.</td>
<td>Customer satisfaction is the ultimate goal. Impacts are mainly measured in numeric or monetary form.</td>
</tr>
<tr>
<td>Whether and with whom public value has been shared / co-created / co-produced.</td>
<td>POP philosophy and the Polder model encourage cooperation and collaboration with private and third sectors, as well as organisations in other countries.</td>
<td>Some cooperation with private sector. However there is a strict procedural process.</td>
</tr>
<tr>
<td>Conclusion</td>
<td>Decision-making is significantly influenced by NPS public value regime.</td>
<td>Decision-making is mainly based on economic theories which is in line with NPM public value regime. However, current decisions lean more towards NPS.</td>
</tr>
</tbody>
</table>

We will now discuss our initial findings in more detail.

5.1 The Netherlands

The Netherlands is one of the most densely populated countries as only 12% of the total land is designated as built-up areas. The Dutch experiences in the past decades have provided supportive evidence that restrictive policies as well as spatial policies focusing on land use and transport connection have been effective. The 2011 Policy on Infrastructure and the Environment (Structuurvisie Infrastructuur en Ruimte) aims to strengthen the link between mobility, the environment and the economy [24].

5.1.1 Why was ITS adopted? What are the alternatives (if any)? The country has been actively deploying ITS since the 1970s to make the best possible use of existing road network and linking it to other transportation networks [24].

The development of ITS is part of a more comprehensive national policy to cope with the growth of traffic mobility while improving safety and the quality of life [34]. The country had invested billions in hardware, software, people and expertise, to enabled existing ITS applications. Additional €170 million (approximate) is budgeted for 75 ITS projects at regional level and around €50 million (approximate) for innovative and effective ITS at national level [24].

The alternative to ITS, according to the interviewees are “business as usual (BAU)”. This is not an option if they are to meet their policy goals. As one interviewee stated in our interview “if we are not doing innovation, at the moment, if we are not working with the industry, the industry will take over our position, our responsibility… but they cannot take over all the responsibilities”, suggesting that as public managers they have responsibilities to the public which cannot be met by private sectors. This way of thinking is shared by other interviewees.

5.1.2 How were the cost and benefit appraised / measured? Several appraisal methods are used at different levels by the transport authorities to evaluate policies, projects and technologies. Overview Impacts Infrastructure or
**Onderzoeksprogramma Economische Effecten Infrastructuur (OEEI)** is applied to evaluate proposed major infrastructural plans. The guideline recommends a cost-benefit analysis and, whenever possible, a systematic evaluation of all possible effects of an investment project, including awarding them a monetary value \[17\]. Recommendations on how to value or measure these effects are provided. Quantitative or qualitative effects should be described if they cannot be monetised. The appraisal also includes a one-page summary table of all impacts of project alternatives using a fixed format, including both quantitative effects and monetised values, in terms of present values. Qualitative scores of non-monetised items are shown in terms of plus, minus and / or question marks for unknown effects.

OEEI focuses on quantitative measurements and monetary valuation of impacts and does not address social exclusion or effects and valuations of travelling \[17\]. The focus on economic theories somehow does not correspond with NPS theoretical approach nor claims from our interviewees that although cost is important, transportation projects often have negative cost-benefits due to the difficulty in monetising impacts. In fact, they often make decisions based on unquantifiable potential societal benefits. This is allowed as public managers are not formally required to decide based on results of the appraisals. As explained by an interviewee, “you have to invest in your relationship with them so don’t apply cost benefit to every little step. It’s more important to look at the larger scheme.” This attitude is expected from public managers in NPS.

Non-infrastructure projects are evaluated using at least another 2 different methods: Field operational test support action (FESTA) Handbook, a handbook of good practice; and Sustainable Traffic Management Handbook, a structured description of complex traffic system and traffic management measures \[35\].

A three-layered approach making a distinction between policy makers, business managers and system engineers have been developed for national traffic management. The idea behind this approach is that “the right people, given the right information will be able to make the right decisions.” The approach should achieve the right balance between user needs and technology push, as one interviewee states, “everything should be linked back to that (societal goals), sometimes it’s easy to lose yourself in new technology.” Conceptually appraisal methods are standardised but in practice interpretations at operational levels are still required.

**5.1.3 What are the impacts?** These public managers’ approach to decision-making is more akin to that of New Public Service, exemplified in the case of Connexion Leiden and The Hague bus route \[6\]. This is where a private company in collaboration with the local authority offered a 12 months free bus service to create public value. One interviewee helpfully explained, “giving public value is what we’d like to do in the public services. That is it. Completely the strategy.”

The mitigating corrections to NPM in The Netherlands were instigated relatively early and with vigour compared to other countries \[19\]. Public sector reform switched from strong focus on the ‘customer’ to an even stronger focus on the ‘citizen’. Sustainability or the ‘future-proof way’ plays an important role in the change. As highlighted by one of the interviewees, “meeting societal goals is the most important driver…. not just now but for the future society.”

An evaluation of the effects of ITS investments for the highway network in the Netherlands for the period 1995 – 2000 showed a cost-benefit ratio of 1:2. From then result-oriented approach to traffic management became more recognised; ultimate quality of trip experienced by the users is most important.

From our interviews one significant theme that comes across is contribution to societal goals. The decision-making is influenced by the need to provide safe, efficient, reliable, and environmentally friendly transportation. The way impacts are discussed by the interviewees is a reflection of Mark Moore’s proposal on how public bodies re-orient ‘end’. Rather than putting a numeric or monetary value, the interviewees talked about safety, quality of life, etc. \[25\]. This is in line with attributes championed by NPS.

**5.1.4 Whether and with whom public value has been shared / co-created / co-produced.** The Permanent Ontwikkelingsproces (POP, or Continuous Development Process) philosophy redefined the focal point of local government to societal clientele. The buzz words were “interactive policy-making” and the much-used synonyms were “co-production of policy” and “participative decision-making” \[19\]. Active collaboration between public sector and private sector, as mentioned in the Connexion case earlier, has been a common occurrence for many years. A recurring theme throughout all interviews is the need to collaborate and cooperate with private sector as well as third sector as early as possible at policy and program development stages. The authorities acknowledge that sometimes “we are not the expert.” Experience has taught that early involvement of outside parties may stretch the time to agree on a policy or program. As explained by one interviewee, “it’s complex because different stakeholders in the whole chain have different interests, benefits to be gained, and different costs.” However, benefits will be reaped from implementation stage onwards.
One of our interviewees mentioned that a ‘triple helix’ of government, private sector and knowledge institutes i.e. third sector, is currently drafting a national roadmap for smart mobility which will set out developments within the sphere of ITS over time. This roadmap is called “Better informed on the road: Roadmap 2013 – 2023.”

Another example is the “Amsterdam Group”, a strategic alliance of road operators and transport industry members in Europe including umbrella organisations CEDR, ASECAP, POLIS and C2C-CC. The group’s mission is to coordinate efforts towards deploying cooperative ITS (C-ITS) in Europe. The pilot project is planned for 2015 in C-ITS Corridor Rotterdam-Frankfurt-Vienna. This collaboration takes them outside the Netherlands but is needed to improve the quality of life of people in their country. This is because Netherlands is a small country and in order to encourage private sectors to invest in new Research and Development (R&D) they need to break the “chicken and egg problem,” as quoted by two of the interviewees, of who should invest first.

Another possible reason for active collaboration with private sector is the government’s intention to transfer an increasing share of operational tasks to private sector. The authorities will then act in a supervisory role.

A recurring theme during the interviews is the porousness of knowledge sharing boundaries with other sectors as well as the public. To quote one interviewee “we try to avoid barriers in knowledge.” The Dutch government pursue an active open data policy. Barring Intellectual Property Rights (IPRs) of the private companies involved in the projects, data are given free to the public. To circumvent any legal complication, the road authority has a Pre-Commercial Procurement Policy where they undertake joint-development projects with private companies. The results, solutions, or standards derived from these developments are then freely available for all to adopt. This ‘open unless’ principal is opted to stimulate innovative services within the realm of ITS. Improved data availability and quality are important cornerstones for the development of ITS applications.

Under the “Polder model” coordination cannot be limited only to a dialog among the governmental agencies. It must reach out to involve the private sector participants, public opinion and political acceptability as well as coordination within the European Union on the international scale.

Network development and negotiation are part of the political tradition. To ensure less regulatory measures, a relatively open political processes that employ “softer” decision-making means such as negotiation need to be established.

There is a strong emphasis in sharing of dilemmas and of policy concepts and conceptions through creative participatory processes [9]. Policy makers attempt to integrate theoretical resources such as interactive approach, conceptual enrichment and creative competition into administrative practice.

In practical policy implementation, the Polder model debates have limited influence on final decisions made by responsible parties. As one interviewee commented “trade-off” between individual user and the collective are decided by policy makers, not technicians.” They also do not lead to a consensus.

The culture of sharing and collaborating with stakeholders are indeed a major driver of NPS. However, a balance need to be struck on when is “too much discussion.”

Another interesting point is the autonomy given to public managers to pursue and test (plug and play) new technologies to find better and more effective ways of managing traffic. As one interviewee stated, “what is most important is innovation, innovation, innovation” and another justifies it as “so I can be proactive in traffic management.” This approach aligns closely to public value concept of ‘shaping what the public needs’ mentioned earlier in Section 2. This is made easier as the authorities have several test sites available to them, which they in turn make available to private and third sectors. However, such independence may no longer be feasible with the financial squeeze on their annual budget. There might be a shift back to NPM similar to what happened in the 1980s as hinted by two of the interviewees.

5.2 The United Kingdom

The first traffic light was installed near the Houses of Parliament on 9th December 1868. It was manually operated by a policeman. Since then, requirement for effective, efficient and safer traffic management have increased. In 2013, total motor vehicle traffic in Great Britain was 303.7 billion vehicle miles [14]. Since the 1980s cars accounted for approximately 80% of all motor vehicle traffic. Congestion is forecast to increase by 30% by 2015 in England alone. The cost of which could amount to £22 billion per annum.

Although we look at the UK in general, this study is highly concentrated on projects in London. This is because according to 2011 Consensus, London’s population is 8.17 million making it the most populated city in Europe [22]. Secondly, from our interviews we also gather that 50% of bus journeys occur in London. There are also 78,000 licensed taxis and 155,100 licensed Private Hire Vehicles (PHVs) in England and Wales, 31% and 34% respectively are in London [11]. This suggests that the need for better and more efficient
5.2.1 Why was ITS adopted? What are the alternatives (if any)? According to the interviewees the reason why ITS was adopted was “we need to replace this system,” and ITS was the best choice taking into consideration the potential capability and costs. The UK Parliamentary Office of Science and respectively Technology (POST) states that the underlying technologies required for ITS are [26]:

- Satellite location; used in navigation systems and could be extended to further range of applications,
- Mobile telephony; the most suitable communication system, and
- Wireless networks; used for some safety applications.

These technologies are already well-established and proven. Therefore, transport stands to benefit substantially from the efficiency gains found in new technologies.

ITS aims to improve the transportation system by making it more effective, more efficient and safer. As one interviewee mentioned, “it was about giving passengers a reliable service and that was really the key benefit that was looked at in the business case. Making sure we have better service control”. There is no overarching strategy or architecture in relation to ITS. However, they have developed specific architectures to aid the development and deployment of systems targeted at achieving specific policy goals [12].

The alternative to ITS is to continue using telematics. The change in policy was a political decision so that they can take more of the monitoring and development role. As one interviewee explained “it was known at that time it wasn’t the right kind of model needed.” Another interviewee added that other than the existing system i.e. telematics, was at near full capacity utilisation, there was also cost associated issue. The emphasis on “passengers”, “capacity utilisation”, and “cost” signals a strong influence of economic theories behind the reasoning of the interviewees.

5.2.2 How were the cost and benefit appraised / measured? The Department for Transport (DfT) requires all projects / studies that require government approval to use Transport Analysis Guidance (TAG). TAG serves as a best-practice guide for projects / studies that do not require government approval. It is now the basis for the appraisal of, for example, multi-model studies, Highways Agency road schemes, and major road and public transport schemes in London Transport Plans. The appraisal framework is made up of four parts [17]:

- Appraisal Summary Table (AST), a one-page tabular summary of the main impacts;
- Environment, safety, economy, accessibility, and integration, of a transport solution. It includes both qualitative and quantitative (expressed in monetary or other units) information. This summary table does not include an overall score of options or alternatives like OEEI. Direct effects are monetised. These are used to estimate cost / benefit ratio, which, in turn, is input for a multi-criteria analyses (MCA). However, personal judgement must be applied since weighing information is not specified. The government is currently moving towards a pure CBA, in which more impacts are to be valued.
- Assessment of the degree to which local and regional objectives would be achieved.
- Assessment of the extent to which the completed choices improved identified problems.
- Advice on how to conduct supporting analyses for distribution and equity, affordability and financial sustainability, as well as practicality and public acceptability.

In practice, this appraisal framework covers a much wider range of social impacts through qualitative assessments scoring impacts in terms of ‘neutral’, ‘slightly beneficial’, ‘largely beneficial’ or ‘adverse’. ‘Option value’ i.e. value people place on having a transport option available, is recognised as a sub-objective to accessibility in guidelines. It is also an addtion to the measurement of user benefits of accessibility changes [17]. This approach is surprising for a NPM regime as social impacts and qualitative assessment do not necessarily align with economic theories.

From the interviews we also gathered that a full cost-benefit analysis is not done at feasibility stage of a project. Rather it was based on “which model most closely matches your requirements.” Another interviewee added that the first step should be the understanding of what the system is about and whether it fits your organisation structure.

Throughout the interviews cost does not seem to be the main concern. Security and reliability were higher in the priority order. This is again a break from traditional NPM approach which emphasises on economic concerns.

5.2.3 What are the impacts? Over 80% of total benefits are derived from the savings in travel time and the desire to travel faster [7]. Transport Direct, an online door-to-door journey planning, achieved over 110 million user sessions [13]. The site have very high satisfaction levels of more than 90% customer satisfaction levels [12].

The exact benefit from the Highways Agency Variable Message Sign project to help drivers avoid congestion has not been quantified. The original business cases expected a cost-benefit ratio of around 1:3 but recent research showed this
benefit is probably lower. Rear end accidents have been reduced by around 7% with the introduction of Motorway Incident Detection and Automated Signalling (MIDAS). These in turn reduced serious injuries related to such incidents by 12% [12].

The Highways Agency National Traffic Control Centre overall project delivered a cost-benefit ratio of 1.24. This is higher than expected from the original business case [13]. The benefits include: provide pre-trip information to drivers to avoid congestion, in-trip information to drivers to avoid congestion, and a single point of contact for Highway Agency stakeholders to obtain information on network state.

The Highways Agency Managed Motorways pilot on M42 improved weekday journey time reliability by 27% and in the first 12 months of the trial personal injury accident rate more than halved. Hard Shoulder Running (HSR) delivers most of the benefits of widening at a significantly lower cost and with fewer environmental impacts. The costs per scheme of managed motorways are on average 40% lower than traditional widening schemes [12].

The Highways Agency Public Access CCTV original cost-benefit ratio is 1: 1.58 based on 425,000 images a month. Currently partner organisations serve out over 2.6 million images on average month to a peak of over 40 million images a month [12].

From our interviews the most significant theme that crosses across is customer research and customer satisfaction. The interviewees, however, are hesitant to attribute improvements in customer satisfaction to their specific projects claiming there are many other factors which also contribute to the results. This pragmatic approach is in contrast with their Dutch colleagues who are more willing to attribute improvements to their projects. The interviewees’ main concern when making decisions are “customer satisfaction” and the word “customer” is synonymous with NPM regime.

5.2.4 Whether and with whom public value has been shared / co-created / co-produced. The government sees its role as enabling and encouraging industry, incentivising and removing potential barriers so that the private sector can innovate and progress rapidly to deploy ITS where it best delivers policy goals [12]. This is backed by one of the interviewee’s comment that “it is in the organisation’s structure to engage with the operator.”

The Highways Agency Public Access CCTV partners with media organisations, and web hosts to allow nominated third parties to access and disseminate still and live images to the public. This is done through their own traffic news bulletins and websites. The Agency also support businesses to develop innovative solutions making images available to the public. This allows the public is able to view network conditions almost anywhere [12].

Another reason highlighted by the interviewees with regards of sharing and co-creating / co-producing with private sector is the complexity of the system. Hence, the need for specialists to be involved and even operates part of the system.

Unlike their Dutch colleagues, transport authorities in the UK do not have the autonomy to ‘play around’ with new technologies to find better, more effective and efficient way to address their transportation issues. Instead they have a strict procedure of problem identification, requirements list, etc. before they can test or pursue a new technology. This probably limits the potential to co-create / co-produce services / products with other sectors. However, this approach can be attributed to the fact that the UK is at the NPM stage where economic theories remain an important aspect of public sector governance.

These initial findings suggest that PV regimes of NPS and NPM influence the way public managers in both countries think and make their decisions. In the next section we will summarise the use of ITS within the 2 PV regimes and analysis of the initial findings.

6. Conclusion

The paper explores 2 different PV regimes namely New Public Service (NPS) represented by the Netherlands, and New Public Management (NPM) represented by the United Kingdom. Theoretically, managers in the Netherlands should embrace the PV concept more readily than their counterparts in the UK, who should be more entrepreneurial in their decision-makings. Accordingly, the choice for ITS and projects within ITS as explained by the interviewees show that in practice, the respective regimes strongly influence their decisions.

The initial findings suggest that both countries have similar reasons for implementing ITS. The alternative to ITS is ‘business as usual’ which in both countries mean telematics. This is no longer the most efficient nor effective way of providing service to the public.

Cost-benefits analysis methods are standardised in both countries. However, the Netherlands have a 3 layer analysis approach. The UK’s recent emphasis on social impacts suggests that it may be leaning towards NPS.

PV has been shared, co-created and / or co-produced by public managers in Netherlands. The UK also shared and co-created public value with private sector but there is no suggestion of co-production. Accordingly, due to reasons mentioned in Section 5 we are of the opinion that Netherlands is leading the way in this section, which is again a characteristic of NPS public value regime.
Based on these preliminary findings, we can conclude that the concept of PV is practiced in the transportation sector in varying degrees in both countries in line with their respective theoretical perspectives. The findings also suggest that the UK is moving towards NPS while the Netherlands shows signs of reverting to NPM regimes.

However, as a final note, we would like to remind the readers that this paper shares the results of our initial findings from published literature review and the first wave of interviews in Delft and London in May 2014. Another wave of interviews will be conducted in the following months to gather more data which will enrich the results of this paper. The study is expected to be finalised in early 2015.

References


1398