

Transport Operations Research Group 2005 Annual Report

BY PROFESSOR PHIL BLYTHE

This report describes the activities and portfolio of research of the Transport Operations Research Group (TORG) during the 2005 calendar year. Readers interested in acquiring a copy of any of the papers or reports referred to in this report, or in obtaining further information on current research, future symposia, short courses, postgraduate study and PhD research should contact Ms. Emma Simblett¹.

STAFF CHANGES

Prof. Anil Sharma, Professor of Transport Planning at the School of Planning and Architecture, New Delhi and distinguished alumnus of TORG joined the Group as a Visiting Professor for 12 months from November 2005. Prof. Sharma is working on the EPSRC funded project 'Sustainable Transport Technologies for Developing Environments'. Dr. Martin Higginson was appointed as Visiting Researcher; Chris Fowler also joined TORG during the year as a Research Associate on a Cubic Transportation-funded fellowship and Hai Nam Ha was appointed as a Research Associate on the ASK-IT Project as a joint appointment with the Informatics Institute and Culture Lab. Eric Sampson (UK DfT) was appointed as a Visiting Professor. Meanwhile, Dr. Annet Ehlert left TORG in November to rejoin PTV in Germany. We wish her well. Finally, congratulations to Dr Corinne Mulley who was awarded an International Meritorious Paper Prize by the Chartered Institute of Transport and Logistics in September 2005.

Up to date news on all our transport activities is available at <http://www.ceg.ncl.ac.uk/research/transport/news.htm>.

RESEARCH STUDENTS

Congratulations to Salma Mahmoud, Tessa Sayers and Neil Thorpe on the award of their PhD degrees. Welcome to Yati Yayha (from Malaysia), Tana Phonphitakchai (from Indonesia) and Dong-Heon Shin (from South Korea) who have joined the public transport team and also to Bin Zhang (from China). Sabine Poitz returned to the Technical University of Dresden to complete her studies. Amy Guo won the best student paper at the Moving On Conference in Glasgow, her prize is a free delegate place at the ITS World Congress in London, in October 2006.

SHORT COURSES AND TAUGHT POSTGRADUATE DEGREE PROGRAMMES

The three Transport MSc courses offered at Newcastle continue to flourish with a large cohort of students registered on the 2005/06 programme. The 32nd Annual Residential Course on Asphalt Materials and Flexible Pavements was attended by over 100 delegates in September. TORG hosted a workshop on Future Road User Charging Research Challenges in March 2005, sponsored by the DfT. Short courses in Railways, Road Safety, Traffic Management and VISSIM again were run successfully and these have now become firmly established in our calendar of annual events. SERCO hosted a technical visit of the MSc students and we are also pleased to announce that SERCO will contribute a new prize on the MSc courses for outstanding performance in the field of Intelligent Transport Systems. Other prizes for students on the MSc courses are already given by Mott MacDonald, Steer Davis and Gleave, Scott Wilson, Faber Maunsell and Jacobs – we take this opportunity to thank all of the sponsors for their continued support and contributions. The EU-funded TRANEE (Transport in e-Europe) project delivered an 'ITS in Freight and Logistics' training course in March 2005, whilst the Marie Curie project, Star-City, ran PhD training courses in Energy (in Kalkar in September) and in Transport (in June in Oporto). Further courses will be held in March 2007 in Newcastle.

NEW PROJECTS FOR 2005

A variety of new projects were awarded in the area of public transport and travel behaviour including the MASCARA DRT (demand responsive transport service for increasing social cohesion in urban/rural areas), project funded under the INTEREG programme; examines area-wide bus networks; Ultra Light Rail; hybrid vehicles; journey to work patterns; and separate market research investigations into regional airport accessibility and quality of local bus services.

In the ITS field, TORG were awarded a new EU-funded project TRACKSS (Technologies for Road Advanced Cooperative Knowledge Sharing Sensors) in the area of sensors, wireless networks and data fusion which commenced in December. Other significant research awards during the year included the OST-Foresight study on Intelligent Infrastructure and the DTI/DfT-funded study on new 'auction-based' approaches to road-user charging (the Smart Market Protocols study).

PROFESSIONAL ACTIVITIES

Professor Phil Blythe continues as Director of TORG and as Director of Business Development for the School of Civil Engineering and Geoscience (CEGs) and sits on the Executive Board of the School. He leads the ITS Research Unit which co-ordinates multi-disciplinary research in Intelligent Transport across the Schools of CEGs, Computing Science and Electronic Engineering, and he is a member of the University's Informatics Institute Advisory Group. Key research activities this year include lead expert of the OST Foresight Intelligent Infrastructure Study. In parallel with the ASTRA project, a new wireless corridor is being developed. Phil continued to advise the DfT, TfL and Cambridgeshire County Council on road-user charging issues, including a peer review of TfL's congestion-charging technology trials. He has also provided advice on smart market protocols and supported Hyder Consulting on their Hong Kong road-user charging study.

During the year Phil became joint editor-in-chief of the new IEE Proceedings of ITS journal and chairman of the IEE's transport sector panel. Other professional activities included the Steering Committee of the DfT's Transport Card Forum, the Executive Board of the IEE's Professional Network in Automotive and Road Transport Systems and membership of the EPSRC Peer Review College. In November he presented papers at the ITS World Congress in San Francisco and provided a keynote address at the Royal Society's BCS 'Thought Leadership' debate on future transport technology, Blythe (2005g and 2005i). Recently he joined the Board of the ITS World Congress and is also on their European and International programme committees.

Professor John Nelson is Professor of Public Transport Systems and Director of Research in the School of Civil Engineering and Geosciences. He has continued to be engaged in many activities relating to his principal research area of Demand Responsive Transport (DRT) and other

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Information on all TORG's teaching and research activities is available at <http://www.ceg.ncl.ac.uk/research/transport/index.htm>

forms of flexible transport. European activities have included the FP6 CONNECT project (as co-ordinator) and two INTERREG projects SUNRISE and MASCARA. This year saw the completion of a Good Practice Guide for Demand Responsive Transport Services using Telematics (for the Department for Transport) and publication of a new book *Systems and Advanced Solutions for eLogistics in the Sustainable City* (ENEA) as well as invited contributions to a number of significant conferences and workshops. He was also invited to join UITP's Regional Transport Commission to promote DRT activities.

External appointments during the year included a very interesting role as academic advisor to the interim Regional Transport Board in the North of England, membership of One North East's Transport Advisory Group; and Chairman of the North Eastern Branch of IHT. He has continued as external examiner to the MSc Transport Engineering and Planning course at Salford University, and as a member of the EPSRC Peer Review College, the DfT's Clear Zone's Steering Group and the local public transport committee of the European Transport Conference. Other continuing professional activities include the Editorial Advisory Board of the *Journal of the Ghana Institution of Engineers* and the Expert Readers' Panel, *Public Transport International*.

Roger Bird has continued his research and teaching activities within the Transport Group and the School of Civil Engineering and Geosciences and in the role of degree programme director for the transport Masters programmes. He leads the undergraduate Transport Engineering and Transport Infrastructure modules, and the postgraduate module in Traffic Management Techniques. He also leads the Integrated Design theme for the undergraduate Civil Engineering degrees. He is also the Pavior's part-time lecturer in Highway Engineering at Imperial College, London. He continues as Course Director of the Annual Residential Course in Flexible Pavements and Asphalt Materials run jointly with the Quarry Products Association, and attended by a wide range of employers across the asphalt industry in the UK. Within TORG's research portfolio, he is responsible for developing a methodology for area-wide safety audits for local authorities in the light of long term accident trends. His research activities this year have also focussed on the consistency of alignment of rural single carriageway roads, highway design standards, junction capacity calculation methods, the quality of cycling infrastructure and life cycle assessment of road paving materials.

Dr Dilum Dissanayake has continued her teaching and research activities in transport modelling. She leads the transport modelling team in TORG, currently lectures in travel demand forecasting, managing urban transport in developing countries, and road safety. She continues to develop her research on travel behaviour modelling and policy analysis, and has started working on two new research areas from 2005, transport impacts on air quality and transport

safety. She is the Principal Investigator for the DICE project, a research project looking at the application of discrete choice methods in travel demand modelling for the UK cities. She is working closely with the EASTS (Eastern Asia Society for Transportation Studies) and is the Principal Investigator for a project (2004-07) funded by EASTS for the valuation of transport safety in Asia including Malaysia, Indonesia, China, Thailand and Sri Lanka. She was also involved in the activities related to the Smart Market Project funded by the DTI Future Foresight research programme on Intelligent Infrastructure. Dilum continues to serve as a reviewer on the TRB Committees on Travel Behaviour and Values, and Environmental Concerns.

Dr Corinne Mulley continues to develop her research portfolio broadly within the Passenger Transport and Policy Unit within TORG and is now a Fellow of the Chartered Institute of Transport. She is the Degree Programme Director for the MPhil / PhD programme in Transport for the School of Civil Engineering and Geosciences. In the past year she has been involved particularly in preparing a Best Practice Guide for public transport network planning; aimed specifically at small and medium sized cities in Europe and the preparation of a Good Practice Guide for Demand Responsive Services in England and Wales. Other activities have included the continued working on the CONNECT project and investigating the travel to work patterns of the residents of South Tyneside in Tyne and Wear. Alongside work on current issues, Corinne has continued her research in the transport history arena and was invited to present at the T2M (Association of Transport, Traffic and Mobility Research) international forum in York. Was awarded an International Meritorious Paper Prize by the Chartered Institute of Transport and Logistics in September 2005, for a paper on "Benchmarking internal efficiency: how useful is the process for local transport operators?"

During the year, new external appointments include: the election to the T2M Executive Committee; member of the Editorial team of the Manchester University Press *Transport History Journal* and the Programme Committee of the European Transport Conference (ETC). She was also successful in the 2005/06 Commission for Integrated Transport Call-Off Framework for Academic Expertise. Other external activities have focussed on giving papers on benchmarking and competitive strategy, participating in the activities of the ILT (both locally and nationally) and she is the Editor of a Companion to *Road Passenger Transport History* covering the whole of the British Isles.

Dr Neil Thorpe has focussed his travel behaviour research activities during the year on road-user charging and road safety. He remained involved in the DfT's DIRECTS trial of interoperable road-user charging systems, and continues to manage two DfT research projects. These involve developing a system of charging HGVs for pavement damage

and investigating the impact of charging on household activity patterns. In road safety, he continues as the independent data analyst for the Northumbria Safety Camera Partnership and is the University's Principal Investigator on a collaborative research project with Northumbria Healthcare NHS Trust to explore the impacts of safety cameras on healthcare provision. Other research activities remain focussed on Local Transport Plan issues including public attitude surveys, Best Value, public transport provision and developing SmartDust solutions for transport applications as part of a DfT New Horizons project. During the year he has co-ordinated the University's input to the EPSRC SOLUTIONS project and acted as an expert project evaluator for the European Commission's FP6 DG-TREN 'Sustainable Surface Transport' Research Programme and the International Association for the promotion of co-operation with scientists from New Independent States of the former Soviet Union (INTAS).

Dr Steve Scott continues as the Director of Undergraduate Studies for the School of Civil Engineering & Geosciences, as chair of the School Teaching & Learning Committee and as chair of the group looking at quality assurance for the School. As such he is masterminding the development of new undergraduate degrees to comply with UKSPEC. He has recently become Consulting Editor for *Emerald's International Civil Engineering Abstracts*. Recent publications include a paper on the use of key performance indicators and two papers published on a new approach to the assessment of risks in contracts, which combine the use of pair-wise comparison and path analysis methods. He continues his interest in the use of virtual reality in transport environments, and is keen to pursue the use of VR to aid the public's awareness of new road schemes and also to enhance the process of road safety audits.-

SUMMARY OF CURRENT PROJECTS

INTELLIGENT TRANSPORT SYSTEMS AND SERVICES

Demonstration Of Interoperable Road-User End To End Charging And Telematics Systems (DIRECTS) (DfT, from October 2001 to December 2005)

Contract holders: Prof. P.T. Blythe and Dr. N. Thorpe

The aim of the DIRECTS project is to demonstrate the interoperability of different road-user charging technologies and to develop a comprehensive and robust road-user charging solution appropriate for the unique conditions of the UK road network. The overall output of the project is a delivery of a National Specification for DSRC-based road-user charging equipment. TORG's principal role in the DIRECTS project is to develop and assist with the implementation of a volunteer recruitment and management strategy

as part of the on-road trials of the end-to-end road-user charging system. A mixed fleet of commercial and private-vehicles have been equipped with suitable DSRC and/or GPS-based road-user charging technology to generate sample transactions as they pass through the various charging sites on the Leeds network. In addition a supplementary trial of GPS-based charging has also been hosted by the City of Bristol. As part of the trial, drivers received specimen transaction reports and enforcement notices to demonstrate the various components of the end-to-end charging system.

Reports: Available at DfT Website (http://www.dft.gov.uk/pgr/regional/ltp/major/direct_sroadchargingresearch)

Future Communications and Networking Technologies for Transport (Department for Transport, from December 2003 to April 2005).
Contract holders: Prof. P.T. Blythe and Dr A. Tully (School of Computing Science).

The development of new and emerging communications technologies (e.g. 4G, WiFi, RFID and CALM) and networking possibilities such as mobile ad-hoc networks and Smartdust require an examination of their potential application in the transport sector. Therefore, the DfT, TORG and the School of Computing Science carried out a state-of-the-art review of emerging communications technologies and the mobile Internet. The review identified relevant candidate technologies and the likely way in which the technology may evolve to support transport services. The ultimate aim of the study was to provide recommendations for the use of new mobile technologies in transport. These recommendations propose a range of application areas, likely timescales to market and a strategic assessment of the impacts the technologies may have on the transport sector. Moreover the impacts that these new technologies may have on standards were also examined.

Reports: Blythe (2005h) and Blythe and Pickford (2005)

Ambient Intelligence System of Agents for Knowledge-Based and Integrated Services for Mobility Impaired Users (ASK-IT) (EU 6th Framework IST programme, Integrated Project Co-ordinating Partner: Siemens, from November 2004 to October 2008). *Mr. S. Edwards, Mr. C. Fowler, Ms. A. Guo and Dr. P.L. Olivier. Contract Holders: Prof. P.T. Blythe, Mr. S. Edwards and Dr. S. Scott*

ASK-IT uses ambient intelligence technology to provide functions and services for older and disabled people in various environments, including home, work, leisure and transport. The main features include: mediation of content and services; seamless environment management (anywhere, anytime); user preference and context-related processes; flexible geo-referenced services; and a user confidence based environment. The first phase of the research involves the collection of info-mobility content

relating to the environments described above. In the leisure and tourism sector, for example, this might include details of accessibility to cinemas, sports venues or restaurants. This content is then integrated with different tools, including enhanced accuracy localisation, accessible inter-modal route guidance modules, and interfaces to e-commerce / e-payment, e-working, e-learning systems and assistive devices. It is envisaged that this framework will be interoperable in terms of mobile devices and local and wide area networks. The integrated ASK-IT services and system will be tested in a number of interconnected cities/areas across Europe, to prove that accessibility for disabled users can be achieved in a reliable, seamless and viable way, using a range of available technologies and communication networks.

Reports: Edwards and Blythe (2004); Edwards (2005). All publicly available reports and documents are available at <http://www.ask-it.org/>

Transport in e-Europe (TRANEE) (European Commission Leonardo da Vinci Programme. Co-ordinating Partner: Local Futures Group, from 2003 to 2006). *Mr. S. Edwards. Contract Holder: Prof. P.T. Blythe*

TRANEE aims to support small and medium-sized businesses (SMEs) in the freight and logistics industry. TRANEE supports these businesses in developing a range of competencies and good practice to perform effectively in the enlarged EU. This requires a recognition and understanding of the fundamental shift to a knowledge-based economy, which includes, but is not limited to, the ability of SMEs to adopt and integrate new technologies, and to identify and capitalise on new market opportunities. TRANEE provides a strategic framework and a practical 'user guide' for competitiveness in the global economy and the enlarged EU. Using a range of diagnostic tools, senior decision makers in companies can identify the most important opportunities for improving the productivity and competitiveness of their businesses.

The method includes a strategic view of technology uptake and use but also looks beyond the technology and evaluates a range of internal and external factors to business innovation in the transport sector. The final training package material was developed at the end of 2005 with each partner hosting a National training day launch (in the UK this was on 29th March 2006 hosted by ITS UK in London).

Reports: Transport in e-Europe Workbook 1: Strategic framework for innovating and using technology and Workbook 2: Good Practice Guide.

Applications of Smartdust in Transport (ASTRA) (DfT New Horizons Programme, June 2004- July 2005)

Contract Holders: Dr A. Tully (Computing Science), Prof P.T. Blythe, Dr C. Mulley, Prof. J.D. Nelson, Dr. N. Thorpe

The ASTRA project investigated the use of mobile

ad hoc networks, and more specifically, 'Smartdust' for transport applications. The project examined the current state-of-the-art with Smartdust, using MOTES as the technology to be tested. It also looked at the likely market and technological advances of the Smartdust technology over the coming decade.

A trial using MOTES technology was hosted in Newcastle with a pervasive intelligent corridor established by a network of fixed MOTES on roads near Newcastle Central Station. Mobile MOTES were also placed in several buses. Communication between a static node and a moving node on-board a vehicle was achieved, showing that communication can take place between road side and vehicles using a network of MOTES. Evaluation of the system revealed that the main limitation of the technology at the present time is battery life.

Reports: Blythe, Tully and Martin (2005) and Tully and Blythe (2005). All publicly available reports and documents are available at <http://research.cs.ncl.ac.uk/astra/>

Transport Direct (DfT Framework Contract as Sub-contractor to WSP Systems, from June 2003 to December 2005).

Contract holder: Prof. P.T. Blythe

TORG is part of a consortium which provides technical support, research and advice to the DfT's Transport Directs real-time transport information programme under a framework contract. Key contributions that TORG made include advice on location-based services, evaluation of user requirements, business case analysis and the delivery of personalised services to mobile devices.

Reports: None yet available

Technologies for Road Advanced Cooperative Knowledge Sharing Sensors (TRACKSS) (6th Framework Programme - Information Society Technologies, Project Coordinator ETRA Investigación y Desarrollo, S.A., from January 2006 to September 2008). *Mr. C. P. Fowler, Mr. S. Grosso, Mr. G. Martin, Dr. A. Tully (School of Computing Science).*

Contract holder: Prof. P. T. Blythe

The focus of TRACKSS is to research advanced communications concepts, open interoperable and scalable system architectures that allow easy upgrading, advanced sensor infrastructure, dependable software, robust positioning technologies and their integration into intelligent co-operative systems to support a range of core functions in the areas of road and vehicle safety and traffic management and control. The overall aim is to develop new systems for cooperative sensing and predict flows, infrastructure and environmental conditions surrounding traffic, with a view to improving road transport safety and efficiency. The University will develop new technology for 'smart' detection on vehicles and infrastructure and a common framework for data

collection and access.

Reports: None yet available. All publicly available reports and documents will be made available at <http://www.trackss.net>.

Future Research Challenges in Road User Charging (DfT, from November 2004 to May 2005)

Contract holder: Prof. P.T. Blythe

To assist with the setting of the DfT's future research agenda in the area of road user charging, TORG has been assisting the DfT with a brainstorming exercise to gather opinions on the key research challenges from the leading UK and international experts in the field. The exercise included a two day workshop in Newcastle in February 2005.

Reports: Blythe (2005a) and Schelin, Gusftafsson and Blythe (2005)

Review of London Congestion Charging Technology Trials (Transport for London, from December 2003 to April 2005)

Contract holder: Prof. P.T. Blythe

TfL is currently undertaking a series of trials with a range of different technologies to explore candidate systems for the future extension of the London Congestion Scheme. A peer review panel of experts has been established to review the performance of the trials and to advise TfL on the next stages of the study. Phase 1 was completed in the Autumn of 2004. In Phase 2 TfL looked in more detail at a number of candidate technologies and undertook medium sized trials of the system in the first half of 2005.

Reports: Restricted, not publicly available.

Foresight Intelligent Infrastructure Research (Office of Science and Technology Future Foresight Programme, from December 2004 to December 2005)

Contract holder: Prof. P.T. Blythe

The Foresight Project on Intelligent Infrastructure Systems (IIS) set out to explore how science and technology could, over the next 50 years, bring intelligence into infrastructure to meet these demanding and sometimes conflicting objectives. The project found that intelligence could help us to meet these objectives and perhaps do more. It could stimulate growth rather than simply supporting it, perhaps going so far as to permit manufacturing with virtually no waste.

Intelligence could also support and promote a more inclusive society. Looking 50 years ahead created challenges for the project. It is very difficult to see how information technology might develop beyond a 5-10 year time horizon, let alone half a century. Also, it is difficult to see how, over a longer time frame, we will invest in the technology and how society might respond to those investments.

The project commissioned leading researchers

to write state-of-the-art reviews, which set out what all areas of science, including psychology and the physical sciences, and technology could deliver within the next few years. The Research Reviews covered areas as diverse as artificial intelligence and data mining, through to how information affects our choices and the psychology of travel.

As part of this, the project developed a Technology Forward Look to review existing roadmaps for the development and application of the technology, and to consider how IIS might shape business in the longer term. It also produced a set of scenarios that provide a range of credible and coherent pictures of the technology we might invest in, and how society might react to those investments.

Reports: Blythe (2006a), Blythe (2005c) Blythe (2005e) and Blythe (2005f) also see www.foresight.gov.uk

Lorry Road User Charging (SERC0, from September 2004 to July 2005)

Contract Holders: Prof. P.T. Blythe, Dr. N. Thorpe, Prof. P. Moore and Dr D. Barber

TORG jointly with the Goemetics Group within the School of Civil Engineering and Geoscience were a member of a consortium tendering for the UK Lorry Road User Charging Procurement. Newcastle University provided several specialist technical roles as well as a development capability and preparation for the trials. The DfT cancelled the procurement programme in July 2005.

Reports: Commercial in Confidence

East London Traffic Control Systems (ELTRACS) Refresh study (TfL Framework Contract as Subcontractor to SERCO Systems, from November 2005 to March 2006).

Contract holder: Prof. P.T. Blythe

As part of the quality control process for the study TORG are providing an independent peer review of the revised communications architecture and strategy for the East London Traffic Control System.

Reports: Restricted, not publicly available.

Smart Market Protocols for Road Transport (OST and DfT) Mr. S. Grosso and Dr A. Ehlert

Contract holder: Prof. P.T. Blythe, Mr. S. Grosso and Dr D. Dissanayake

To test the premise that future intelligent infrastructure could offer new and innovative possibilities in how traffic demand management could be implemented, Foresight and the DfT commissioned Essex, Newcastle and Cranfield Universities to model traffic volume and traffic flow and what price to charge users to maintain free flowing traffic. The model assumed a bidding process for slots to use cars on the network. The work was based on a VISSIM model of the

Gateshead area, calibrated to determine the traffic emissions and pollution generated by the traffic. The research team also investigated the possible impact of road-user charging on congestion in the area by simulating individuals' behaviour in the bidding process. The approach provides a means of testing road-user charging options to investigate optimal price strategies. The research team are currently considering the research challenges relating to the technical implementation of such a scheme.

Reports: Blythe (2006b) and Blythe (2005k)

Bucharest Traffic Modelling (WSP, from March to September 2005) Dr. A. Ehlert

Contract holder: Prof. P.T. Blythe

TORG provided input into building a micro-simulation model of the road and traffic control network of down-town Bucharest. The model was developed using the VISSIM Traffic Micro-simulator. The research was in support of a larger traffic management project undertaken by WSP Transport.

Reports: Commercial in Confidence

Star City (EU Marie Curie : January 2005 to December 2008)). Dr. O. Heidrich and Prof. P.T. Blythe.

Contract Holder: Prof. P.T. Blythe

Star City is a project to deliver Doctoral training to Students in the areas of Transport, Energy and Waste Management. A series of weeklong workshops and training events are held, bringing together key experts in Europe in the domains together with leading edge PhD students. The project is part of TORGs commitment towards broadening and enhancing their transport post graduate research student training. To date workshops have been held in Kalkar, Majorca, Athens, with the next in the series in to be hosted in Estoril in June 2006.

Reports: Blythe (2005j)

INTELLIGENT TRANSPORT SYSTEMS: RESEARCH STUDENTSHIPS

Future Personalised Transport Information Delivery using Pervasive Mobile Computing Services

Sponsor: University Studentship

Start Date: December 2003

End Date: November 2006

Amy Guo.

Supervisors: Prof. P.T. Blythe, Dr S. Scott and Dr P.L. Olivier (Informatics Institute)

The aim of this research is to understand the extent to which the application of pervasive computing in traveller information systems could facilitate better use of traveller information services and motivate greater changes in travel behaviour, in particular, a modal shift from the car to public transport. Also, there is the opportunity to examine how various scenario

presentations support the delivery of a future concept.

The primary study involves an elicitation survey to identify a set of salient perception-related attributes of travel information websites will be identified and applied to a number of key websites for the main survey. The purpose of this is to examine the relationship between user perceptions and actual usage of Internet-based traveller information services. A theoretical model will be developed to examine the effectiveness of traveller information services delivered via other means of access.

The study also aims to assess future traveller information systems supported by pervasive computing environments. Guo (2006) won the best paper prize at the Moving on Conference, March 2006.

Reports: Guo and Blythe (2005) and Guo (2006)

The development and evaluation of a road user charging system for heavy goods vehicles

Sponsor: Department for Transport Research Studentship

Start Date: October 2001

Expected End Date: July 2005

Mr N.A. Dodoo.

Supervisor: Dr. N. Thorpe

The principal aim of this project is to develop and evaluate an on-board system for charging heavy goods vehicles taking into account costs associated with pavement damage. Following the successful development and initial on-road trials of the prototype on-board charging system involving the use of GPS technology and an on-board axle weighing system, the system has been installed on a 2-axle HGV and demonstrated in on-road field trials. Results from the field trials suggest that the implementation of the prototype system could improve current charging systems in terms of fair and efficient charging for HGVs and also generate benefits for the management and use of road pavements.

Reports: Dodoo, N.A.; Thorpe, N. (2004a-d);

Dodoo, N.A.; Thorpe, N. (2005)

Autonomous Navigation along Marine Superhighways

Sponsor: EPSRC & UK Hydrographic Office Case Studentship

Start Date: October 2004

Expected End Date: October 2007

Richard Fairchild

Supervisors: Prof. P.T. Blythe, Prof. P. Moore and Dr. P.L. Olivier (Informatics Institute)

More and more emphasis is being placed on improving safety in the maritime industry, especially at night or under poor visibility when most of accidents are a result of human error. The overall objective of this project therefore is to develop an autonomous control system that can be modelled in a virtual simulated marine environment. This autonomous system would control vessels and thus avoid dangerous

situations. A second objective is to identify the potential impacts of switching from current GPS-based receivers to the new Galileo-based receivers.

Reports: Fairchild (2005)

PUBLIC TRANSPORT UNIT: RESEARCH PROJECTS

Demand Responsive Transport Good Practice Guide (Department for Transport, from November 2004 to April 2005) Dr J.F. Brake.

Contract holders: Prof J.D. Nelson, Dr C.A. Mulley, Dr J.F. Brake. Partner: Cumbria County Council.

To complement the conventional rural bus network, Rural Wheels was developed as an important element of transport provision in rural areas of Cumbria. It currently provides Demand Responsive Transport (DRT) services in two rural areas of the county. It uses a network of existing transport providers in both the commercial and voluntary sectors to provide subsidised travel. Rural Wheels uses smart card technology with stored travel payment, both for ease of use by travel providers and users and for improved management of the service. The Good Practice Guide demonstrates how DRT services can contribute to the overall strategy and commitment of statutory authorities to provide citizen mobility within budgetary constraints. Using Rural Wheels as a case study along with other European examples, this practical guide highlights key issues under five themes: economic framework, technologies, service design, setting up a Travel Dispatch Centre and marketing and promotion. The Guide will be distributed to all Local Authorities in England and Wales.

Reports: Brake, Mulley, and Nelson. (2006)

DESTINO (DEcision Support framework for flexibly delivered public transport services) (EPSRC, from March 2005 to February 2007). Dr J.F. Brake, Dr S.D. Wright, Dr M.A. Smith, Mr C.P. Fowler.

Contract holders: Prof J.D. Nelson, Dr J.F. Brake, Dr S.D. Wright.

Currently, many statutory authorities and public transport operators are experimenting with or considering flexibly delivered public transport systems mainly with a view to improving social inclusion in rural and urban areas that are difficult to cover by conventional public transport. The DESTINO project is developing a decision support tool to aid Local Authority public transport planners in the design and implementation of appropriate flexible public transport solutions, particularly registered DRT solutions.

There are many varied and often interrelated decisions to be taken along the road to DRT service operation, through the consideration of strategic policy, option appraisal, funding and legislative constraints, consultation with end

users, operators and other partners and decisions on technologies applied, vehicle specifications and tendering processes. This is clearly a very complex task and one for which there are currently no established and recognised procedures to guide the planner through the stages in the process. An easy to use framework is being developed in DESTINO which will put these decisions into a recognised sequence and provide detailed information and guidance on considerations at each step within the sequence. This is being developed as a web-based tool providing a one-stop shop for information and guidance on all factors related to design and implementation of flexible transport services. Users will input to the tool, their choices related to each factor. The validity of these choices is checked with earlier decisions and other constraints (legal, financial, technical etc).

With the DESTINO tool the Local Authority public transport planners will be better equipped to make informed decisions for delivering flexible public transport services which meet strategic policy objectives while satisfying financial budget constraints.

Reports: None yet available

EMIRES (Economic Growth and Sustainable Mobility Supported by IST at Regional Level Including SME's) (EC 5th Framework, IST Programme, from May 2002 to January 2005). Dr S.D. Wright, Dr J.F. Brake.

Contract Holders: Prof J.D. Nelson, Dr J.F. Brake. Partners: ETRA (Spain), RCAUEB (Greece), Mobisoft Oy (Finland), CCSS (Czech Republic) and others.

EMIRES in the UK provided a web-based search facility for users to find job vacancies which not only matched their pre-defined job preferences but had the added value in that details were also provided of public transport (including Demand Responsive Transport) available between the user's designated home address and the location of the job vacancy. The service has been designed for use in predominantly rural areas where lack of transport is one of the main barriers to people gaining employment. Use of the service in the pilot East Sutherland area of the Scottish Highlands helped identify spatial and temporal gaps in the public transport provision for job seekers. This has led to a follow on project, 'T2e', establishing a shared taxi scheme for job seekers in the area, which plugs the identified transport gaps, and has so far helped 20 job seekers into work.

Reports: EMIRES Consortium (2005), Cooper et al (2005). All publicly available consortium documents are available at: <http://www.emires.net>

CONNECT (Co-ordination of Concepts for New Collective Transport) (CEC DG RESEARCH, from January 2004 to December 2005). Dr M.A. Smith, Dr J.F. Brake, Mrs S Murphy.

Contract holders: Prof J.D. Nelson, Dr C. Mulley, Dr J.F. Brake.

6 University of Newcastle-upon-Tyne

CONNECT is a Co-ordination Action funded under the EC FP6 programme taking the subject of Flexible Transport Services (FTS), such as DRT and other related types of public transport. 23 partners are involved in 11 European countries, being co-ordinated by the University of Newcastle. The principal outputs of the project are a Knowledge Portal, which is now available fully populated on the project website - www.flexibletransport.com - a series of thematic workshops covering different aspects of FTS. These have been held in Strasbourg, Cremona and Manchester, and new advances in understanding the business models appropriate for the future development of FTS. Reports: Nelson (2005); Nelson et al (2005). All publicly available documents are at: <http://www.flexibletransport.eu>

SUNRISE (Social cohesion in Urban / rural areas based on Innovative and Sustainable collective mobility services) (INTERREG III C, from June 2004 to May 2006). Dr J.F. Brake.
Contract holders: Prof J.D. Nelson, Dr J.F. Brake, Dr C Mulley. Partners: ATAF SpA (Firenze Transit Company) (Italy), Aristotle University of Thessaloniki, (Greece), Bratislava Transit Company (Slovak Republic), Ring a Link, Kilkenny (Ireland), City of Terrassa, (Spain), CAT Spa (Italy).

SUNRISE addresses the key factor of improved mobility for all categories of citizens within the context of sustainable, competitive development and social cohesion in European areas and Regions. Co-operation is being encouraged between providers of six Demand Responsive Transport (DRT) schemes in urban and rural areas by promoting the exchange of experience and transfer of good organisational/operational practice between transport operators. Together with feasibility studies and the implementation of DRT services, training courses on the design and operation of DRT services are being given. DRT technology and tools, already developed in R&D programmes, have been transferred to the sites. Important output will be a Best Practice handbook for analysing and operating DRT services alongside conventional more general transport schemes. TORG has developed the common evaluation methodology and cross-site analysis for the five diverse demonstration sites across Europe and is assisting data collection and analysis at the Kilkenny site in Ireland. Reports: All publicly available documents are at: <http://www.interreg3csunrise.com/>

MASCARA (Demand responsive transport service for increasing social cohesion in urban/rural areas) (INTERREG III C, from May 2005 to June 2007). Dr J.F. Brake.
Contract holders: Prof. J.D. Nelson and Dr J.F. Brake. Partners: Cork City Council (Ireland), Angus Transport Forum (UK), University of Porto (Portugal), University of Gent (Belgium), Sita (Italy), Gyor University (Hungary).

TORG are providing technical support to Angus

Transport Forum in the recently-awarded INTERREG IIIC project MASCARA whose overall objective is to examine the potential of Demand Responsive Transport (DRT) services and how they can be built into regional transport strategies. The key tasks are to provide support to ATF in pursuit of Component 2 activities (Training Courses); Component 3 (Local Projects Realisation) activities; and Component 4 (Evaluation Methodology) activities. The Angus site is exploring the potential role of the TDC as a one stop shop for all travel and tourism activities in the area specifically through the development of a transport co-operative in the context of DRT business development objectives. Reports: All publicly available documents are at: <http://www.mascaraproject.com>

Phone and Go II (Northumberland County Council, from September 2004 to April 2005). Dr J.F. Brake, Dr S.D. Wright, Mrs S.M. Murphy.
Contract holder: Prof. J.D. Nelson.

'Phone and Go' was Northumberland County Council's (NCC) Rural Bus Challenge project to demonstrate and evaluate Demand Responsive Transport (DRT) services in two diverse rural locations. Between July 2002 and November 2004 TORG managed the Travel Dispatch Centre, implemented service design and managed the evaluation of the scheme. TORG facilitated the transfer of dispatching activities to the Nexus call centre in November 2004 and were retained by NCC until April 2005 to provide liaison between themselves and Nexus and to aid NCC in planning better co-ordination with the Health and Social Service sector transport provision in rural areas. Following a reprioritisation of resource by NCC the core 'Phone and Go' DRT services were withdrawn in summer 2005 with a number of taxi-bus services remaining. Reports: Mageean, Nelson and Wright (2004); Brake and Nelson (2005); Brake, Nelson, Usher and Wright (2005)

Specification of Future Requirements for Demand Responsive Transport Software (Mobisoft UK, from October 2004 to June 2006) Dr J.F. Brake, Dr S.D. Wright and Mrs S.M. Murphy.
Contract holders: Dr J.F. Brake, Prof J.D. Nelson, Dr. S.D. Wright.

The aim of this project is to devise a strategy for future development work for the Mobisoft suite of Demand Responsive Transport (DRT) software applications. The pressure on the education, health and social service sector to offer ever increasing choice to their clients is putting added strain on their limited transport resources. In tandem with this is the Government drive to improve social inclusion and accessibility for all. Without additional major investment, more efficient and co-ordinated use must be made of the transport resources available. At present, efficient integration and co-ordination of trips between sectors is constrained by historical funding arrangements, organisational structures and legislation. These are being addressed by

Government through partnership building and joint working encouraged by accessibility planning strategies and consultations with providers. Therefore it is timely to investigate the research requirements for the future development of scheduling software and telematics based products to ensure the required technology will be available when it is needed. General requirements were elicited from a high-level DRT Strategy Workshop held in January 2005 and more detailed sector specific requirements are being investigated by working with the providers of transport in each sector starting with education. Reports: Wright et al (2005)

Monitoring and evaluation of Demand Responsive Transport services for PTEG (Passenger Transport Executive Group (PTEG, from May 2002 to May 2005). Dr J.F. Brake.

Contract holders: Prof J.D. Nelson, Dr J.F. Brake. Partners: Nexus, West Yorkshire PTE, Greater Manchester PTE, South Yorkshire PTE, Strathclyde Passenger Transport, Centro, Merseytravel.

Following their success in securing substantial funding from the (then) DTLR Urban and Rural Bus Challenge programmes, the seven PTEG members have developed and implemented Demand Responsive Transport (DRT) services at diverse sites. These services are operating with varying levels of ITS and different strategies for service design in urban and rural areas. TORG has developed and implemented a generic evaluation methodology, as it is a particular requirement that the methodology adopted was transferable to other DRT schemes so as to ensure a valid cross-site evaluation. Data collection in the field used multi-application survey forms (face-to-face/postal/telephone) which were designed for seven identified types of user groups. Reports: None publicly available

Monitoring and evaluation of the Cango Demand Responsive Transport service (Hampshire County Council, from July 2002 to May 2005). Dr J.F. Brake.

Contract holders: Prof. J.D. Nelson, Dr J.F. Brake.

Hampshire County Council (HCC) has introduced several Demand Responsive Transport (DRT) services – under the brand name of Cango – in rural areas of the northern Test Valley from 1st July 2002 as a result of receiving funding from the (then) DTLR Rural Bus Challenge Fund. TORG developed a programme of monitoring and evaluation for these Cango services. It was of particular interest that the methodology adopted should be based on that developed by TORG for the monitoring and evaluation of DRT services across the PTEs and for the Northumberland Phone and Go project, so as to facilitate comparison of findings. Additionally, a number of strategic level indicators to establish the overall impact of the new services from the local authority viewpoint were required as part of this

study. The evaluation identified areas of good practice such as a high standard of customer by the drivers and Travel Dispatch Centre; the accessible vehicles used are of high quality; the service itself substantially increases social and employment mobility by varying the service design during the day; there was evidence of modal shift enabled by improved interchange; the publicity was of high quality. Areas for improvement include greater consultation and integration between operators (including Patient Transport Services) and modes; as a non door-to-door service, accessibility is still an impediment; and improved knowledge and training of staff (e.g. passengers need reassurance that their timing requirements will be met).

Reports: Brake, Murphy and Nelson (2006)

Investigation of an Area-wide Bus Network for Rural Northumberland (Countryside Agency/Tynedale Rural Transport Partnership, from January 2005 to March 2005) Dr J.F. Brake, Mrs S.M. Murphy.

Contract holders: Dr J.F. Brake, Prof J.D. Nelson.

This project aimed to provide a better understanding of rural transport planning issues by highlighting the barriers to the improvement of public transport networks in rural areas, using the north Tyne and Redesdale as a case study. The existing public transport network within the study area was described and proposals made for its revision. This was enabled by consulting operators and local people within the area through face-to-face and telephone interviews and focus groups which assessed local accessibility needs and the acceptability of network improvement proposals. The report concluded that matching supply and demand needs to be an on-going process, not an occasional one; rural public transport services are characterised by satisfying a set of interrelated requirements (a limited number of destinations strongly linked to trip purpose and hence the timing of the journey); potential passengers do not expect an unreasonably high level of service and understand that it is hard to justify economically; there is limited awareness of what public transport services are available; the general public seemed receptive to new forms of public transport; whilst operators were receptive to developing public transport, they need encouragement. These issues were applicable to other rural areas of the country. The study also discussed changes that may be needed within the structures, financing and regulation of public transport provision.

Reports: Brake, Murphy and Wilkinson (2005)

Click and Go (Northumberland County Council and Northumberland Health Authority, from April 2001 to September 2005). Dr M.A. Smith.

Contract holders: Prof J.D. Nelson, Dr J.F. Brake.

This project investigated possible savings to the health services through transferring patient transport trips on to public transport. A pilot

evaluation into bookable health trips has been carried out as part of the monitoring of a semi-fixed route taxi service, introduced to give access to GP's surgeries from the village of Shilbottle. Another scheme of bookable taxis for health-related trips in Berwick is currently being evaluated.

Reports: Smith (2005)

Public transport networks and methods and tools for assessing public transport schemes (Civitas, from October 2003 to September 2005).

Contract holders: Dr C. Mulley, Prof J.D. Nelson.

The focus of this project is principles and methods for network planning for public transport in towns and regions within restricted budgets, regulations and fiscal context. The idea is to develop and implement customer-oriented and financially solid public transport networks, and identify any possible needs for new public transport infrastructure.

The three main objectives can be stated as: (a) to examine and define optimal characteristics of co-ordinated public transport networks; (b) to identify suitable methods and tools for the assessment of solutions for optimal public transport, with specific focus on the "border area" between bus and rail solutions; and (c) to identify institutional barriers to optimal network development, i.e. how organisational, legal and financial frameworks can restrict or stimulate the development of more optimal solutions. The findings of the study has been published in a "Good practice Guide" format which gives concise advice about public transport network planning under the considerations of different institutional settings.

Reports: Nielsen, Lind, Mulley, Nelson, and Tegnér (2005a); Mulley, Nelson, and Nielsen, (2005b)

A Review of Ultra Light Rail for Middlehaven, Middlesbrough (Centre for Process Innovation, from July 2005 to August 2005). Dr Martin Higginson, Prof J.D. Nelson, Dr C. Mulley.

Contract holders: Dr C. Mulley, Prof J.D. Nelson

This study was undertaken to identify the robustness of the key assumptions with respect to operations and finance of a proposal to install and operate ultra light rail in the Middlehaven development in Middlesbrough. The research comprises two distinct but related activities. The first investigated the operational feasibility of the proposed scheme and the second the cost/revenue streams and likely profitability of the proposed scheme.

Reports: Higginson, Mulley, and Nelson (2005)

Travel to Work Issues and Employment in South Tyneside, Tyne and Wear (South Tyneside Council, from February 2005 to August 2005). Dr M. Smith, Mr S. Grosso, Ms. H. Du.

Contract holders: Prof J.D. Nelson, Dr C. Mulley

This is a report on travel to work patterns in South Tyneside, commissioned by South Tyneside

Council. The first part of the work concentrated on bringing together existing written evidence. The principal conclusion was that employment outflows from South Tyneside are to some extent due to the employment profile of the district, which may lead better-qualified and more mobile residents to seek employment in other areas. By contrast, the higher rate of part-time work may restrict many local residents, particularly women, in their commuting distance. The attitudinal surveys suggested that there were public transport difficulties in reaching certain employment locations outside South Tyneside for non-car users, and hence that residents of some more deprived areas may have relatively limited access to job opportunities.

The second empirical part of the research was based on an analysis of the 2001 census data at a disaggregate level using resident population and employment figures by district and a more detailed analysis of the figures at ward level and by mode of transport used. The main conclusion was that there appear to be certain structural effects in the distribution of population and employment of South Tyneside which may make access to appropriate work opportunities difficult, particularly for non-car users. Specifically, the 'grain' of the district, in terms of land-use and transport corridors, tends to run east to west, whereas a need may be identified for south to north travel to work flows. The orientation of the main transport routes also appears to be an enabling factor in the significant outflow of work trips to neighbouring districts or other parts of the north east, and in corresponding inflows to local employment centres. This effect would be more of a barrier to the lower-paid and part-time sectors of the workforce, who would be less likely to have access to a car and for whom travel cost and time are likely to be more limiting factors.

Report: Du, et al (2005)

PUBLIC TRANSPORT RESEARCH STUDENTSHIPS

Evaluating the Effect of Public Transport Improvements on Bus Patronage

Sponsor: Majlis Amanah Rakyat, Malaysia

Start Date: January 2005

Expected End Date: January 2008

Ms. N. Yahya

Supervisors: Prof. J D Nelson, Dr C Mulley

The research is exploring the quality aspects of public transport improvements which are seen as a pivotal factor in increasing the attractiveness of public transport, particularly buses. This research will address two main questions: (1) what effect does public transport improvement have on patronage? and (2) what are the impacts of implementing Quality Bus Partnerships in terms of achieving high quality of public transport. A survey will address questions related to 'before and after' the Quality Bus Partnership has been implemented using "Superoutes" in Tyne and Wear as a case study. Interviews will highlight the particular quality aspects perceived by customers

whilst interviews with the operators and local authorities will also be carried out.

Reports: None yet available

Modelling Satisfaction of Demand Responsive Transport services and modal choice: a Structural Equation Modelling approach

Sponsor: Thai Government

Start Date: April 2005

Expected End Date: February 2008

Tana Phonphitakchai

Supervisors: Prof J. D. Nelson, Dr. D. Dissanayake

Over the last decade, DRT services have grown in popularity. However, they are still not performing to their true potential, and many of them could not be viable as commercial services. There is still a need to understand passenger requirements and to carry out an analysis of the expected demand level. In order to promote DRT, this research will apply Structural Equation Modelling techniques to evaluate DRT services and to analyse travel demand. The former will evaluate the satisfaction of DRT services from the perspective of passengers and experts through a causal model. The latter will apply discrete choice analysis with latent variables to develop a mode choice model, which includes bus, DRT, taxi, and private car. The case study for this research is in Tyne and Wear.

Reports: None yet available

The Communication Strategy: its Realisation and Effectiveness for a Demand Responsive Transport Service

Sponsor: Erasmus programme / Technical University of Dresden

Start date: January 2005

End date: June 2005

Sabine. Poitz

Supervisor: Dr J.F. Brake.

In recent years, DRT services have come into focus in the UK as they were expected to help meet the transport needs of inhabitants of rural areas with particular reference to reducing social exclusion. Considerable research has been conducted on the technical side of DRT, but the customers and their need for information have not been investigated. This research pursued the hypothesis that people do not get the right information about DRT so they are not motivated to try it out. The case study of the Phone and Go services in Northumberland was used to analyse those aspects of the communication strategy which successfully informed the potential customers about the service in a way that they were encouraged to use it. Semi-structured interviews were conducted with people who were responsible for – or whose work was directly affected by – the communication. Afterwards a postal questionnaire was conducted with users and non-users of Phone and Go which ascertained that recognition of the service was high (particularly due to design of the bus); users found the information they had received more

useful and encouraging than the non-users, possibly because they were familiar with the service. The quality of information for Phone and Go was considered better than general public transport information.

Reports: None yet available

Best practices for procuring sustainable, efficient bus services in urban areas

Sponsor: Self-financed

Start date: August 2000

Expected end date: December 2006

Brendan Finn

Supervisor: Prof. J. D Nelson

This project examines the processes involved in the provision of urban bus services in a range of regulatory and market frameworks. A detailed examination has been made of the transport authorities and procurement processes in a set of European and Australian cities, as well as through a broader literature review. Building on these sources, a functional model has been developed which described the tasks involved in each of the key stages of planning, procuring and monitoring bus services in urban areas, with emphasis on services which are operated under licence, tender and franchise. Organisational models have been layered on the functional model to describe how the processes work in a range of regulatory environments. A 16-step model of a competitive tendering process has been described, and the collective materials now form part of distance-learning materials for transport officials in Russian cities. The practical implementation of planned reforms has been examined in a set of cities in Kazakhstan and China, with the former showing that a full transition can be successfully achieved. The current phases of the work are to consider what adaptations are needed to the functional model for the special case of DRT; and to map organisational models on to the functional model for specific cities. The final phase of the work will identify good practice in the domain in different regulatory environments, with recommendations which are usable by practitioners.

Reports: Finn (2005); Finn and Nelson (2005)

INFRASTRUCTURE DESIGN AND CONSTRUCTION MANAGEMENT: RESEARCH STUDENTSHIPS

An investigation of the use of key performance indicators in the UK construction industry

Sponsor: Sudan University of Science and Technology

Start Date: November 2000

Completion Date: December 2005

Salma Mahmoud

Supervisor: Dr S. Scott

Key Performance Indicators (KPIs) have only recently been developed for the construction industry, following the publication of the Egan report. They are intended to be used to assess the

current state of the UK construction industry, as generation of this information should allow comparison, not only between a company's contracts, but between construction companies and also between the construction industry and other industries. Interview surveys have been completed with local contractors, consultants and clients to determine what use the industry is making of performance indicators and how useful they find the information generated.

Reports: Mahmoud and Scott (2002); Mahmoud and Scott, S. (2005); Mahmoud (2005)

Relating risk to project performance in Indonesian building contracts

Sponsor: TPSDP Project

Start date: August 2002

I Putu Artama Wiguna

Completion date: December 2005

Supervisor: Dr. S. Scott

Construction projects are unique, specific and dynamic, and therefore projects have different levels and combinations of risks, different responses are taken to minimise those risks and different consequences affect project performance. This study set out to analyse the impacts of project risk on project performance. A path model and path analysis were used to determine the relationships between risk and performance. The main survey was predominantly based on a series of interviews with project managers. A total of 22 building projects under construction were surveyed, however, only 13 projects used an 'S' curve to monitor their project performance. The study focused on these 13 projects and found that project risk had a direct negative effect on monthly progress achievement, while monthly progress had a direct positive impact on schedule performance. However, although project risk had no direct effect on schedule performance, this was influenced indirectly with monthly progress as the mediator between them. These findings indicate that the higher the project risk in a project, the greater the negative impact on monthly progress, and consequently the worse the schedule performance will be.

Reports: Wiguna and Scott (2005a and b)

The influence of supply chain management practice on construction site performance

Sponsor: TPSDP Project, ADB Loan

Start date: October 2003

Expected completion date: October 2006

Jati Utomo Dwi Hatmoko

Supervisor: Dr. S. Scott

Many construction processes are beset with problems, e.g. poor controllability, delays, budget overruns, poor quality, etc. Analysis of these problems has shown that a major part of them are supply chain problems, which are originating at the interfaces of different parties or functions. The supply chain network in the construction sector can be very complex and may involve many subcontractors and suppliers for just one project.

There is therefore an opportunity to make significant improvements in construction supply chain performance, which will inevitably improve construction site performance. Current research on supply chain management (SCM) in construction is mainly focusing on issues such as relationships between contractor-subcontractor-supplier, JIT, organisational perspectives on construction processes, SCM mapping and IT. There is however, to date, little hard evidence on SCM practice and its impact on construction site performance. This research will investigate this important area, aiming to increase understanding of the problem and to identify avenues for improvement. The case study work on construction contracts in the Newcastle area has now begun and a simulation model is also being developed.

Reports: None yet available

TRAVEL BEHAVIOUR AND NETWORK MODELLING: PROJECTS

SOLUTIONS (Sustainability of Land Use and Transport in Outer Neighbourhoods) (EPSRC, from April 2004 to December 2007). Dr M.A. Smith, Mr S. Grosso.

Contract holders: Prof J.D. Nelson, Dr N. Thorpe.

SOLUTIONS has as its objective the investigation of socially inclusive, environmentally sustainable and economically efficient patterns of urban settlement. The principal approach will be based on spatial analysis, using a variety of quantitative and qualitative analytical tools. It is centred on three in-depth, multi-disciplinary case studies, to be carried out in Cambridge, London and Tyne and Wear, in partnership with the appropriate local authorities. Spatial economic models are being used to investigate sustainability issues at a strategic level, whilst tools such as sustainability threshold analysis will be utilised at a more local level to evaluate options. Expected results include strategic recommendations for national policy makers and agencies, guidelines for local authorities and urban area stakeholders and area specific recommendations for the participating case study cities. TORG is currently collaborating with local authorities in developing modelling tools and identifying study sites for the Tyne and Wear case study.

Reports: None yet available.

Road Casualty Reduction (Northumbria Safety Camera Partnership, from April 2003 to March 2007)

Contract holder: Dr. N. Thorpe

TORG has been retained by the Northumbria Safety Camera Partnership to act as independent data analysts. This role involves co-ordinating the collection of relevant data for monitoring the partnership's performance in terms of the impact of safety camera activity on road casualty reduction in Northumbria, and providing advice

on key operational issues.

Reports: None yet available

Impacts of Road Safety Cameras on Health Care Provision (Northumbria Safety Camera Partnership, from July 2004 to September 2006) Dr. T.M. Sayers

Contract holder: Dr. N. Thorpe

This project is being undertaken jointly by TORG in collaboration with the Northumbria NHS Trust to quantify the impact that the operation of mobile road safety cameras has had on healthcare provision in the region, in terms of the resources required for the treatment of RTA casualties from mobile camera enforcement locations. Additional activities have involved focus group meetings to explore motorists' attitudes to road safety, excessive and inappropriate vehicle speeds and speed limit enforcement using fixed and mobile camera technology. The representativeness of several of the key attitudes revealed during the analysis of the focus group data will be tested as part of a wider public attitude survey to be administered and analysed in 2006.

Reports: Beard et al (2004)

Modal Split Market Research for Newcastle International Airport (Newcastle International Airport, from July 2005 to April 2006). Mrs. S. Murphy.

Contract holders: Prof J D Nelson, Dr N Thorpe.

This research project has arisen out of a need for Newcastle International Airport to undertake market research to establish the modal choice of visitors to the Airport. For a number of years this research was part-funded and undertaken by Nexus (The Tyne and Wear Passenger Transport Executive). The original survey was an attitudinal questionnaire conducted via face-to-face interview to gather information on where people who are visiting the area are travelling from; how people travelled to the Airport; and the purpose of the visit to the Airport. The surveys have been undertaken within the terminal building and include both people flying from the Airport and those who are not. Members of staff have also been questioned within this survey. The survey has previously been undertaken on a quarterly basis with a sample size of 1750 – 2000 respondents per quarter. This data collection exercise is now to be repeated at two six-monthly periods, September 2005 and March 2006 with a combined target sample of 6,000 questionnaire returns.

Reports: Murphy et al (2006)

Discrete Choice Modelling Applications for Travel Demand in the UK Cities (DICE), (Cathrine Cookson Foundation, from September 2005 to August 2006) Dr D. Dissanayake.

Contract holder: Dr D. Dissanayake.

The aim of the DICE project is to investigate the

travel demand for public and private transport modes in the UK cities. The project has several specific objectives in order to achieve the aim including the development of travel demand models using discrete choice techniques for several UK cities, an investigation of travellers' hidden preferences on mode choice, comparison of the current transport situation in the UK cities, and recommendations on improvements/patronage increase in public transport. The outcome of this project is expected to be incorporated in the transport Masters' programmes in TORG, especially in the travel demand forecasting module.

Reports: None yet available

Sustainable Transport Technologies for Developing Environments (EPSRC, from November 2005 to November 2006). Prof A K Sharma, Dr D Dissanayake and F O Crouch.

Contract holder: Prof J D Nelson.

Most cities in the developing world are in the process of re-engineering, upgrading, modernizing, strengthening, integrating and introducing new alternatives in their cities to meet the future needs of travel. These actions range from introduction of area traffic control, development of interchanges, introduction of high capacity rail transport systems, improved inter-city highways in the short to medium and long range scenarios requiring the application of varying skills and expertise in development, management and operation of efficient transport systems. As a result of a long track-record of collaboration with developing countries and strong links with Professor A K Sharma in the School of Planning and Architecture, Delhi there is an ideal opportunity for the transfer of appropriate expertise from the developed to developing world context and the development of new thinking on what constitutes sustainable technologies for transport in a developing world environment. The objective of this project is thus to refine and redefine progress towards the development of safe and sustainable transport systems in developing environments. The work plan at Newcastle will be focussed on the identification of instruments and good practice for the delivery of sustainable and clean technologies in the development and management of transport systems within the context of improving quality of life in developing environments. Four workshops will be held through 2006 to facilitate production of Guidelines for the Implementation of Sustainable Transport Technologies for the developing world.

Reports: None yet available.

Research into Users' Attitudes To Public Transport Best Value Performance (Darlington Borough Council, from April to September 2005) Dr. T.M. Sayers

Contract-holders: Dr. N. Thorpe and Prof. J.D. Nelson

In May 2005, Darlington Borough Council commissioned the Transport Operations Research Group (TORG) at Newcastle University to undertake a survey of public attitudes to local public transport services in Darlington as part of the Borough's Best Value monitoring review of public transport. The Darlington study was undertaken during May of 2005, involving face-to-face interviews with 410 respondents in various locations in and around Darlington. The final report presents the results and interpretation from the analysis of the data collected.
Reports: Thorpe and Sayers (2005)

Options for and Attitudes to Biometric Templates on Transport Smart Cards (IBF and ISIS International, from June 2002 to August 2005)

Contract holder: Prof. P.T. Blythe

TORG has undertaken a series of studies to examine the use of a biometric template on transport smartcards for anti-fraud and security purposes. Studies have identified the options for making a biometric template and their suitability for operation in various transport environments. Furthermore, a study of public attitudes to biometrics on smartcards has been undertaken which includes questions on preferred and least-preferred biometric methods, where such a template should be stored and to what services end-users would be happy to have access with their template. A follow-up study aimed specifically at assessing views and attitudes regarding a biometric template on a passport are currently underway as is some additional work associated with European Driving Licence biometrics
Reports: Blythe (2005b), Blythe (2005d) and Blythe and Carr (2005)

TRAVEL BEHAVIOUR AND NETWORK MODELLING: RESEARCH STUDENTSHIPS

An Activity-Based Investigation Of Households' Short-Term Responses To Road User Charging

Sponsors: Department for Transport and Newcastle University

Starting date: January 2004

Expected completion date: February 2006

Vincent Chow

Supervisors: Dr. N. Thorpe and Prof J D Nelson

One of the remaining concerns, surrounding the introduction of urban road-user charging, is its impact on households' activity patterns resulting from changes in mobility patterns. Changes in activity patterns could lead to an exodus of activity-centres (such as for retail, employment and housing) to new or existing out-of-town developments (or to competing urban centres) or to a recentralisation and concentration of activities in the city-centre. Many previous studies of the potential impacts of charging have tended to focus on individual trips for estimating

users' willingness-to-pay to continue current mobility before choosing to do something else, such as change mode, route, time of travel and so on. These studies largely ignore the knock-on impacts of these possible behavioural changes on individual and household activity patterns that in turn influence the demand for activities in time and space. To investigate these impacts, travel and activity data were gathered from a sample of households as part of a before-and-after experiment involving a hypothetical morning peak-period cordon-charge in the UK city of Newcastle upon Tyne. The analysis focused on households' short-term responses to the cordon-charge measured in terms of changes in their daily mobility and activity patterns.

Reports: None yet available.

The role of neighbourhood design in transferring travel from private car to public transport, walking and cycling

Sponsor: Self-financed

Starting date: January 2004

Expected completion date: December 2006

Paulus Teguh Aditjandra

Supervisors: Prof. J D Nelson, Dr. C. Mulley

This project aims to understand the extent to which the neighbourhood design could play a role in making people's travel decision and potentially motivate a change in travel behaviour from private car use into public transport use, walking or cycling. The initial stage of this research has led to a selection of current good practices of sustainable mobility, namely more public transport use, a walking and cycling friendly built environment and the production of a theoretical model to explain the relationships of neighbourhood design impact on people's travel. The very reason of looking at sustainable mobility practice is to meet the future demand of settlements which will improve air quality, reduce congestion, and create liveable neighbourhoods. We nowadays live in a private car society, but the growth rate of road traffic is environmentally unsustainable. Thus people may or may not be aware of the extent of the problems created by excessive use of private cars. However, a critique of current practice from the previously successful development before the car age may be the key to understanding how to build for people in the future. A questionnaire has been developed to measure travel patterns, assess built environment characteristics and understands attitudes/preferences towards current perception of settlers of their neighbourhood influence on their travel and the causal relationship between the neighbourhood design and travel behaviour. The results of the questionnaire, in combination with the theoretical model, will be used in predicting travel behaviour in future neighbourhood development.
Reports: Aditjandra (2005)

The relationship between transport accessibility and land value: a local model approach using Tyne and Wear as a case study

Sponsor: Newcastle University, the School, Rees Jeffreys Road Fund, RICS Education Trust, The Henry Lester Trust Ltd, Lincoln Institute of Land Policy and the Chartered Institute of Logistics and Transport

Start Date: October 2002

Expected End Date: October 2006.

Hongbo Du

Supervisor: Dr C Mulley.

In recent years, land value capture has attracted increasing attention as a result of its potential for funding transport infrastructure. It is well acknowledged that transport infrastructure can improve accessibility to employment and amenities thus one might expect that it is the part of improved accessibility that adds value to land. Therefore, the issues in the relationship between transport accessibility and land value rise in connection with the concept of land value capture are the subject of this study.

This study looks at the relationship between transport accessibility and land value with the implication of a local model – Geographically Weighted Regression (GWR). Traditional techniques, such as hedonic models, used to understand the attributes of land value, are global models that could be misleading in examining the spatially varying relationships, such as transport accessibility and land value. Using Tyne and Wear Region, UK as a case study, this research reveals that non-stationarity exists in the relationship between transport accessibility and land value and that transport accessibility may have a positive effect on land value in some areas but in others a negative or no effect. This suggests that a uniform land value capture would be inappropriate as a fiscal policy tool. The use of GWR allows such spatially varying relationships to be revealed leading to a better understanding of the factors determining positive land value uplift and the implications of spatially-dependent transport access premiums in housing values in the context of value capture policies.

Reports: Du, H. (2003); Du, H.; Mulley, C. (2004); Du (2005), Du and Mulley (2005, 2006a, 2006b)

The Potential Effects of Alternative Transport Policies on Commuters Mode Choice in Metropolitan Kuwait

Sponsor: College of Technological Studies, Kuwait

Start date: September 2001

End date: March 2006.

H. AISaeid.

Supervisor: Prof. J. D. Nelson.

Kuwait is a car dominant country. Car represents 97% of commuter's mode choice. In order to achieve a mode choice balance between the only two available modes for commuters' the car and the bus, a package of policy measures has developed. First, to find the most technically feasible policy measures, focus groups have been

utilised. Then to find a combination of these policies that considered being acceptable and effective in terms of the public and the politicians' point of view, a preliminary survey was conducted. The final outcomes of this survey were four policies: road-user charging, physical restrictions on cars, bus priorities and reduced bus fare. To find out to what extent (how well) these measures will be effective in reducing car-use levels several discrete mode choice models (Logit) were developed based on Stated Preference experiment and Revealed Preference data and estimated using ALOGIT software.
Reports: None yet available

Developing the Combined Fluid Analogy and Singly Constrained Gravity Model for Application in Developing Countries.

Sponsor: Technical and Professional Skills Development Sector Project / Asian Developing Bank, Institut Teknologi sepuluh Nopember (ITS), Surabaya, Indonesia
Start date: May 2002
Expected completion date: May 2006
W.Herijanto
Supervisor: Dr. N. Thorpe.

This research aims to enhance the accuracy of the singly constrained gravity model by incorporating principles from fluid analogy theory. The method is based on an iterative process to generate and allocate trips in an origin-destination matrix and involves estimating the number of trips produced by and attracted to individual zones. The deterrence function and the attraction factor embedded within the model plays an important role in the relative attractiveness of each zone, while the fluid analogy method is used to allocate trips between zones. The method is applied to replicate the distribution of trip-lengths to work in the case-study city of Surabaya, Indonesia for a base year (1993) and for a horizon year (2003). The Kolmogorov-Smirnov and chi-square tests indicate that the performance of the combined fluid-analogy and singly constrained gravity model output is better than the conventional singly constrained gravity model in this context.
Reports: Herijanto (2005); Herijanto and Thorpe (2005)

An Integrated Traffic-Air Quality Model for Evaluating Sustainable Urban Policies: Linking Real-time Traffic Information on Air Quality Prediction

Sponsor: School Studentship
Start Date: Nov 2005.
Expected End Date: Oct 2008
Bin Zhang
Supervisor: Dr D. Dissanayake

The aim of this study is to evaluate urban policies, especially congestion charging, introduction of bus lanes, and increasing road capacity, in order to understand its impacts on the environment and its feasibility for successful implementation. Development of an integrated

traffic-air quality model is the foundation of the policy analysis suggested. Firstly, a traffic model will be developed using the VISSIM micro-simulation software to replicate the traffic flows in the road network in a computer-based system. Secondly, the ADMS (Atmospheric Dispersion Model System) software will be used to model the traffic related air pollution. Thirdly, an integrated traffic-air quality model will be developed in order to link real-time traffic information in the study area for air quality prediction. The proposed model will be used finally to evaluate the impact of urban policies for both local and regional levels. It is further expected that this project will provide some important methodological inputs to the local authorities, and consulting and planning organisations who seek a balance between the development of transport systems and a sustainable environment. Tyne and Wear is considered as a case study area in this study.
Reports: None yet available

A multi-criteria decision support method for transport investment proposals

Sponsor: EPSRC
Start date: March 1999
Completion date: March 2005
Tessa Sayers
Supervisor: Dr C. Mulley

The research has developed a decision support method which addresses the problems faced by decision takers in the transport sector today. Their task is to evaluate and rank a number of transport investment options, taking into account many diverse evaluation criteria. An interactive multiple criteria decision support tool, based on the linear additive model, has been developed and trialled. The emphasis is on robustness, transparency, and practicality.

The method uses a linear additive model which requires a weight to be associated with each of the evaluation criteria. This can present difficulties, especially in the case of criteria such as landscape, for which there is no recognised monetary equivalent and whose measurement is on a qualitative scale. In addition, there may be different interest groups taking part in the decision making process, whose views about the relative importance of the criteria may differ substantially. The research approaches the task of finding suitable weights by eliciting acceptable value trade-offs between pairs of criteria. These need not be precise, but may take the form of an unbounded inequality (e.g. 1 unit of x has less value than 2 units of y) or a pair of inequalities, effectively defining a range of acceptable trade-off equivalences. These trade-off preferences are translated into constraints on the values that may be taken by the criterion weights. At each step in the incremental process of defining trade-offs, the weight set under which the option scores are most evenly distributed (i.e. vary as little as possible) is chosen from the set of feasible weight vectors. This avoids introducing unintentional bias between the options and reveals the point at which the scores begin to diverge. The final option ranking may or may not be determined by the trade-offs that have

been gathered. If not, then a further stage ensues in which the rank orders that could result from the feasible weights are investigated and sensitivity analysis is carried out to inform the decision takers of the crucial factors affecting the final outcome.
Reports: Sayers, et al (2002a, 2002b, 2003) Sayers (2005)

Assessing the Casualty Cost of Motorcyclist in Surabaya Indonesia

Sponsor: Technical and Professional Skills Development Sector Project / Asian Developing Bank (ADB), Institut Teknologi sepuluh Nopember (ITS), Surabaya, Indonesia
Start Date: September 2002
Expected End Date: August 2006
H. Widyastuti
Supervisors: Dr. C. Mulley and Dr D. Dissanayake

There are various ways of assessing the cost and impact of road traffic casualties. Willingness-to-pay and Gross Output are the two methods which are usually used to estimate the value of safety. The purpose of this study is to propose a method to estimate the best figure for valuing the motorcyclist casualty cost. To find the best figure, this study looks at evaluation of gross output and willingness-to-pay methods for costing motorcyclist casualties in Surabaya, Indonesia, where the number of motorcycles has grown by an average of 6.25% yearly and correspond with growth of the casualties. In order to obtain a real value that reflects the economic burden of the casualty, a questionnaire survey has been undertaken. The results of both methods have been analysed and compared.
Reports: Widyastuti (2004); Widyastuti and Mulley (2005a, 2005b).

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