Green Logistics-Project Overview

➢***The Green Logistics project aims to explore how we can continuously improve our logistics and transport operations for economic benefit whilst simultaneously ensuring that we look after the environment we live in.***

➢***It aims to challenge and stretch the imaginations and business cases of UK logistics operators and managers through exciting research undertaken jointly by a partnership of universities, industry and Government.***

➢***This new way of thinking will help companies be socially and environmentally responsible whilst improving the bottom line of their activities - 'Green Gold!'.***

Project Objectives

- To integrate previously uncoordinated initiatives and techniques
- To establish the baseline trends again which the success of Green Logistics initiatives can be monitored
- To identify and prioritise Green Logistics measures in terms of potential environmental and economic impact
- To review the range of methodologies currently used and enhance the tool kit available for Green Logistics research
- To find ways of engaging industry, policy makers and other stakeholders in joint Green Logistics initiative
- To develop new analytical approaches of practical benefit to managers and policy makers

The Research Partners

- Individual centres of excellence with expertise across all the relevant research areas
- Cohesion and a track record of successful collaboration
- Closely networked with the transport and logistics industry, professional associations and governmental organisations
- Substantial involvement in international research and collaboration with foreign academics and agencies in the field

Transport for London

EPSRC
Engineering and Physical Sciences Research Council

University of Leeds

Department for Transport

Cardiff University
Prifysgol Caerdydd

University of Southampton

Lancaster University

University of Westminster

Heriot Watt University

WM1: Review of the Sustainability of Freight Transport in Supply Chains

Dr. Andrew Potter

Logistics Systems Dynamics Group
Cardiff University

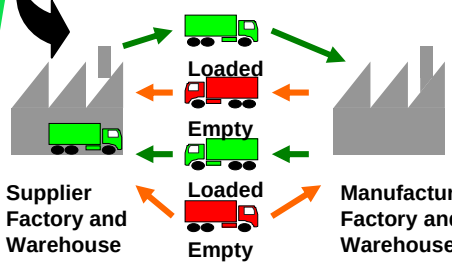
Uncertainty in Supply chain

- Wrong forecasts
- Late delivery
- Poor quality
- Vehicle breakdowns
- Amended orders
- Stale information

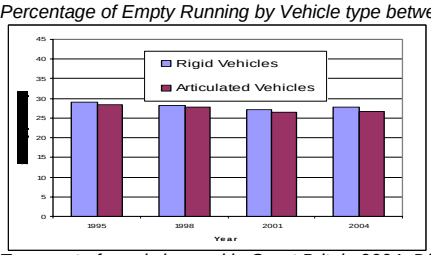
OBJECTIVES

- To review the previous research into the sustainability of freight transport
- To rationalise our understanding of the role of freight transport in the supply chain
- To start the process of developing methodologies and tools to improve our understanding of complex supply chain

TRADITIONAL DISTRIBUTION



Percentage of Empty Running by Vehicle type between 1994 and 2004

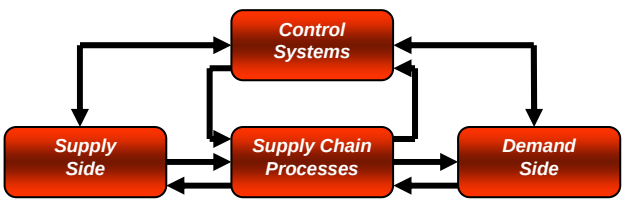


Transport of goods by road in Great Britain 2004- DfT Statistics

WORK PROGRAMME

1. Supply Chain and Transport Literature Review

- Align and extent the SCOR model and Cardiff University Uncertainty Circle framework focusing on green logistics
- Structure the literature review
- Review the literature of transport, supply chain and sustainability



Uncertainty Circles Model (Mason-Jones and Towill 1998)

2. Initial data collection- Focus groups

- Obtain from practitioners and academic experts the realities and opportunities of improvement of the UK transport
- Improve understanding of interactions between freight transport and other supply chain activities.

3. Survey

- Generalise the results of the focus group stage by developing and conducting a quasi-Delphi survey
- Developing a framework which can be used and adapted by subsequent work modules within the work programme

If you would like to participate in the Focus Groups or Survey, please leave your contact details at reception

Work Module 2:

Understanding and Forecasting Business-as-Usual Trends

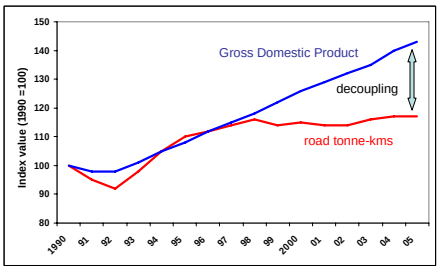
Professor Alan McKinnon
Logistics Research Centre
Heriot-Watt University

OBJECTIVES

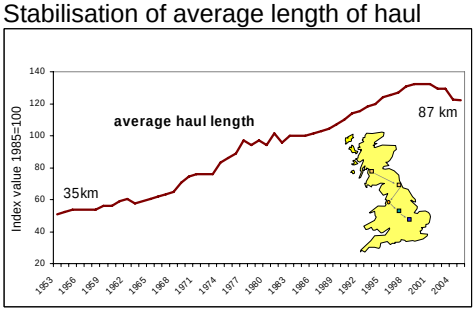
- Analyse business-as-usual trends in a series of key parameters which determine the environmental impact
- Canvas expert opinion on future trends in these parameters
- Construct forecasting models capable of making baseline projections of these parameters

'Greening' trends – how long will they last?

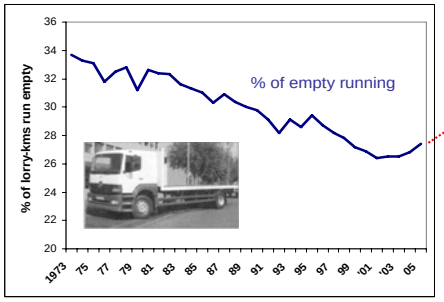
Decoupling of economic growth and road freight traffic growth



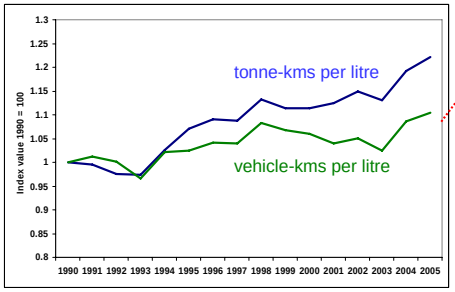
Stabilisation of average length of haul



Decline in the empty running of lorries



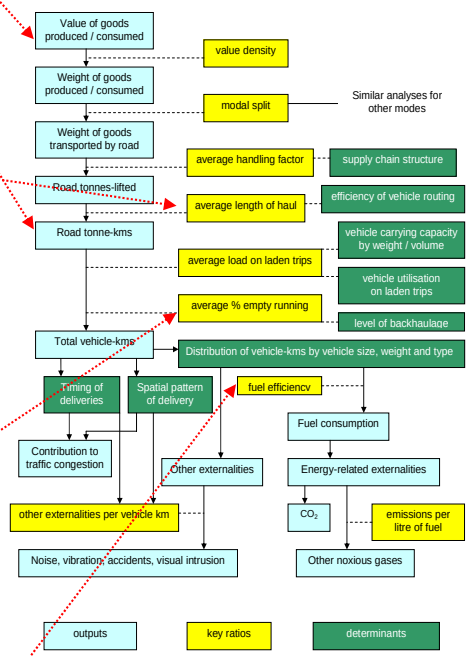
Increasing energy efficiency for road transport



Research Issues:

- Recent breaks in key trends prevents extrapolation
- Discontinuity in statistical time-series
- Need to construct different scenarios
- Reliance on expert judgement
- Exploring inter-relationships between key parameters

Complex inter-relationship between logistical variables and environmental impacts



Methodology

Analysis of government statistics

Delphi survey of expert opinion

Focus group discussions with key stakeholders

Development of forecasting models

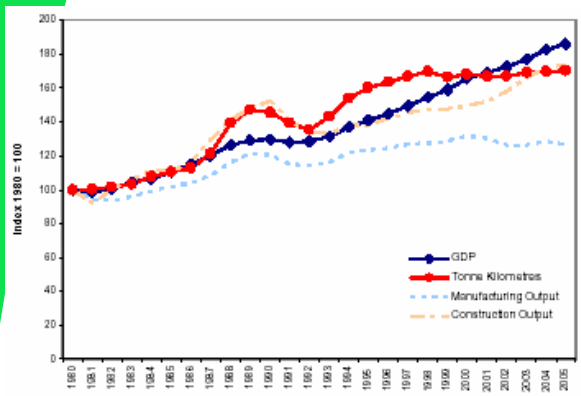
Work module partners:

Cardiff, Lancaster, Leeds, Southampton and Westminster

WM 3: Data management and data collection techniques for sustainable distribution

Professor Mike Browne
Transport Studies Group
University of Westminster

HGV freight and economic growth, 1980-2005



Source: Department for Transport (2006)

OBJECTIVE

- To ensure a consistent, systematic and comprehensive approach to data collection across the different work modules in the overall work programme

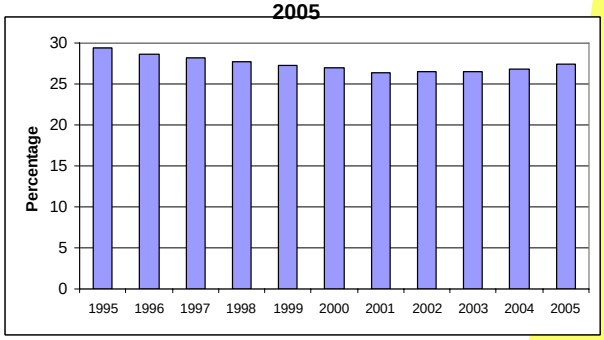
EXPLANATION

- This is a cross-project work module on surveys and other data collection techniques used in project
- It is important due to the following issues regarding freight and distribution data:
- Data is often incomplete and inconsistent
- Differences often occur in the units of measurement used
- Data is often held by many different organisations
- There is a shortage of data necessary for freight modelling

WORK PROGRAMME ACTIVITIES TO INCLUDE:

- Establish Module Management Group to consider data collection across all Work Modules (WMs)
- Consider opportunities to design data collection so that it can be used for more than one WM
- Ensure consistent and comparable performance measurement across all WMs
- Will consider scope for innovative data collection techniques (including vehicle GPS data)
- Data from WMs verified in WM3 and passed to WM12 for inclusion in Virtual Centre

Empty running by goods vehicles over 3.5 tonnes, 1995-2005



Source: Department for Transport (2006)

WM4: Enhanced Econometric Freight and Commercial Vehicle Modelling Techniques

Dr A S Fowkes
Institute of Transport Studies
University of Leeds

This module aims to deliver a range of enhancements to econometric modelling, in order to provide better forecasts of future freight transport volumes and their impacts, in terms of

- *Tonnes lifted*
- *Tonne-kilometres*
- *Vehicle kilometres*
- *Environmental impacts*

resulting from a wide range of sustainability initiatives

Current models

EUNET
GBFM
LEFT
CAST etc

Policies to test include

- Taxation changes
- Road user charges
- DfT Grant regime
- New technologies
- Emissions limits

Dimensions of the models

- Mode, e.g. road or rail?
- Commodity
- Spatial / Geography

Data issues

- Limitations of CSRGT
- Land use data
- Rail freight data

Enhancements to the models

- Improved mode choice
- Generation
- Average length of haul
- Vehicle loading
- Route choice
- Treatment of externalities

Contributing partners

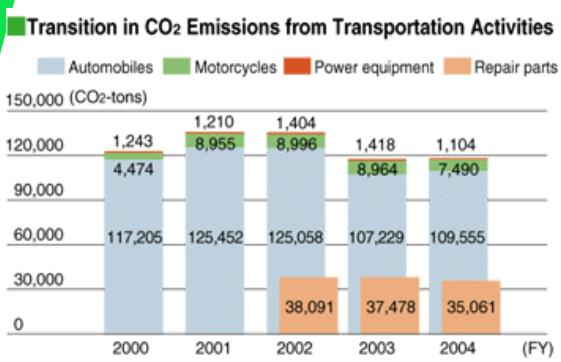
- ITS University of Leeds
- Heriot-Watt University
- MDS Transmodal

WM5: Enhanced Supply Decision Tools

Dr. Christine Mumford
Cardiff School of Computer Science
Cardiff University

Cardiff School of Computer Science (COMSC)

Honda green KPIs worldwide from 2000 to 2004



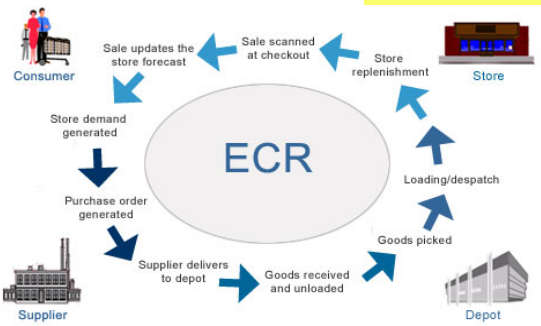
OBJECTIVES

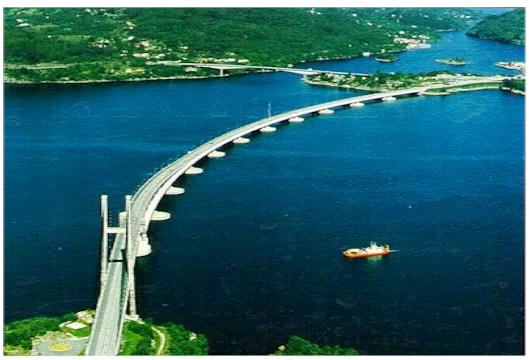
- To develop a set of improved decision tools to help business strategies and policy makers assess the effect of the use of modern supply chain strategies on sustainability KPIs
- To develop a generic framework for this purpose within which such decision tools can be embedded
- To test such decision tools in the light of the latest information and communication technology advances
- To determine the current gaps that need to be filled by decision tools development later in the research programme

WORK PROGRAMME

Methodology

We will evaluate those proprietary tools that are currently available to test future scenarios. The availability of those tools will be identified via a desk based review. The survey conducted in Work Module 1 will also enquire about the current usage of these tools in the UK industry. We will test the tools , ascertain their strengths and weaknesses and examined ways in which they can be improved. Working with partners and government departments we will establish appropriate "real world" change projects within which we can test our framework. This will require the secondment of research staff on government / industry task forces as appropriate. It is envisaged that such secondments will typically be of 6 – 9 months duration the remits of which will be defined by the project stakeholders





Deliverables

- An improved understanding of decisions tools suitable for the assessment of the impact on freight transport use of supply chain re-engineering strategies
- An understanding of what development work on such tools will need be addressed in subsequent work modules

WM6: Integrating Vehicle Routing and Scheduling

Professor Richard Eglese
Lancaster University Management School

Lancaster University MANAGEMENT SCHOOL

OBJECTIVES:

- To refine the tools that companies use to optimise vehicle routing and scheduling by incorporating estimates of the average speeds that can be achieved on particular road links at particular times, given prevailing traffic conditions
- To test this prototype against a range of scenarios
- To examine the opportunities that companies actually have for modifying delivery schedules and the associated logistical cost trade-offs they have to make, particularly in low-inventory supply chains.

WORK PROGRAMME

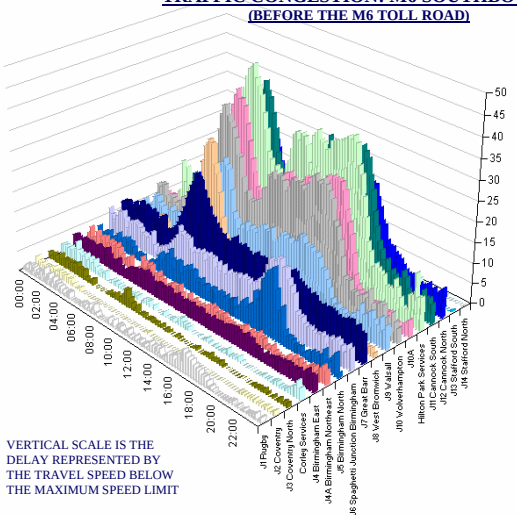
WP 6.1: Measuring the benefits from vehicle routing & scheduling according to expected traffic conditions

- Develop prototype vehicle routing and scheduling software
- Construct a Road Timetable™ using data from ITIS Holdings
- Compare conventional vehicle routing and scheduling with results from the prototype for a range of scenarios
- Use software to evaluate consequences of changed traffic patterns arising from road charging or other initiatives

WP 6.2: Finding the scope for modifying delivery schedules in practice

- Produce sample of companies from different industrial sectors and levels in the supply chain
- Compile process maps for their core operations
- Assess the consequences of varying delivery start and end times
- Estimate the effects of different levels of road user charges

TRAFFIC CONGESTION: M6 SOUTHBOUND
(BEFORE THE M6 TOLL ROAD)



VERTICAL SCALE IS THE DELAY REPRESENTED BY THE TRAVEL SPEED BELOW THE MAXIMUM SPEED LIMIT

SOURCE:

www.itisholdings.com

iTIS Holdings plc

WM 7: Scope for modal shift through fiscal, regulatory and organisational change

Dr Allan Woodburn
Transport Studies Group
University of Westminster

OBJECTIVES

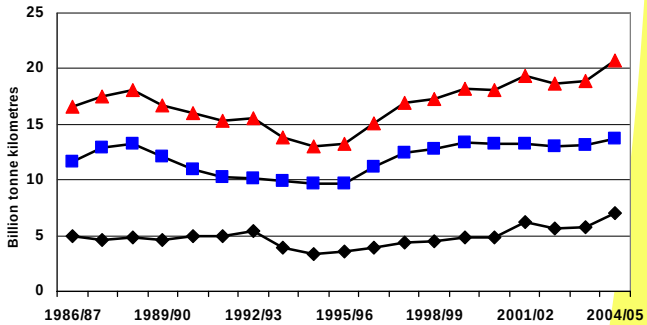
- To identify means by which modal shift (primarily from road to rail transport) can be achieved
- To determine the barriers that currently prevent further modal shift
- To identify how these barriers can be overcome through a range of fiscal, regulatory and organisational changes

WORK PROGRAMME

Understanding current use of non-road modes for freight transport

- Examine existing data on non-road modes
- Identify gaps in current data collection
- Design approaches to fill gaps in current data collection
- Engagement with providers and users of both road and non-road freight services

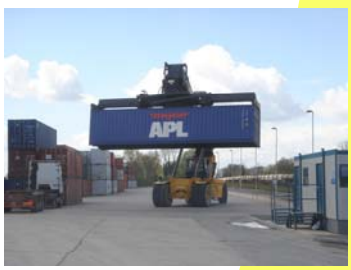
Rail freight volumes in Great Britain, 1985/86 – 2004/05



Source: SRA (2005)

Examine mode choice decision-making in freight transport

- Identify specific sectors of the non-road freight market
- Carry out in-depth case study work to identify the influence of supply chain changes on mode choice
- Analysis of case study findings



Determining scope for modal shift

- Establish a set of indicators to determine the existing efficiency and performance of rail freight operations and to assist with the achievement of modal shift from road
- Evaluate potential policies and actions, including fiscal policies and regulatory changes, to encourage the greater uptake of non-road freight services

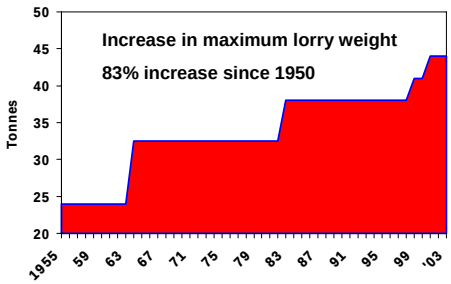
WM8: Improving Vehicle Utilisation in Supply Chains

Professor Alan McKinnon
Logistics Research Centre
Heriot-Watt University

Objectives

- Refine the method of cost-benefit analysis used to measure the economic, social and environmental impacts of changes in vehicle weight and size.
- Review research on the use of larger and heavier trucks in other countries.
- Analyse changes in the statistical distribution of load densities to determine the economic and environmental benefits and costs of higher weight and size limits at a sectoral level.
- Assess the effect of online freight procurement services on freight traffic levels and related externalities.
- Examine the potential environmental benefits of relaxing current order-invoice cycles.

Previous increases in lorry weight – controversial decisions.



No truck with the truckers
TRANSform Scotland
the campaign for sustainable transport

Benefits yielded by the last increase

Estimated savings from increase in maximum weight to 44 tonnes in 2001

	2003	2007
Vehicle kms (million)	134	170
Operating costs (£m)	110	140
Fuel saving (m litres)	51	65
CO_2 ('000 tonnes)	136	173

Higher weights in other EU countries
Sweden 60 tonnes
Netherlands 55 tonnes –trialling 60 tonnes
Denmark 50 tonnes

Should Britain follow their example?

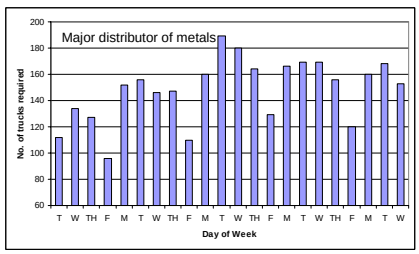
Declining density of freight creating greater need for cubic capacity

Opportunities for increasing height and length

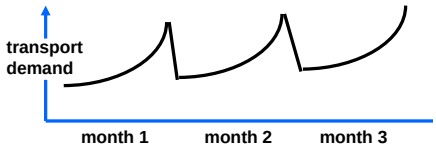
Methodology

- Analysis of unpublished data from the government's main road freight survey and industry partners.
- Survey of lorry operators to investigate operational constraints on vehicle loading, the trend in load densities and the effects of online freight procurement and monthly trading cycles on load factors
- Case studies of manufacturers and retailers to assess benefits of vehicle size / weight increases

Utilisation impaired by instability in the ordering process

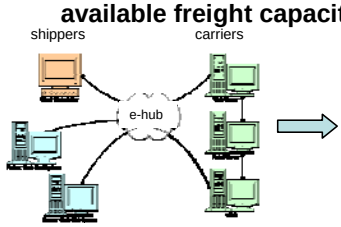


and the monthly order-invoice cycle…



What would be the environmental benefits of relaxing this cycle?

Improved matching of transport demand with available freight capacity through online trading



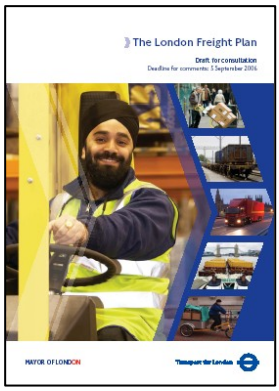
FREIGHT TRADERS

1bn Euro of road haulage transactions per annum

What are the net environmental benefits and costs of the online trading of logistics services?

WM 9: Achieving greater sustainability in the urban distribution operations

Julian Allen
Transport Studies Group
University of Westminster



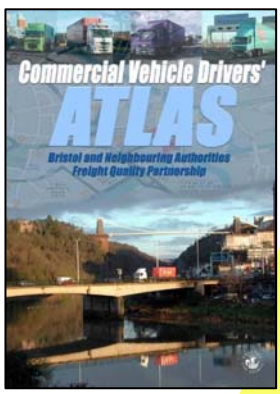
OBJECTIVES

- To achieve a better understanding of the ways in which different industrial sectors make use of freight transport for the provision of goods and services in urban areas
- To understand the issues and difficulties affecting freight transport operators in urban areas
- To consider the effect of potential operational and technological changes to freight transport on the service levels, traffic generation and environmental impacts
- To analyse ways in which the efficiency of the flows of goods and services provided by freight transport could be improved in order to achieve economic and environmental benefits
- Sectors to be studied in the research include: parcels carriers, construction and building, home deliveries, food and non-food transport, waste, and service sectors such as utility and telecommunications companies
- There will be a particular focus on light goods vehicles (LGVs), which are fast growing but relatively under-researched

WORK PROGRAMME

Understanding current freight transport use in urban areas

- Examine existing freight transport data collection exercises
- Identify and fill gaps in current freight transport data collection
- Consultation with companies responsible for urban freight transport activity



Considering likely changes in urban freight transport use

- Carry out industry consultation with freight transport operators and vehicle manufacturers
- Conduct dialogue with central and local government policy makers
- Identify potential innovations in urban freight transport design, use and regulation

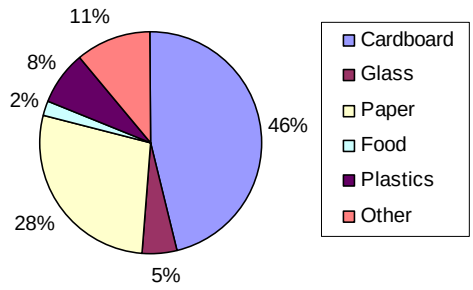
Future patterns of light goods vehicle (LGV) use

- Hold focus group sessions with LGV operators
- Carry out analysis and modelling of future LGV operating patterns in urban areas
- Devise possible approaches to maximise efficiency and reduce the negative social and environmental impacts of LGV use in urban areas

WM10: Integrated Reverse Logistics for Sustainable Urban Waste Management

Dr. Tom Cherrett
Transportation Research Group
University of Southampton

Waste compostion from businesses on Winchester High Street



From a study undertaken as part of the EU MIRACLES project (2005)

OBJECTIVES

- Review the decision processes behind the various transport chains which supply core goods and services to, and collect returns and handle waste products from businesses in urban areas
- Develop a substantial knowledge base providing a fundamental understanding of the environmental and social impacts of these collective supply chain operations
- Determine the ways in which a range of new technologies and operating practices could mitigate the negative environmental and social impacts of current urban distribution systems
- Quantify and appraise the potential impacts of these new technologies and operating practices through a focussed demonstration to enable the effects to be understood for subsequent promotion

WORK PROGRAMME

WP 10.1: Handling returns and collecting waste

- Examine current urban centre reverse logistics
- Engage in wide-ranging consultation with industry and government
- Develop new sustainable supply chain models with fully integrated goods return and waste disposal

WP 10.2: How do supply chain operations interact? Opportunities for improvement through technology

- Sub-projects to help improve the sustainability of urban supply chains
- Investigate conceptual technologies and operational processes
- Evaluate using: analytical processes; simulation; routing and scheduling
- Identify additional scientific advances to further develop these concepts

Winchester City Centre

WP 10.3: Case study demonstration and evaluation

Through a case study in the City of Winchester:

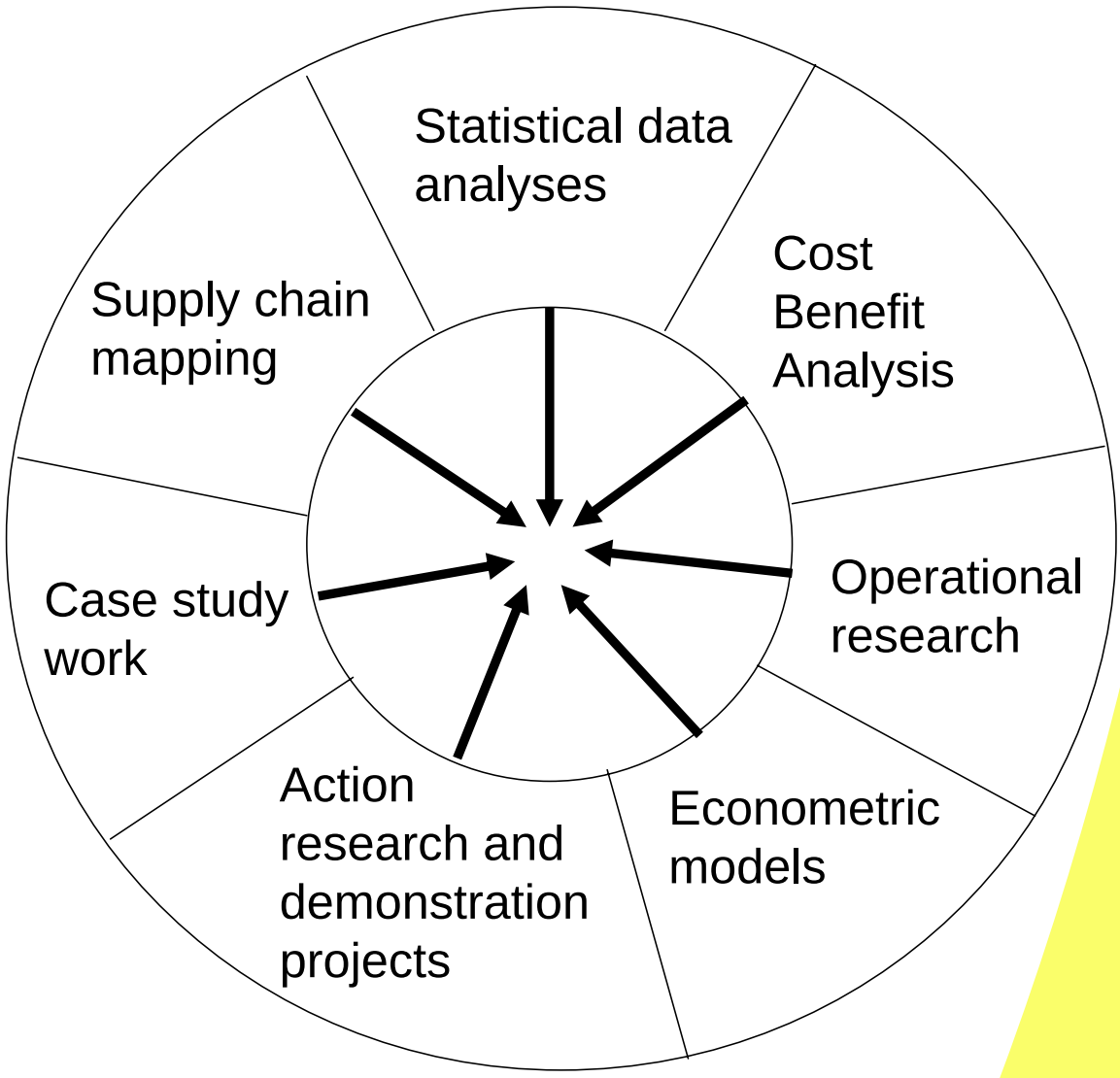
- Create core goods and service vehicle operations databases
- Determine how new technologies and operations could reduce the impact of urban freight traffic involved in core goods return and waste collection

WM11: Integrating the tools of analysis and shaping the holistic evaluation framework

Dr A E Whiteing
Institute of Transport Studies
University of Leeds

This module aims

- *To identify and further develop the most appropriate methodologies for examination of how to improve the sustainability of supply chains*
- *To identify the best ways to integrate these methodologies to create a much more holistic toolkit for use in future research*



WM 12: Establishment of Virtual Centre for Research on Green Logistics

Professor Alan McKinnon
Logistics Research Centre
Heriot-Watt University

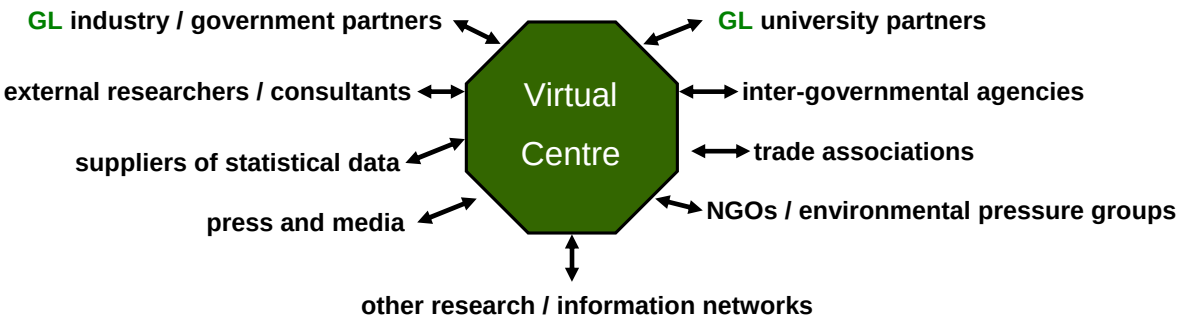
Objectives

- Create a online hub for researchers investigating the effects of logistical activity on the environment.
- Act as an electronic 'clearing house' for relevant statistics and research results
- Facilitate networking between members of the Green Logistics research consortium
- Organise workshops on a range of green logistics issues
- Manage the dissemination of research output from the programme

Where do companies, government officials, journalists, academics and members of the public go if they want information about, for example:

- the environmental effects of freight deliveries
- why so little freight moves by rail
- the 'food miles' issue
- the logistics of waste recycling

The Virtual Centre website will help to satisfy the information needs of these various users



Data Inputs

- Data will be collected from external sources and members of the Green Logistics consortium
- The Centre will have a multi-disciplinary perspective
- The Centre will be proactive in establishing external links and collecting data
- International networking will be used to give the Centre global coverage

Examples of current international research links of Green Logistics consortium universities

EUROPE
University of Leuven, Belgium
Linkoping Inst of Tech, Sweden
TNO and Ecorys, Netherlands
FLUX research centre, Denmark
Tech. Univ of Berlin, Germany
Aarhus School of Business, Denmark
University of Minho, Portugal
NEA, Netherlands
PTV, Germany
INRETS, France

OVERSEAS
Griffin Manufacturing, USA
Supply Chain Visions, USA
Hong Kong Poly-University
Central South University, China
Univ. of Kyoto, Japan