Urban Freight Consolidation Centres
Final Report

by

Prof. Michael Browne, Michael Sweet,
Dr. Allan Woodburn and Julian Allen

Transport Studies Group,
University of Westminster

for the

Department for Transport

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Contact details:
Michael Browne
Transport Studies Group
University of Westminster
35 Marylebone Road
London, NW1 5LS
Tel. 020 7911 5154
Fax 020 7911 5057
E-mail: M.Browne@westminster.ac.uk

EXECUTIVE SUMMARY

Study approach

- The Transport Studies Group (TSG) at the University of Westminster was commissioned by the Department for Transport (DfT) to carry out a scoping study to identify the potential for the development of urban consolidation centres (UCCs).

- UCCs have been subject to much discussion and occasional trials, but to date there has been a lack of evidence-based information upon which potential operators or policy-makers can base decisions as to the viability of such initiatives. This report is intended to assist with the provision and interpretation of that information.

- Broadly speaking the key purpose identified for UCCs is the avoidance of the need for vehicles to deliver part loads into urban centres or other large developments. This objective can be achieved by providing facilities whereby deliveries can be consolidated for subsequent delivery into the area in an appropriate vehicle with a high level of load utilisation.

- The main components of the study have been:
  - a thorough literature review of UCC initiatives
  - analysis of specific examples of different UCC types
  - discussions relating to the concept with a sample of interested supply chain parties
  - preliminary evaluation of different types of consolidation centre, incorporating the development of an evaluation methodology

- For the purposes of this project, a UCC is best described as a logistics facility that is situated in relatively close proximity to the geographic area that it serves, be that a city centre, an entire town or a specific site (e.g. shopping centre), from which consolidated deliveries are carried out within that area. A range of other value-added logistics and retail services can also be provided at the UCC.

Previous UCC analysis

- A large body of literature relating to UCCs has been identified, but much of this omits a comprehensive evaluation that considers the full financial and environmental impacts of a UCC. Many UCC trials and schemes that have since been terminated do not appear to have been subject to published evaluation that quantifies scheme results.

- 67 UCC schemes have been identified where there is evidence of detailed research into the establishment of a UCC, or where trials or operations have taken place. These are mainly in European countries.

- The most commonly quantified impacts are changes in vehicle trips, vehicle kilometres, total fuel consumed and vehicle emissions.

- Most of the published evaluation treats the UCC and its transport and environmental impacts in isolation from total transport activity and its impacts in the urban area concerned. The results indicate that localised improvements in transport activity and associated environmental impacts can be considerable as a result of establishing a UCC. However, at a wider scale traffic reduction and its associated environmental impacts will be less significant.

Key findings and outputs (including elements from the Recommendation section of the report)

- In the right circumstances there are realistic opportunities for UCCs and therefore the concept should be progressed in the areas of greatest potential.

- The report proposes a framework by which the range of UCC types can be appraised, through the establishment of a clear and consistent method of evaluation. This is based upon the identification of the key elements of UCC evaluation, together with the distribution of the costs and benefits between the range of parties involved.

- In order to achieve a more comprehensive evaluation of a UCC development it is desirable to identify and measure both broad indicators such as the impact on upstream logistics activities as well as the more specific indicators such as detailed changes in vehicle operations. The evaluation process needs to:
  - decide upon the boundaries of the analysis
  - collect sufficient "before" data to allow impacts to be observed
  - standardise the data collection between the "before" and "after" phases

- An evaluation model is presented which allows different types of UCC to be assessed and their impacts to be established, both in aggregate and on individual parties involved.

- Analysis of the allocation of the costs and benefits associated with UCCs suggests that it is critical to ensure that the issue is thoroughly examined prior to trying to establish a scheme. Focusing solely on the direct monetary costs associated with a UCC and its operation may lead to a misunderstanding about the potential longer-term benefits.

- A number of generic lessons can be learned from this study:
  - Awareness of the concept and its varied potential applications needs to be increased, as there is considerable lack of knowledge and misunderstanding in both the private and public sectors at present.
  - A clear organisational structure is necessary to lead the development and operation of a UCC, with clear (realistic) objectives required. It appears that some UCC trials have been based on intuition rather than a quantified assessment and as a consequence are never likely to be viable.
  - The resolution of funding and other financial matters, including funding from the EU, central government and local government, are fundamental to the level of success of a UCC.

- In general terms, it appears that UCCs have the greatest prospect for success if they meet one or more of the following criteria:
  - availability of funding, since there is no strong evidence that any truly self-financing schemes yet exist
  - strong public sector involvement in encouraging their use through the regulatory framework
  - significant existing congestion / pollution problems within the area to be served
  - bottom-up pressure from local interests (e.g. retailers in a Street Association)
  - locations with a single manager/landlord

- From the evidence available, UCCs are most likely to be successful in situations similar to those detailed below:
  - specific and clearly defined geographical areas where there are delivery-related problems

- town centres that are undergoing a "retailing renaissance"
- historic town centres and districts that are suffering from delivery traffic congestion
- new and large retail or commercial developments (both in and out of town)
- major construction sites

- The work carried out in this project suggests that, from a logistics perspective, the major potential beneficiaries from the establishment of UCCs would be:
  - transport operators making small, multi-drop deliveries
  - shared-user distribution operations
  - businesses located in an environment where there are particular constraints on delivery operations (e.g. limited access conditions – physical or time related)
  - independent and smaller retail companies

- The traditional concept of a transhipment centre, with loads transferred into smaller vehicles, has generally not succeeded. Recent developments, with the main focus on improving vehicle utilisation and integrating the operation into the supply chain, seem to offer more potential.

- There is a need for further investigation into the total supply chain costs and benefits associated with the use of UCCs. The traffic and environmental benefits associated with UCCs that are not reflected in existing pricing mechanisms need to be included in this work.

CONTENTS

1. INTRODUCTION

1.1 Background

This project was commissioned by the Department for Transport (DfT). It has been carried out between December 2004 and June 2005 by the Transport Studies Group (TSG) at the University of Westminster by a project team consisting of Professor Michael Browne, Michael Sweet, Dr Allan Woodburn and Julian Allen.

The project has essentially consisted of a scoping study to identify the potential for the development of urban consolidation centres (UCCs) that have as their principal objective the alleviation of local environmental and traffic concerns in urban areas. It is also concerned with the wider business and supply chain issues. UCCs have been subject to much discussion and the occasional trial, but to date there has been a lack of evidence-based information upon which potential operators, be they logistics providers or local authorities, can base decisions as to the viability of such initiatives. This report is intended to assist with the provision and interpretation of that information, to highlight where additional investigation is required in order to further develop the extent of understanding of the role for consolidation centres, and to identify opportunities for establishing UCCs.

Broadly speaking the key purpose identified for UCCs is the avoidance of the need for vehicles to deliver part loads into urban centres. This objective can be achieved by providing facilities whereby deliveries (retail, office, residential or construction) can be consolidated for subsequent delivery into the urban area in an appropriate vehicle with a high level of load utilisation.

1.2 Project objectives and research approach

The specific project objectives have been to:

- Review existing literature on consolidation in the United Kingdom and elsewhere.
- Investigate different types of consolidation practice, considering both the business and environmental case for each.
- Obtain the views of a sample of supply chain parties and local authorities on the appropriateness of different types of UCCs and their impacts.
- Carry out a preliminary evaluation of the situations in which each type of urban consolidation centre considered is likely to be most appropriate and to make comparisons between the strengths and weaknesses of different types of UCCs.

Task 1 identified and examined the existing literature about UCCs, and urban consolidation in more general terms. Searches for relevant literature covered academic journals, public sector documents and industry publications from the United Kingdom and elsewhere. In this task specific consolidation centre research, trials and schemes that have been referred to in the literature were also identified and an attempt made to record consistently the available data relating to each of them. Additionally, the literature review has provided an important input to the evaluation task (Task 4). Detailed outputs from the literature review can be found in Appendix 1 (details of each piece of literature) and Appendix 2 (data sheets relating to specific proposals, trials and schemes). Finally, contact lists and checklists for Tasks 2 & 3 were also developed as part of Task 1.

In **Task 2**, existing UCCs for urban areas in the UK and elsewhere in Europe were studied. This review and summary assessment of scope and practices related to UCCs for urban areas including: commercially-operated and publicly-supported UCCs (e.g. Broadmead in Bristol), site-specific UCCs for airports and shopping centres (e.g. Heathrow Airport and Meadowhall shopping centre), co-operative city logistics schemes (e.g. schemes in German cities), and community collection and delivery points.

Site visits and information collection were carried out in the case of urban consolidation schemes and trials in the United Kingdom. In the case of UCCs based outside of the United Kingdom, such as the schemes in German cities, use has been made of published material and contacts rather than making visits to these countries.

Task 3 involved investigating the views of different interested parties regarding consolidation schemes. These parties were selected from: freight transport and logistics operators (both those currently involved in different types of consolidation schemes and those not), receivers and shippers of goods in urban areas, local government/policy makers with transport responsibilities.

Issues addressed during the interviews with the sample of respondents included their views about the appropriateness of different types of consolidation systems with respect to factors such as product types , supply chain organisation, type of receiver, geography/location of delivery point, suitable types of vehicle, appropriate traffic regulations / restrictions, and localities suitable for UCCs.

Respondents' views were sought on the likely effects of consolidation schemes on: supply chain operations (including efficiency and security), supply chain costs, transport intensity, and environmental impacts.

Based on the findings of Tasks 1 to 3, a preliminary evaluation of UCCs was carried out in **Task 4**. This evaluation process sought to review the evaluation approach applied in urban consolidation research described in the literature, together with consideration of how this evaluation work should ideally be carried out, as well as to indicate the conditions in which UCCs are likely to be most effective.

Finally, **Task 5** has involved the preparation of this report.

1.3 Structure of the report

For reasons of clarity, and to avoid undue repetition, the report is not structured wholly in line with the individual tasks. In Chapter 2, the main issues from the previous literature are synthesised in accordance with the key questions addressed. Chapter 3 reviews UCC feasibility studies, trials and on-going schemes. It also addresses ways in which UCCs can be classified, and discusses the evaluation work that has taken place in trials and on-going UCC schemes, together with examples of the quantified results of this evaluation.

Chapter 4 develops an evaluation methodology that attempts to more fully identify the costs and benefits of such schemes, as well as to further the understanding of how these costs and benefits are distributed amongst the parties involved. Chapter 5 presents the study's conclusions, drawing out the factors influencing the relative success or failure of those schemes either still in existence or which have ceased, the barriers to the successful implementation of UCCs, and policy considerations relating to the implementation of such centres. Chapter 6 contains the our recommendations both in terms of UCC policy considerations, and future UCC scheme development, as well as future research required.

2. SYNTHESIS OF KEY ISSUES

2.1 Introduction

In this chapter, the general issues from the literature relating to UCCs are summarised in relation to the five key questions identified in Task 1:

- What is meant by UCCs and what definitions are applied?
- How do UCCs work?
- What are the advantages and disadvantages of UCCs?
- What impacts do UCCs have on transport operations (upstream and downstream)?
- What impacts do UCCs have on other supply chain activities?

The chapter does not consider details of specific schemes: these are dealt with in subsequent chapters. Instead, it defines the scope of UCCs and summarises the development of the concept over the last few decades. As has already been mentioned, in excess of 120 documents have been identified in the literature review. These are not referred to individually within this chapter, which is intended as a synthesis of the main issues contained in this large body of literature.

2.2 Definitions of urban consolidation centres

It is apparent from the literature that the consolidation centre concept means different things to different people, and much of the literature does not actually provide a definition for the concept(s) under discussion. Elsewhere, in addition to differences in definition over time and between countries, there are variations between the definitions of specific active schemes or proposals. While the definitions are often vague or ambiguous, making classification difficult, it is perhaps appropriate to view the consolidation centre concept as a range of potential applications along a spectrum dependent upon the split of involvement (or control) of the public and private sectors, with the range of terms used to refer to the UCC concept including:

- public distribution depot
- central goods sorting point
- urban transhipment centre
- shared-user urban transhipment depot
- freight platforms
- cooperative delivery system
- consolidation centre (sometimes specific, e.g. retail, construction)
- urban distribution centre
- city logistics (or city logistik) schemes
- logistics centre
- pick-up drop-off location
- offsite logistics support concept

This list is only indicative and while there tends to be a progression from public to private sector control, this is not always the case. The bulk of the older literature on transhipment centres (and similar public sector driven initiatives) can be said to focus on “the traditional break-bulk form of transhipment being implemented at an urban level on a communal, shared-user basis”, with much attention devoted to the use of small vehicles for the urban distribution (McKinnon, 1998).

In contrast, much of the literature since the late-1990s talks of UCCs, which are generally seen to be more flexible and involve break-bulk, transhipment and groupage, often with a focus on maximising vehicle loads and with a far greater role for the private sector.

In addition, there are similarities between UCCs and other operations, such as neighbourhood collection points for home deliveries, intermodal terminals, traditional retailer distribution centres, and express parcels hubs. This study concerns itself only with physical centres where consolidation-type activities take place and where the facility is shared-user in some sense, for example more than one logistics service provider delivering goods to the UCC or more than one business receiving goods from the UCC. This therefore excludes off-site stockrooms operated by department stores (as there is only one receiver in this case), and parcels carriers' urban depots (as all the goods delivered to the depot are transported by the parcel carrier rather than other logistics companies).

For the purposes of this project, a UCC is best described as a logistics facility that is situated in relatively close proximity to the geographic area that it serves be that a city centre, an entire town or a specific site (e.g. shopping centre), from which consolidated deliveries are carried out within that area. A range of other value-added logistics and retail services can also be provided at the UCC. Logistics companies with deliveries scheduled for the urban area or site are able to transfer their loads at the UCC and thereby avoid entering the congested area. The UCC operator sorts and consolidates the loads from a number of logistics companies and delivers them, often on environmentally friendly vehicles, to an agreed delivery pattern.

2.3 Factors influencing the nature of a UCC

Factors influencing the nature of a UCC that have been identified in the literature include:

- objectives of the UCC: a UCC can have either a single or multiple objectives which can include:
  - reducing road freight traffic levels (reducing goods vehicle movements in the urban area through improved consolidation or modal shift)
  - altering road goods vehicle types used (e.g. fewer light or heavy goods vehicles)
  - reducing the environmental impacts associated with goods vehicle activity (i.e. through reduction in total trips and/or greater use of environmentally-friendly vehicles)
  - improving the efficiency of urban freight transport operations (through improved load factor, and the need for fewer deliveries)
  - reducing the need for goods storage and logistics activities at urban premises which could result in improved turnover (through offering storage facilities at the CC, as well as other value added services)
- location of centre(s): in particular their proximity to the area served
- spatial coverage of the UCC: the extent of the urban area that is covered can vary between UCC schemes from a single site up to an entire urban area
- range and type of products handled
- transport modes utilised
- range of additional activities provided
- flexibility of operations, for example fixed delivery schedules or on demand
- ownership and operation of consolidation centre(s), for example whether public or private, and single operator or joint venture
- finance issues, particularly the nature of any financial support
- responsibility for transport operations, for example the same provider as the operator of centre or a separate transport arrangement, and whether it is a monopolistic or competitive operation
- degree of permanency of the centre and its operations
- role of local authorities and other public sector bodies
- compulsory or voluntary: a UCC can be operated on a voluntary basis in which users decide whether or not they want their deliveries to flow via the UCC. Alternatively, a UCC can be compulsory (either on a 24 hour basis or at particular times during the day) and goods must be delivered via the UCC rather than direct to the receiver's premises
- whether a freestanding initiative or incorporated into the wider policy and regulatory framework of an urban area or region

Many of these factors, and the options available within each factor, that influence the nature of a UCC are shown in Table 2.1.

The issues raised above will be examined again later in the report, in the context of evaluating existing consolidation centre schemes and assessing the future role for the concept.

2.4 General advantages and disadvantages

With such a large body of literature having been reviewed, a large number both of positive and negative issues about UCCs have been identified. This section raises the main ones.

The key advantages are:

- environmental and social benefits resulting from more efficient and less intrusive transport operations within urban areas
- better planning and implementation of logistics operation, with opportunity to introduce new information systems at same time as consolidation centre
- better inventory control, product availability and customer service
- can facilitate a switch from push to pull logistics through better control and visibility of the supply chain
- potential to link in with wider policy and regulatory initiatives
- theoretical cost benefits from contracting out "last mile"
- public relations benefits for participants
- potential to allow better use of resources at delivery locations
- specific transport advantages
- opportunity for carrying out value-added activities

The key disadvantages that have been identified are:

- potentially high set up costs (and sometimes high operating costs)
- much urban freight is already consolidated at the intra-company level or by parcels carriers, so limited benefits (or even negative consequences) for trying to channel these flows through a consolidation centre. The potential scope for UCCs may therefore be limited
- difficult for a single centre to be able to handle the wide range of goods moving in and out of an urban area, for example due to different handling and storage requirements
- most studies report an increase in delivery costs due to an additional stage in supply chain which imposes a cost (and often a time) penalty, though this clearly depends on how well the centre is integrated into the supply chain and the extent to which all costs and benefits are considered
- a single consolidation centre for an urban area is unlikely to be attractive for many suppliers' flows due to the degree of diversion required from normal route (and may therefore negate transport savings for onward distribution)
- lack of enforcement of regulations for vehicles not included in the consolidation scheme
- organisational and contractual problems often limit effectiveness
- potential to create monopolistic situations, thus eliminating competition and perhaps leading to legal issues
- loss of the direct interface between suppliers and customers

It should be noted that, in many cases, these advantages and disadvantages are not backed up with evidence, but the ones shown here are those that feature most frequently in the literature.

Table 2.1: Factors influencing the nature of a UCC

Objective of CC	Product types handled	If food handled	Services offered	Geographical coverage	Distance from CC to delivery area	Ownership	Operation (1)	Operation (2)	Regulation about use	Duration (life of CC)	Goods vehicles used from CC (1)	Goods vehicles used from CC (2)	Transport modes used
Reduce goods vehicle contribution to congestion (trips &/or km)	Retail	Ambient	Consolidated delivery (CD)	Single site	Short distance	Public sector	Public sector	Single operator	Voluntary	Temporary	Conventionally powered	Only large goods vehicles	Road
Reduce air pollution from goods vehicles	Special (e.g. construction)	Chilled	Stockholding (S) + CD	District	Medium distance	Private sector	Private sector	Multiple operators	Compulsory	Permanent	Alternatively powered	Only small goods vehicles	Rail
Improve delivery security/ reliability		Frozen	Value added services + S + CD (e.g. pre-retail, returns, inventory management)	Entire town/city	Long distance	Public-private partnership						Mix of goods vehicles	Water
Improve economic performance/ Efficiency of receiving premises													

2.5 Impacts on transport operations

While one of the primary reasons for considering the implementation of a consolidation centre is the potential to reduce transport impacts within the area of operation, there is little in the literature that provides quantification of the actual transport impacts. Certain schemes, referred to later, have attempted to identify the detailed effects, but the evidence is largely anecdotal and limited in scope and with little explanation of the methodology used to calculate any impacts. A number of studies have claimed that vehicle trips and/or vehicle kilometres have been reduced by 30 to 80 per cent for those flows that switch to using a consolidation centre. As a result of generally low uptake, however, the wider reductions in freight movements within the study areas seems to be 1 per cent or less, and some of the literature reports no measurable change in overall transport activity. This is an issue that is explored in greater detail later in this report, in the context of the analysis of specific schemes (see Section 3.3).

In general terms, the literature suggests that the use of a consolidation centre can potentially result in substantial transport benefits, though clearly dependent upon the level of uptake and the nature of the scheme. The main benefits that feature include the following:

- reductions in the number of vehicle trips
- reductions in the number of vehicle kilometres
- better vehicle and driver utilisation for suppliers as a result of quicker turnarounds (and a potential reduction in the number of drop locations) and for deliveries through easier access to loading and unloading facilities at drop locations
- improvements in volume/weight utilisation rates for vehicles on deliveries from the centre (and potentially for inward flows from suppliers too), thereby reducing the unit costs of transportation for the final delivery stage
- fewer vehicles required within the area served by the consolidation centre
- the ability to separate trunk movements from local deliveries, making the use of alternative modes and vehicle types more feasible (e.g. environmentally friendly vehicles such as bikes or electric vans within the urban area, and rail for trunk movements into the consolidation centre)
- ease of access for suppliers to drop-off goods, reducing the time spent driving to the delivery address and accessing the point of delivery by the driver, who may only have a small quantity or a single item to deliver in any case
- opportunities for revenue earning return loads

2.6 Impacts on other supply chain activities

With some notable exceptions, mainly in relation to specific schemes, the wider supply chain implications are generally not explored in detail within the literature identified. No comprehensive investigation of wider supply chain impacts has been found in any of the literature. However, there is discussion in some of the literature of additional supply chain activities that are (or can be) provided in addition to the standard consolidation-type activities, and their potential impacts are identified in this section.

Inventory control and associated activities

One potential additional use for a UCC is stockholding, subject to available capacity and appropriate storage conditions for the products involved. In the main, only short-term storage tends to be envisaged, providing a useful local buffer stock that can be called off quickly when needed, thus reducing delivery lead times and improving product availability and customer service. Of course, for maximum benefit this depends on the centre offering the flexibility for quick call-off of product as

required. For certain products or customers, seasonal or peak storage can sensibly be provided by a consolidation centre so as to provide valuable additional space.

In addition there are other activities that can be provided, mainly in the context of retail UCCs but perhaps also for other types of centre. Inventory monitoring and information collection and analysis, linked to in-store systems, can be provided. This can increase the visibility of the supply chain, again leading to better availability and service levels, as well as reducing loss of stock. Product quality and quantity checking can be carried out upon consignments' arrival at the centre, giving advance notice to the customer of any problems with supplies. Various pre-retailing activities, such as consignment unpacking, preparation of products for display and price labelling, can also be carried out at the consolidation centre to reduce time and space requirements upon delivery.

Impacts at the delivery location

As a result of the services that can be offered by a consolidation centre, space at the delivery location can be freed up for other activities that are more productive or profitable, such as retailing floor space or construction areas, which is likely to be particularly beneficial when space is at a premium or expansion is desirable. By removing stockholding from, say, a retail outlet and instead holding the stock at a local consolidation centre space can be freed-up at the shop for additional retailing footage. The same argument also applies to construction consolidation and building sites.

If the UCC offers an enhanced delivery service, with more flexible and reliable delivery times, higher product or component availability may be achieved and, ultimately, sales volume or site productivity may be increased. Fewer deliveries to the destination may be required as a result of the load consolidation undertaken at the centre, thereby reducing the disruption and labour requirements associated with receiving multiple deliveries, leading to improvements in staff planning and productivity at delivery locations.

Impacts for suppliers and logistics companies

Deliveries to well-equipped UCCs at more flexible times (potentially 24 hours per day, seven days per week), and with staff available to receive the consignment, and without the problems of delivery restrictions or congested loading bays that are found in many urban locations, should be attractive to those responsible for delivering the goods inwards. In some cases, the number of locations that a supplier has to deliver to may reduce, since a particular consolidation centre could be serving more than one customer location. In a broader sense, there may be some potential to help overcome skills shortages within the transport and related sectors (e.g. construction) through more efficient methods of working.

Product flow

UCCs have a role in the handling of return and recycling flows, including product returns and the coordination of waste and packaging collection for reuse or recycling, instead of individual customers having to deal with this. As regulations in this area tighten, such coordinated approaches may offer greater benefits over time. Such centres may also offer a new distribution channel which, as a result of a consolidation centre serving multiple customers, may offer opportunities to smaller suppliers to access new markets that are currently beyond their reach. Finally, centres may be in a position to offer B2B (business-to-business) and B2C (business-to-customer) services within their catchment area, perhaps including inter-store transfers, home delivery or customer collection of products purchased in town or by mail order.

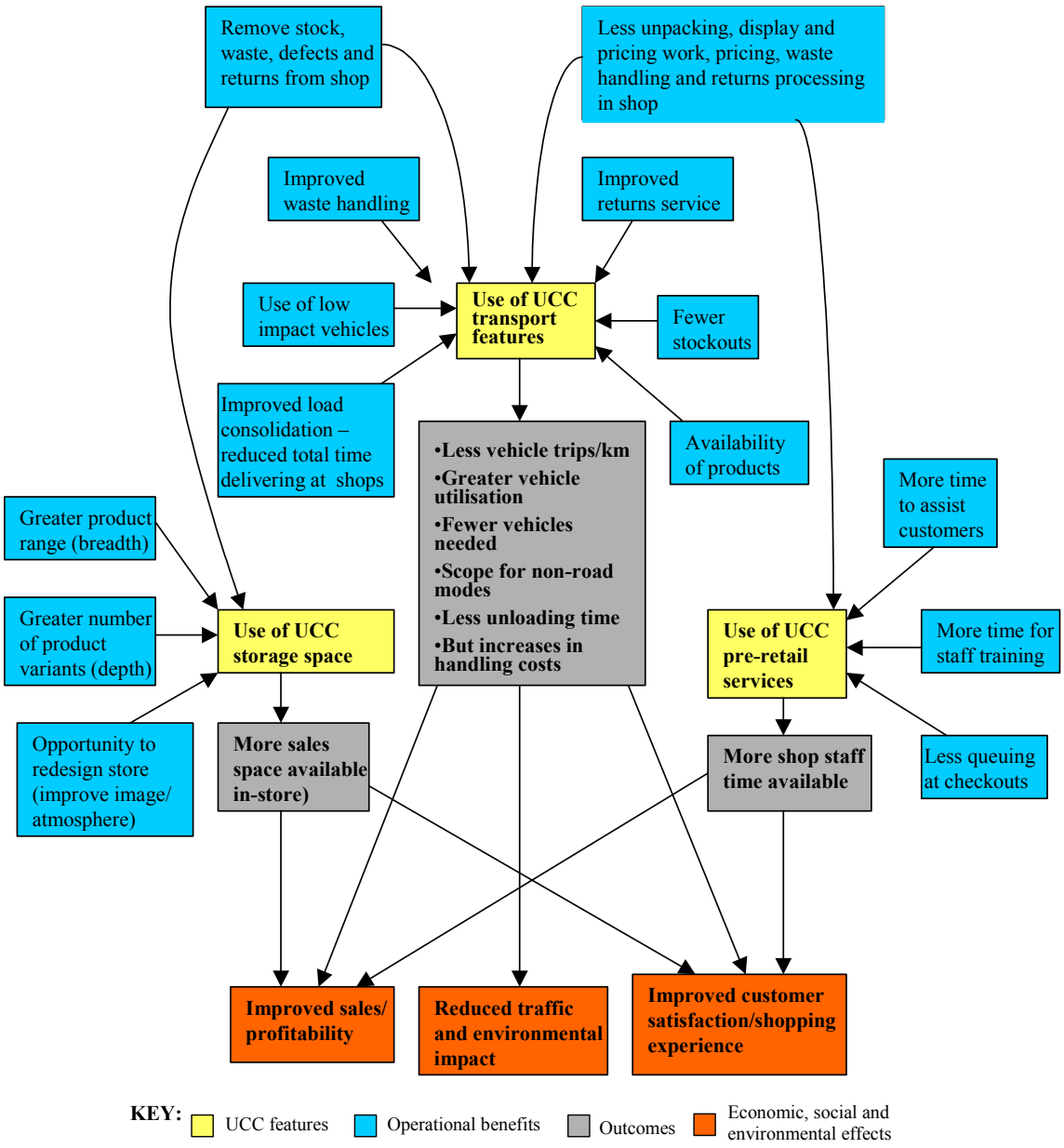
Overview

In general terms, there is some evidence from the literature that UCCs can offer the potential to improve the management of the supply chain. Figure 2.1 illustrates the range of logistics and pre-retail activities that can be carried out by a UCC and the potential benefits of these activities. If UCCs can be used to improve supply chain management this may lead to reductions in supply chain costs and improvements in service quality, though it is by no means certain that these outcomes will result from the adoption of the concept. It is perhaps surprising that many of the consolidation centre examples identified in the literature review do not appear to have paid much attention to the impacts on the wider supply chain, though this may result from the complex nature of many supply chains and the involvement of numerous different parties, thus making it difficult to identify and allocate benefits.

The organisational and contractual problems identified earlier seem to be major supply chain barriers, as does the desire for companies to maintain competitive advantage rather than share expertise and systems. Problems relating to loss of control suffered by shippers of goods are also highlighted. Indeed, the counter arguments of additional costs, extra product handling and poorer service standards also feature in the literature, particularly with reference to the public sector schemes that were concerned with environmental and social improvements rather than better supply chain performance.

It is only in some of the more recent literature, particularly relating to the more "commercial" schemes in the United Kingdom and elsewhere, that attention has been paid to the potential total supply chain benefits, as a result of greater effort being devoted to integrating the centres into the supply chain. Even then, the impacts are generally only identified towards the end of the supply chain, with little attention being devoted to what happens further upstream.

Figure 2.1: Range of potential logistics and pre-retail activities at UCC and possible benefits



2.7 Conclusion

UCCs can be used to reduce or eliminate the number of large goods vehicles entering a particular urban area. Conversely, UCCs can be used to reduce or eliminate the number of small goods vehicles entering an urban area. The key issue seems to be that available capacity is used to its maximum, so as to achieve both economic and environmental benefits. From an economic perspective consolidation can help to:

- increase the volume of goods carried on vehicles entering a given urban area, thereby reducing the unit costs of transportation for the final delivery stage
- reduce the number of deliveries that have to be received at a location
- reduce the time spent driving to the delivery address and accessing the point of delivery by the driver

Additionally, retail UCCs in particular can be used to reduce the time it takes to replenish stock and thereby help to reduce out-of-stock situations. They can also perform a range of other activities such as unpacking, preparing products for display, pricing, waste removal, and product returns thereby removing the need for these tasks to be performed in the store.

From an environmental and quality of life perspective, UCCs can help to:

- reduce the number of unsuitable goods vehicles and possibly the total number of vehicles operating in the urban area
- improve the lading factor and empty running of goods vehicles thereby reducing vehicle movements and distance travelled
- reduce the fuel consumed and hence vehicle emissions and noise generation in delivering goods
- offer the opportunity to operate environmentally sensitive vehicles on the final leg of the urban supply chain
- make the area more pedestrian-friendly

However, these potential benefits have to be weighed against the potential costs associated with consolidation that can include:

- capital and operating costs of UCCs
- an additional handling stage in the supply chain
- security, liability and customer service issues associated with additional companies handling goods.

3. APPRAISAL OF URBAN CONSOLIDATION CENTRE SCHEMES

3.1 Introduction

This chapter is based on the literature review carried out. It discusses the number and status of UCC schemes identified in the literature (Section 3.2), and presents UCC classification schemes previously used together with our classification for UCCs (Section 3.3). The final Section of the Chapter (3.4) reviews published work that contains quantification of the financial, transport and environmental impacts of UCCs that have been set up. It comprises discussion of the impacts that have been quantified in these previous studies, and presents the results of these evaluation exercises for selected schemes.

3.2 Detailed review of UCC schemes

The detailed review of the documents that formed the basis of the desk research has identified 100 localities / schemes where there is evidence of consideration, or more detailed interest, being given to the establishment of a UCC. Excluded from this list are instances where a locality was seeking to improve its urban traffic scheme by measures other than UCCs (e.g. improved traffic control and regulation; a new approach to parking bays; purely transport led schemes such as the Vienna city courier system and the use of electric vehicles).

Within these 100 localities / schemes there are 33 that are reported as little more than as a reference to the possibility of establishing a UCC and have had no identifiable work carried out on them. These are listed in Table A2.2 in Appendix 2.

Of the remaining 67 schemes that involved work being undertaken on them these can be placed in one of three categories:

- Research projects / feasibility studies
- Trials / pilots
- Operational schemes

These 67 schemes are reported on individually in Appendix 2 of the report.

What has been particularly difficult while undertaking this research is that the documentary records of all the schemes are, in the main, quite inadequate for the purpose of tracking the commencement, progress, results and current status of the schemes. In particular it has proved very difficult to identify start dates with any precision and even more difficult to determine when, or if, a trial was concluded. As a result many of the dates used should be considered as indicative rather than absolute. To add to the difficulty, a large number of the schemes have ceased being reported following the research or trial phase which suggests that the initial enthusiasm that was associated with the launch of many of the schemes, especially in Germany, France and the Netherlands, soon evaporated. However, it does seem reasonable to assume that those trials that proved to be successful and worth extending are the ones that have received the greatest attention from both the academic and commercial press, whereas those that are no longer mentioned have been terminated. With particular reference to the numerous schemes and trials that were undertaken in Germany, Köhler and Groke (2003) state that approximately 200 schemes were either planned or carried out. Flämig (2004) has estimated that less than 15 schemes were still in existence by the end of 2002, and Klaus (2005) has even more recently stated that all of the German schemes have (more or less) been aborted. By comparison, Nobel (2005) has reported that 5 schemes are still operating in 2005, namely Aachen, Bremen, Essen, Frankfurt am Main, and Regensburg. In addition, Nuremburg is still operating (but this has become just a parcels consolidation and delivery service operated by DPD). That said, there are examples of success, often where the main driver of the scheme has been a single commercial enterprise rather than a “co-

operative" of local authorities, transport companies and consignees all of whom tend to have conflicting objectives and financial goals.

Tables 3.1 to 3.4 provide an analysis of the 67 schemes about which more than the most basic information is available. These UCC schemes date from the 1970s onwards.

Table 3.1: Analysis of Schemes by Country and Category

Country	Total	Research / Feasibility	Pilot / Trial	Operational
Austria	1	1	-	-
Belgium	1	1	-	-
Canada	1	1	-	-
France	8	5	2	1
Germany	14	1	2	11
Italy	5	-	2	3
Japan	3	-	2	1
Monaco	1	-	-	1
Netherlands	7	3	-	4
Portugal	1	-	1	-
Spain	1	-	-	1
Sweden	4	1	1	2
Switzerland	2	-	2	-
United Kingdom	17	12	1	4
U.S.A.	1	1	-	-
Total	67	26	13	28

Notes:
1. The "operational" schemes include any that extended beyond the trial stage.
2. In the Netherlands Leiden had both a study and an operation and Maastricht had a study and a trial, in both cases in different years. For this Table only one event is recorded – Leiden / operation, Maastricht / study.
3. "Research/ Feasibility" refers to UCCs that did not progress beyond an initial research/feasibility project.
As previously mentioned, far more schemes have either been planned or trialled in Germany than shown in the table. The table contains schemes about which it has been possible to obtain literature.
4. In addition, German multi-modal freight centres that operate at a regional scale (referred to as Güterverkehrszentrum - GVZ) have been omitted from the table, as although some urban distribution does take place from some of these centres it is not their primary operational purpose.

Table 3.1 shows that the countries that have been most involved in researching and piloting UCC schemes have been France, Germany, Netherlands and the UK. The approach has differed between Germany and the UK, with the majority of all UCC schemes in the former country having been operational, whereas in the UK the majority of schemes have been research and feasibility studies. In the three mainland European countries the schemes were often civic-led with "boards" of participating players. Environmental improvements were often the main objective in such schemes. Of those schemes that are no longer operating the major difficulties encountered were lower than required goods throughput volumes, and consignee (end-user) dissatisfaction with service levels. The result was disintegration of the schemes.

In the UK, most of the early research and feasibility work in the 1970s was undertaken by local authorities. There was a diminishing interest in the UCC concept in the UK between the mid 1980s and mid 1990s. Since then, much of the work carried out has taken the form of trails and operational schemes and has been led by commercial enterprises who, perhaps following the path established by the major grocery retailers, recognised the benefit of controlling the logistics movements that affected their operations. Accordingly it has been the BAA (2 projects at Heathrow), Meadowhall, Bluewater

and Broadmead (Bristol) together with Exel as the logistics service provider that has driven the recent development of UCC trials and operational schemes in the UK.

With the notable exception of the Tenjin scheme in Japan that was first established in 1978 the majority of the other extant schemes are of recent origin and may have benefited from the earlier schemes in France, Germany, Netherlands and the UK.

Table 3.2: Analysis of Schemes by Country and Geographical Coverage

Country	Total	Site Specific	District	Town-wide
Austria	1	-	1	-
Belgium	1	-	-	1
Canada	1	-	-	1
France	8	-	3	5
Germany	14	1	4	9
Italy	5	-	3	2
Japan	3	1	2	-
Monaco	1	-	-	1
Netherlands	7	-	6	1
Portugal	1	-	1	-
Spain	1	-	1	-
Sweden	4	2	2	-
Switzerland	2	-	-	2
United Kingdom	17	4	7	6
U.S.A.	1	-	-	1
Total	67	8	30	29

Note: Site Specific = UCC scheme serves a single site or commercial unit (of which three – Hammerby, Potsdamer Platz in Berlin, and Heathrow Airport are construction consolidation centres, the other five are shopping centres)
District = UCC scheme serves part of a town/city - usually historic core or c.b.d.
Town-wide = UCC scheme serves the whole town

Table 3.2 shows the 67 schemes divided into whether the scheme served a specific site, a district or an entire town/city (in the case of research/feasibility study the proposed area that the UCC scheme would cover is shown). The distinction between a UCC serving a district rather than an entire town has been difficult to determine from the literature. From general experience UCCs normally serve specific geographic districts within a town rather than the whole town, but for this exercise unless the information specifically refers to an historic centre or central business district (cbd) it has been assumed that the whole town constituted the target market.

The rationale behind the usual favouring of specific districts for UCC projects is that they have a tendency to be places with narrow streets, historic layouts and the like and therefore have a concentration of freight transport related issues surrounding them:

- vehicle congestion and delay
- restricted access times and insufficient parking provision
- a preference for pedestrians only schemes
- unacceptable levels of air pollution

Given these difficulties and constraints it is clear that there may be significant benefits from reducing the number of vehicles that enter the specific urban area – for example:

- fewer delivery vehicles resulting in less congestion and faster turn-round times when delivering

- an overall reduction in pollution made even greater when use is made of electric vehicles
- a more attractive environment for visitors, retailers and office workers
- by developing the UCC away from or at the periphery of the district it becomes possible to introduce consolidation activities into an area that is unsuited to such an intrusive development in its own right

The "site specific" UCCs on the other hand are essentially associated with developments that are under the control of a single entity that is usually a commercial organisation and their creation is either part of a master plan when the development is in the process of being designed or are established in response to the specific needs of the organisation to meet its logistics, commercial or environmental needs. These UCCs come in two forms:

- Those associated with major retailing developments / shopping malls such as the retailing operations at Terminals 1-4 at Heathrow, Bluewater and Meadowhall.
- Those associated with special projects such as construction operations such as Hammerby (Stockholm) and the Heathrow construction centre.

Table 3.3: Analysis of Schemes by Country and Date of Investigation / Start-Up

Country	Total	1970-1975	1976-1990	1991-1995	1996-2000	2001 +
Austria	1	-	-	-	1	-
Belgium	1	-	-	-	1	-
Canada	1	-	1	-	-	-
France	8	1	-	5	-	2
Germany	14	-	-	8	6	-
Italy	5	-	-	-	1	4
Japan	3	-	1	-	-	1
Monaco	1	-	1	-	-	-
Netherlands	7	-	2	3	1	1
Portugal	1	-	-	-	1	-
Spain	1	-	-	-	-	1
Sweden	4	-	-	-	2	2
Switzerland	2	-	-	2	-	-
U. K.	17	4	4	1	4	4
U.S.A.	1	1	-	-	-	-
Total	67	6	9	19	17	15

Note: The table excludes the start date of the scheme for Osaka – it is not known.

Table 3.3 indicates that in the UK prior to the 1990s a number of county towns (Camberley, Winchester, Chichester, Chester, Aberdeen and Worcester) together with the industrial towns of Barnsley, Bradford, Hull and Swindon and the City of London and Borough of Hammersmith all undertook studies. However, these did not proceed beyond the investigation stage.

During the 1990s the available literature suggests increasing interest in the UCC concept in France and Germany and to a lesser extent the Netherlands where numerous pieces of research were undertaken that in the case of Germany frequently led to operational UCCs being set up (usually referred to as City Logistik schemes). However, as noted, many of these have since closed.

Since 2000 there has been another period of interest in UCCs, both in terms of policy makers thinking about the role they could potentially play in efforts to bring about more sustainable urban distribution, and also in terms of UCC trials and operational schemes that have been established. As can be seen from Table 3.4, 14 of the 27 schemes that are understood to still be in operation today, date from 2000 or later.

Table 3.4: Continuing UCC Schemes

Pre-2000 Schemes	Post-2000 Schemes
Aachen, Germany	La Rochelle, France
Bremen, Germany	Paris (tricycles), France
Essen, Germany	Ferrara, Italy
Frankfurt am Main, Germany	Padua, Italy
Kassel, Germany	Vicenza, Italy
Nuremburg, Germany	Evora, Portugal
Regensburg, Germany	Malaga, Spain
Siena, Italy	Stockholm (Hammerby) – Construction
Tenjin, Japan	Stockholm – Old Town, Sweden
Monaco	Broadmead, Bristol, UK
Amsterdam, the Netherlands	Bluewater, Kent, UK
Groningen, the Netherlands	London Heathrow – Retail, UK
Utrecht, the Netherlands	London Heathrow – Construction, UK
	Meadowhall, Yorkshire, UK

There is relatively little discussion in the literature reviewed about the financial arrangements for UCC schemes. However, where reference to financing has been identified it varies between schemes. Some UCCs have been dependent on public funding either from central, regional or local government. This is the case, for example, in Amsterdam and Monaco with the Municipalities contributing towards the cost (City Ports, 2005). Some UCC schemes have received funding from EU projects (such as La Rochelle, Nuremberg and Broadmead in Bristol). Meanwhile, other UCC schemes have been funded through a mix of financial support from commercial partners and contributions from receivers using the scheme (for example the Heathrow retail consolidation centre). Some schemes are striving to demonstrate that they can operate on a commercial basis without the need for subsidy (such as Meadowhall), while other schemes apparently operated on this basis from the outset (for example Freiburg, and Kassel – City Ports, 2005). Other schemes have been funded by incorporating the UCC into the project contract (e.g. Stockholm construction consolidation centre). In several UCC schemes it appears that companies receiving goods from the UCC are expected to pay something for this service, and this income meets at least part of the total operating costs. In one scheme (Tenjin in Japan) the logistics companies dropping goods at the UCC pay to do so.

3.3 Classification of urban consolidation centres

Several commentators have produced classification systems for UCCs. Summary information about these classifications is shown in Table 3.5. Further details of the classification systems summarised in Table 3.5 can be found in Appendix 4.

The UCC classifications shown in Table 3.5 only concentrate on a selection of types of UCC rather than attempt a classification system for all UCCs. This is explained by the fact that these classification systems have been produced with reference to a particular country and the UCCs that exist within that country, rather than trying to classify all UCCs that exist or that have been operated.

Table 3.5: UCC Classification Systems Proposed by Other Commentators

Author	Description	Comments
Köhler, U. (2001)	Classifies six fundamental co-operation forms for UCC ("city logistics") schemes in Germany	Based only on German experience. Only refers to German "city logistics" schemes in which distribution companies share their depot and vehicle capacity.
Ministère de l'Equipement (2002)	Classifies three UCC "models": • "Monaco model" • "Dutch model" • "German model"	Dutch model is based on vehicle licensing not physical UCC. Does not cover privately established and operated UCCs such those at Heathrow .
Klaus, P. (2005)	Classifies three types of "inner city cargo logistics" initiatives tried in Germany in 1990s: • Milk round-type schemes for a single retailer • City logistics schemes • Schemes using telematics and alternative transport technologies	Based only on German experience.
BESTUFS (2002)	Classification of freight platforms at urban, regional, national and international level. Defines 3 types of freight platform possible at the urban scale: • Single company UCCs • Multi-company UCCs • Freight villages	Deals with all freight platforms not just in urban area. Freight villages are defined as focussing on bi- or multimodal transport that are on large sites usually outside the urban area and also working at a region-wide scale.

It was felt necessary to produce a classification system for UCCs as part of the project that would provide a simple means by which to categorise UCCs, as this would assist in quickly being able to distinguish between UCC schemes. However, having reviewed other authors' classifications (several of which were based on a limited range of UCC types) it was apparent that a large range of factors can vary between UCCs. This meant that it would be possible to produce a very detailed classification containing a large number of UCC types, which would be of little use in trying conveying information and ideas about UCCs.

Building on the work in Section 3.1, in which all the existing and trialled UCCs from around the world about which information was obtained were studied, the following three categories of UCC were devised:

1. **Special project UCC**s: these are UCCs that are used for non-retail purposes, for example construction material UCCs in Heathrow and Stockholm. This type of UCC may well serve a single site. However, such UCCs could potentially operate over any given geographical scale of the urban area. This type of UCC may well operate for a given period of time while the specific activity linked to the UCC takes place.

2. **UCCs on single sites with one landlord**: examples include UCCs at airports and shopping centres (e.g. Heathrow retail UCC, and Meadowhall shopping centre). These UCCs differ from other retail UCCs in the following ways: i) these sites are built as a single development so the UCC can potentially be designed into the planning of the site), ii) the landlord has the potential to insist that tenants use the UCC, iii) the unloading points tend to be located off-street in a specially designed delivery area with access via a single route, iv) the UCC operation can potentially be made self-financing through rent structures and handling charges.

3. **UCCs serving a town/city:** examples include many German city logistics schemes, La Rochelle in France, and Broadmead (in Bristol). These UCC schemes can vary in terms of:
   - the geographical area they serve (which can either be large or small. For instance such schemes can, serve a small district such as a narrow, historic centre of an urban area, a specific retail area, or a larger, more diverse geographical area up to an entire town/city).
   - the number of companies operating the UCC scheme (which can be a single company (e.g. La Rochelle, or several companies (e.g. German city logistics schemes).

Each of these three types of UCC can offer either relatively basic consolidation services or can offer a wider range of value-added logistics activities such as stockholding facilities, ticketing and pricing, goods return and waste collection services. Similarly, each of the three types of UCC could also potentially offer community collection and delivery point facilities (for other consumer and business products), and home delivery operations could also be operated from the UCC.

3.4 Evaluation approaches and results

In carrying out the literature review, previous attempts to evaluate UCCs have been identified. As mentioned in Section 2.5, relatively few of the items of literature reviewed contain quantification of the financial, transport and environmental impacts of UCCs that have been set up. Seventeen UCC schemes were identified in the literature in which a reasonable attempt to quantify results had been made (i.e. more than just a single or couple of impacts measured). These 17 UCCs were: Tenjin and Marunouchi (Japan), Leiden (the Netherlands), Heathrow retail and construction, and Broadmead (UK), Freiburg, Kassel, Munich and Bremen (Germany), Evora (Portugal), Brussels (Belgium), Basle (Switzerland), Stockholm Old Town (Sweden), La Rochelle and Paris (France) and Monaco.

In the literature about these 17 schemes there is typically little explanation of: i) the methodology used, and ii) whether the results presented refer to actual operations or are the outputs of modelling work and hypothetical calculations. This makes it difficult to determine the importance of the results reported. The impacts that have been quantified include the following (although not all schemes report on all impacts):

- **Changes in the number of vehicle trips**: the literature that addresses trip numbers refers to the change in goods vehicle trips making deliveries to the final receivers using the UCC compared with the trip numbers before its introduction. One of the studies quantifies the change in total vehicle traffic along the trunk road connecting the UCC to the delivery area in the city before and after the introduction of the UCC (Nemoto, 1997). None of the literature appears to address the change in total vehicle trips necessary in the supply chain to make deliveries to final receivers in the urban area (i.e. taking account of the goods vehicle trips upstream of the UCC). Also none of the literature consulted refers to the effect on total goods vehicle trips in the urban area (i.e. including those goods flows that do not go via the UCC).

- **Changes in the number of vehicle kilometres:** some of the results presented in the literature quantify the change in vehicle kilometres performed in making deliveries to the final receivers using the UCC before and after its introduction. However, only one of the 17 scheme evaluations

compares the effect of the UCC on total goods vehicle kilometres in the urban area or total vehicle kilometres (i.e. all vehicle types).

- **Changes in number of vehicles used:** some of the results presented in the literature quantify the change in the number of vehicles required to make deliveries from the UCC to the final delivery point (i.e. a comparison of the total vehicles used to make deliveries to the final receivers for goods flowing through the UCC before and after its introduction).

- **Changes in travel time:** one UCC scheme evaluation refers to changes in the total travel time i) to and from the city terminal and ii) in the city centre of all goods vehicle trips using the UCC before and after its introduction. These results are of interest as they reflect the difference in vehicle operations that are associated with the use of a UCC. However in order to assess the effect of UCCs on travel time to and from the terminal it would be necessary to include consideration of the time spent travelling from the company terminal to the UCC as well. Travel time in the city centre would be expected to increase when using a UCC due to the increase in multi-drop vehicle operations associated with it, so whilst the data is of interest, it would be necessary to calculate it on a per delivery basis both before and after the introduction of the UCC in order to compare the effects of the UCC.

- **Goods delivered per delivery point:** one UCC scheme evaluation refers to the average weight of goods delivered at each delivery point compared with deliveries not using the UCC. It is not clear from the results whether the results show the difference in the average weight of deliveries for goods vehicle trips using the UCC before and after its introduction or whether goods vehicle trips from the UCC are being compared with trips that do not make use of the UCC before and after the introduction of a UCC.

- **Vehicle load factor:** two of the 17 scheme evaluations refer to the difference in vehicle load factors with and without a UCC. It is not clear from the results whether the results show the difference in load factors for goods vehicle trips using the UCC before and after its introduction or whether goods vehicle trips from the UCC are being compared with trips that do not make use of the UCC. Vehicle load factor would be expected to increase when making use of a UCC due to the multi-drop operations associated with it.

- **Changes in loading/unloading time and frequency:** this refers to the change in the total loading/unloading (referred to as parking) time (i.e. the total time that goods vehicles are spent parked while making deliveries) and the total frequency of loading/unloading (i.e. the number of vehicles stationary while making deliveries in a given period of time). This can be expressed either in terms of the goods vehicle trips using the UCC before and after its introduction, or in terms of total parking activity by goods vehicles making deliveries within a given urban area. One of the studies also calculated the number of goods vehicles queuing to make deliveries in a given area and the average time they spent queuing.

- **Changes in total fuel consumed:** a few studies have quantified changes in fuel consumed by goods vehicles for those trips involving deliveries to the final receivers using the UCC after the introduction of the UCC compared with these goods flows before its introduction. This data is likely to be based on assumptions about the fuel consumption rates of vehicles used prior to UCC introduction and the UCC vehicles rather than actual on-board fuel measurement.

- **Changes in vehicle emissions:** a few studies have included quantification of reductions in vehicle emissions from goods vehicles for those trips involving deliveries to the final receivers using the UCC after the introduction of the UCC compared with these goods flows before its introduction. These results appear to be based on standard information about vehicle emissions per vehicle kilometre travelled rather than on actual tailpipe measurements. One study involved actual vehicle

emission measurement at the intersection on two trunk roads used by goods vehicles entering the urban area from the UCC (Nemoto, 1997).

- **Changes in operating costs:** refers to changes in the cost of goods vehicle operations as a result of UCC introduction. This appears to be limited to the vehicle costs and does not take into account the costs associated with operating the UCC, or cost changes experienced by receivers due to any time savings. These results seem to be based on assumptions about the hourly cost of goods vehicle operations rather than detailed costing of actual distribution operations making deliveries to UCC.

Table 3.6 shows the number of UCC scheme evaluations identified that have included quantification of each of the UCC results described above in the 17 UCC schemes identified with published impacts.

Table 3.6: Impacts Included in UCC Scheme Evaluations Identified

Impacts of UCCs	Number of the UCC studies quantifying this (out of the 17 studies identified)
Changes in the number of vehicle trips	8
Changes in total fuel consumed	8
Changes in vehicle emissions	8
Changes in the number of vehicle kilometres	7
Changes in the number of vehicles	4
Vehicle load factor	4
Changes in parking time and frequency	4
Changes in operating costs	2
Changes in travel time	1
Goods delivered per delivery point	1

As Table 3.6 indicates, the most commonly quantified impacts of the 17 UCCs studied, are changes in vehicle trips, vehicle kilometres, number of vehicles used, total fuel consumed, vehicle emissions, parking time and frequency, and load factors. Other UCC schemes for which very limited quantification of impacts was identified in the literature tended to report on either changes in vehicle trips or vehicle kilometres (and also changes in the vehicle fleet required in a couple of cases).

In these 17 UCC evaluation studies, reductions in vehicle trips were calculated to range from 30-80%, reductions in vehicle kilometres ranged from 30-45%, improvements in vehicle load factors ranged from 15-100%, and reductions in vehicle emissions ranged from 25-60%. All of these results refer only to the change in transport activity associated with goods handled by the UCC (i.e. a comparison of the transport activity from the UCC to the receivers when the UCC is used and when it is not for those goods flowing through it) rather than the changes in total freight transport operations and impacts in the area covered by the UCC or the entire town/city.

The quantified results from five of the UCC schemes identified in the literature review are summarised in the following sections.

3.4.1 Tenjin UCC (sources: Nemoto, 1997; BESTUFS, 2002)

Tenjin is the central business district in Fukoaka in Japan. The UCC is a cooperative scheme, which is organised by 29 existing carriers on a voluntary basis. They contribute 160 yen per parcel to the costs of the centre. Tenjin comprises an area of 37 hectares, and contains 2161 business establishments (3% of the total business establishments in Fukoaka). The scheme was introduced in 1979. Deliveries from

the UCC take place three times a day (08:00, 10:00 and 14:00). Approximately 90,000 parcels are delivered per month from the UCC, and approximately 10,000 parcels are collected in Tenjin and pass through the UCC for delivery elsewhere. The round trip distance from the UCC to the delivery area is about 4km.

Nemoto (1997) developed a mathematical evaluation model for calculating the financial costs and benefits to all parties using the UCC. He also developed a model to evaluate external effects of the UCC including traffic congestion, traffic pollution and energy consumption. It was not possible to evaluate the overall net social benefit due to lack of data.

Benefits of the Tenjin UCC (estimates based on modelling work by Nemoto, 1997):

- decrease in number of trucks compared with those previously doing the same work of 61%
- decrease in total traffic along the trunk road to city centre after introduction of the UCC of 0.8%
- decrease in total delivery vehicle parking time in service roads in city centre after introduction of the UCC of 6.8%
- decrease in total NOx emissions in Tenjin after the introduction of the UCC of 0.4% (measured at the intersection of two trunk roads)
- decrease in total fuel consumption in Tenjin after the introduction of the UCC of 0.3%

Further results from the Tenjin UCC have been reported more recently (BESTUFS, 2002). These report that the UCC has resulted in a 28% decrease in the total distance travelled (compared with not using a UCC).

3.4.2 Heathrow Airport Retail CC (source: Department for Transport, 2002; Foster, 2005)

The British Airports Authority (BAA) has developed a 25,000 square feet consolidation centre at Heathrow Airport that is managed by Exel. The purpose of the scheme is to reduce goods vehicle movements, and to improve goods handling systems and waste packaging management in the terminals. In this scheme, goods destined for retailers with premises in Terminals 1-4 are now delivered to the centre, which is located away from the terminal buildings, rather than directly to the shops. The following metrics have been used by Exel to assess the consolidation centre performance:

- throughput (roll cages delivered, and retail deliveries)
- % reduction in vehicle movements
- NOx emissions reduction
- PM10 emissions reduction
- CO_2 reductions

Benefits of the consolidation centre quoted in the literature for the period 2001/2 (Department for Transport, 2002) are:

- reduction in vehicles travelling to terminals and driving airside (reduction of 35 vehicle deliveries into the airport per week)
- faster deliveries for distribution companies (at consolidation centre compared with shops) (calculated to be 234 hours per week saved in making deliveries)
- more frequent and reliable deliveries at shops
- potential cost savings (time savings for delivery companies were estimated to be worth £4715 – assuming £20 per hour, which is equivalent to an annual saving of £245,000 based on the activity levels. Fuel savings were calculated to be worth £100 per week).
- vehicle kilometres reduction (approximately 560 fewer vehicle kilometres travelled per week)

- reductions in CO_2, carbon monoxide, nitrogen oxide and particulate emissions (weekly reductions of 426 kg of CO_2, 1.06 kg non-methane volatile organic compounds, 3.79kg nitrogen oxide, and 0.28 kg of particulates)

More recent results show that in 2004 the centre received 20,000 vehicle deliveries; this resulted in 45,000 store deliveries being made from the centre on 5,000 vehicle trips. 190 out of 240 of the retail outlets are using the centre. Vehicle trip reduction of approximately 70% is being achieved for those goods that flow through the centre. This was estimated to result in 87,000 vehicle kilometres saved in 2003, and 144,000 vehicle kilometres saved in 2003. Vehicle emissions reductions have also increased as goods throughput has grown, with CO_2 savings of 1,200 kg per week in 2003 and 3,100 kg per week in 2004 (Foster, 2005).

3.4.3 Freiburg UCC (source: Köhler, 2001)

This UCC scheme in the German city of Freiburg started in 1993. This was a voluntary scheme with the purpose of providing consolidated retailers to retailers. Rather than a dedicated UCC being set-up, the existing distribution facilities of the companies participating in the scheme were used. Companies taking part were divided into four groups based on their geographical locations and the types of products they handled. Deliveries from the companies' depots to the retailers in the city were made by a neutral carrier. Quantified results of the UCC are shown in Table 3.7. It is not clear from the source whether these results are from actual measurement and data collection or from estimates.

Table 3.7: Results of the Freiburg UCC Scheme

	Without UCC	With UCC	Change (%)
Quantity per month (tonne)	396	396	0
Number of trips	440	295	-33
Travel time to/from the city terminal (h)	306	98	-68
Travel time in the city centre (h)	260	70	-73
Total time in the city centre (h)	612	317	-48

Source: (Köhler, 2001 from Ewers et al, 1997)

In addition, the scheme produced an increase in vehicle load factor from 45% to 70%. (CITY PORTS, 2005). All of these results are expressed in terms of just the UCC vehicle activity, and these results are not related to total goods vehicle traffic or total vehicular traffic in Freiburg.

3.3.4 Kassel UCC (source: Köhler, 2001)

The UCC in Kassel started in 1994. In this scheme a neutral carrier collected goods from seven co-operating forwarding agents in the urban area at 06:00. The neutral carrier transported these goods to the UCC, sorted the goods and then delivered them in the city from 10:00 onwards. Table 3.8 shows the results of the Kassel UCC.

Table 3.8: Results of the Kassel UCC Scheme

	Without UCC	With UCC	Change (%)
Kilometres towards inner city (km/year)	31,000	18,000	-40%
Kilometres within inner city (km/year)	6,500	2,600	-60%
Average distance between stops (m)	670	260	-60%
Delivery weight per stop (kg)	170	195	+15%
Utilisation of vehicle capacity (%)	40%(volume) 25% (weight)	80% (volume) 60% (weight)	+100% +140%
Average lorry frequency per retailer (number of lorries/year)	300	260	-13%

Source: Köhler, 2001 from Struass, 1997

All of the results shown in Table 3.8 are expressed in terms of just the UCC vehicle activity, and these results are not related to total goods vehicle traffic in Kassel. However, Köhler has noted that the reduction in total traffic mileage in the central business district of Kassel as a result of the UCC is only marginal.

3.3.5 Basle UCC (source: Huijsmans and Wildeboer, 1997)

Three transport companies jointly established a UCC in Basle in 1993. It was operated as a voluntary scheme. The UCC was sited 2 km south of the city centre, at the depot of the largest transport company in Basle. A gas, an eco-diesel and an electric vehicle with gross weights of 3.5 tonnes were used for deliveries from the UCC. The UCC was closed several years later due to it generating fewer users and goods throughput than as expected. The results of the UCC are shown in Table 3.9.

Table 3.9: Results of Basle UCC Scheme

	Without UCC	With UCC
Load factor (in %)	28	47
No.of consignments (per day per vehicle)	8	15
Average load per ride (in tonnes)	0.28	0.52
Fuel consumption (per 100 km in litres)	Diesel: 17 Petrol: 18.8	Diesel: 15 Petrol: 18.6

Source: DIANA 6, 1996 referred to in Huijsmans and Wildeboer, 1997

The effects of the UCC in terms of energy consumption and environmental effects was considered to be “barely measurable because of the low level of support” (Huijsmans and Wildeboer, 1997).

3.4.6 Summary of previous evaluation of UCCs

The following points have emerged from the review of the UCC evaluation work carried out in previous research:

- Many UCC trials and schemes that have since been terminated do not appear to have been subject to published evaluation that quantifies scheme results.
- Of those UCC schemes for which quantified evaluation has been identified, some only provide a single quantified result (usually in terms of changes in trips numbers or vehicle kilometres).
- More extensive quantified evaluation has been identified for 17 UCC schemes. However, even in these cases the evaluation tends to be relatively limited, and little explanation of the methodology is provided.
- It is unclear from many of these evaluations whether results are based on measurement of actual vehicle operations or modelling work.
- The most commonly quantified impacts are changes in vehicle trips, vehicle kilometres, parking time and frequency, total fuel consumed, and vehicle emissions.
- Most of the published evaluations treat the UCC and its transport and environmental impacts in isolation from total transport activity and its impacts in the urban area concerned.
- The results that have been published suggest that UCCs can lead to significant reductions in transport activity and transport-related environmental impacts between the UCC and the final point of delivery for those goods flows that pass through the UCC.
- Given the scale and goods throughput at UCCs, this implies that any reduction in transport activity and associated environmental impacts due to the UCC are, as would be expected, marginal in terms of total freight traffic and total motorised traffic in the urban area concerned.

The next chapter considers the issues associated with evaluating UCCs and proposes ways in which UCC evaluation could be enhanced.

4. A FRAMEWORK FOR URBAN CONSOLIDATION CENTRE EVALUATION

4.1 Introduction

The previous chapter summarised the appraisal of existing UCC schemes that was identified from the literature review. It was found that no clear and detailed methodology has been developed for, or applied to, the evaluation of UCCs: a number of schemes have clearly been evaluated to some extent, but these evaluations have tended to be fairly ad hoc and generally have been limited in scope. As a consequence, this chapter aims to develop a framework by which the range of UCC types can be appraised, through the identification of a clear and consistent method of evaluation. First of all, the key elements of the evaluation process are discussed. This is followed by a section highlighting the importance of ensuring that the distribution of the costs and benefits associated with the UCC are taken into account.

The objectives of a specific consolidation centre may have an important bearing on how to evaluate the success of the UCC. The objectives could vary in the following ways:

- They could be based on economic efficiency or environmental/social factors (or both).
- They could be based on achieving supply chain-wide improvements or improvements in a localised geographical area (or both).
- They could aim to bring about greater consolidation of goods destined for the urban area or to tranship these goods onto smaller, lighter, cleaner goods vehicles for final delivery (or both).

Given the potentially differing objectives, it may well be the case that there is no single approach that can adequately evaluate all of the potential UCC types and applications. However, the framework identified in this chapter attempts to be comprehensive so as to allow the evaluation of a scheme against multiple objectives. In practice, schemes with a more specific objective may not require all of the framework elements that have been proposed.

4.2 Key elements of the evaluation framework

It is quite clear from the discussion thus far that the evaluation of a UCC is far from a straightforward task. Despite this, the current section attempts to set out the most important aspects that should be part of any such evaluation. In Chapter 3, nine different measures were identified that have typically been used in previous evaluations. These were:

- changes in the number of vehicle trips
- changes in the number of vehicle kilometres
- changes in the number of vehicles
- changes in travel time
- goods delivered per delivery point
- vehicle load factor
- changes in parking time and frequency
- changes in total fuel consumed
- changes in vehicle emissions
- changes in operating costs

While each of these measures may be important, dependent upon the UCCs objectives, they in themselves are not sufficiently tightly defined to be able to be provide a meaningful evaluation. In previous evaluations, there appears to have been both a lack of consistency in comparing the “before” and “after” situations and a lack of clarity in identifying the precise boundaries of the parts of the supply chain being analysed. Many results have been presented in a relatively abstract way, with little

quantification of the overall changes caused by a UCC across an urban area and/or along a supply chain.

In order to achieve a more comprehensive evaluation of a UCC development it will be desirable to identify and measure both broad indicators such as the impact on upstream logistics activities as well as the more specific indicators such as detailed changes in vehicle operations (see Table 4.1).

It is evident that the ease of data collection will vary significantly between the different indicators. Some are fairly localised in their impacts and are relatively easy to obtain data for, while others are significantly greater in scope and are more problematic as a consequence. Some general comments about the evaluation of these measures have arisen from the analysis of the previous literature and the discussions with relevant parties. These include:

- Deciding upon the boundaries of the evaluation process – this should ideally be as far-ranging as possible, considering the impacts on all supply chain activities affected by the UCC, but may practically be limited by the resources and timescale available. Previous analyses of the impacts of UCCs have tended to focus only on the very specific changes in goods movements as a result of new distribution patterns between the UCC and the customers(s), while ignoring any wider changes.

- The importance of collecting "before" data - as with any evaluation of this kind, it is important to clearly establish the base situation so that the impacts of the consolidation centre can be measured.

- Standardisation of data collection between the "before" and "after" phases, to allow meaningful evaluation to be carried out.

- Undertaking the evaluation in as controlled an environment as possible, though this often is not practical. However, it is difficult to isolate and establish the impacts of a UCC if it is introduced at the same time as other measures such as vehicle access restrictions or changes in the nature of retailing activity. In reality, UCCs are perhaps more likely to succeed when introduced as part of a package of measures, so there may be a conflict between the desire to maximise the benefits and the need to evaluate thoroughly the specific impacts of the UCC.

With the wide range of variables to be measured, there are clearly many ways in which UCCs can potentially be evaluated, with no one single method appropriate to all circumstances. In this section, the evaluation methodology previously developed by Nemoto (1997) is adapted to show how different UCC models can be evaluated using common principles. Two different models are discussed here to highlight the differences – the first (see Figure 4.1) shows the effects of a UCC model based on switching from poorly loaded vehicles making direct deliveries to the use of better loaded vehicles for goods movements from the UCC to customers (shown as receivers). By way of contrast, the second model (shown in Figure 4.2) demonstrates a fairly typical transhipment-type of operation, where large goods vehicles making direct deliveries to customers are replaced by smaller vehicles operating out of a UCC.

Table 4.1: Variables and Indicators to be Included in a Comprehensive UCC Evaluation

Broad Indicators	Narrow Indicators
1) Logistics and supply chain changes Potential to improve efficiency at receiving premises due to fewer, more reliable deliveries Potential to improve efficiency/sales at receiving premises due to stockholding & value added services at UCC On-time delivery (punctuality) Change in order cycle time (i.e. time between despatch and receipt) Effect of greater reliability on stockholding strategy Change in total handling costs for goods passing through UCC Change in total freight transport costs for goods passing through UCC **2) Social/environmental impact of UCC vehicle activity** <u>Fossil fuel consumption</u> Fuel consumption *in* urban area compared with previous consumption to make same deliveries Fuel consumption *outside* urban area compared with previous consumption to make same deliveries All Fossil fuel consumption by goods vehicles in urban area (i.e. in order to consider overall impact of change) <u>Emissions</u> Emissions *in* urban area compared with previous emissions to make same deliveries Emissions *outside* urban area compared with previous emissions to make same deliveries All emissions by goods vehicles in urban area (i.e. in order to consider overall impact of change) <u>Congestion</u> Contribution of UCC-related goods vehicle trips to traffic congestion *inside* urban area Contribution of UCC-related goods vehicle trips to traffic congestion *outside* urban area Existing or potential use of non-road modes for delivery to UCC	**3) Goods vehicle activity** <u>Vehicle kms</u> Kms run *in* urban area compared with previous vehicle km to make same deliveries Kms run *outside* urban area compared with previous vehicle km to make same deliveries All goods vehicle km in urban area (i.e. in order to consider overall impact of change) <u>Vehicle trips</u> Trips *in* urban area compared with previous vehicle trips to make same deliveries Trips *outside* urban area compared with previous vehicle trips to make same deliveries All goods vehicle trips in urban area (i.e. in order to consider overall impact of change) <u>Vehicle load factor</u> Vehicle weight and volume utilisation for deliveries from UCC Vehicle weight and volume utilisation for supplies into UCC **4) Loading/unloading activity** <u>Space utilisation</u> Utilisation of unloading space in urban area compared with previous demand to make same deliveries Total utilisation of unloading space in urban area by all goods vehicles <u>Time</u> Duration of total time spent unloading in urban area compared with previous duration to make same deliveries Duration of total time spent unloading in urban area by all goods vehicles

Figure 4.1: Model 1 - Poorly Loaded Vehicles on Direct Deliveries Replaced by Better Loaded Vehicles from UCC

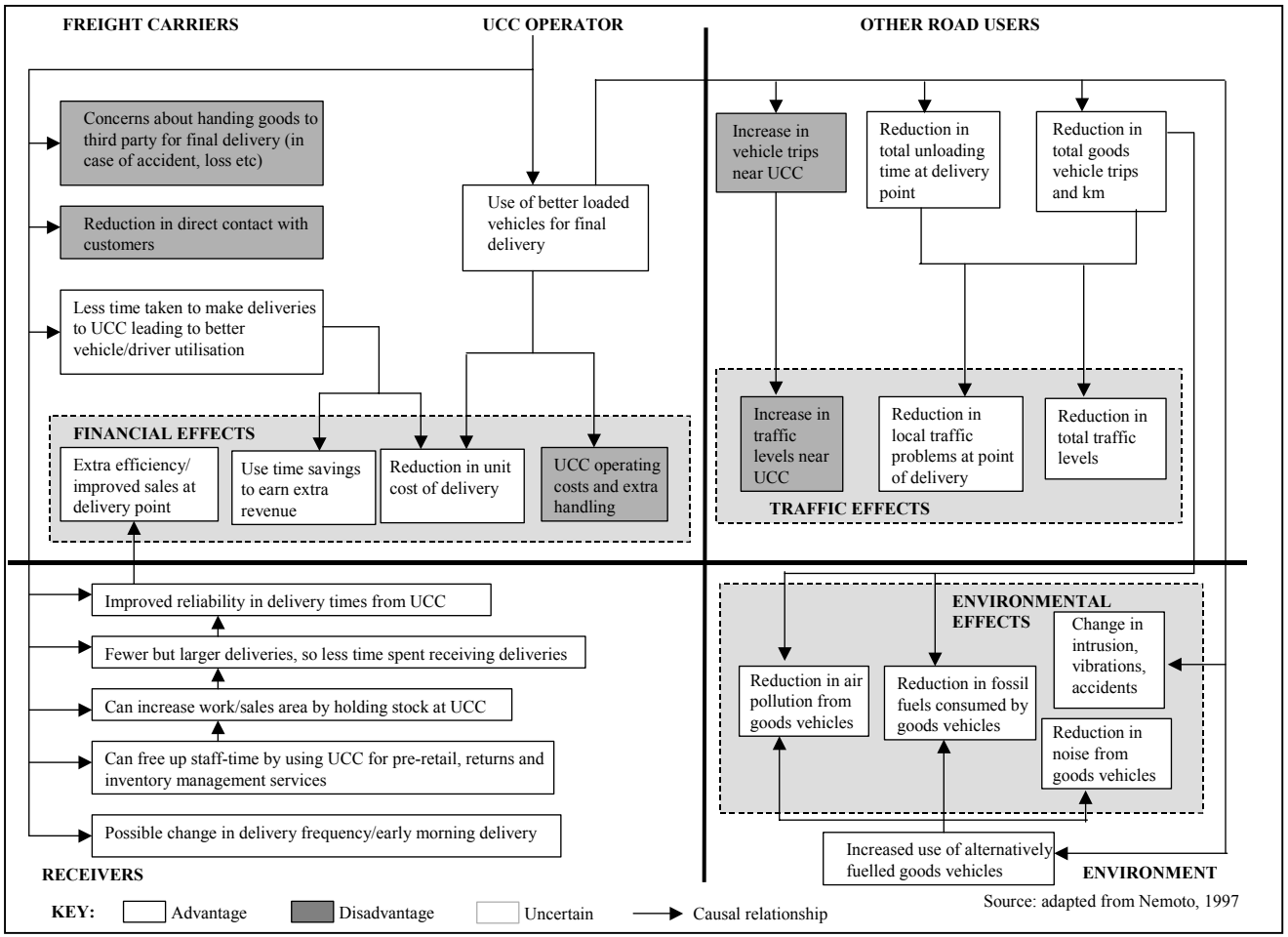
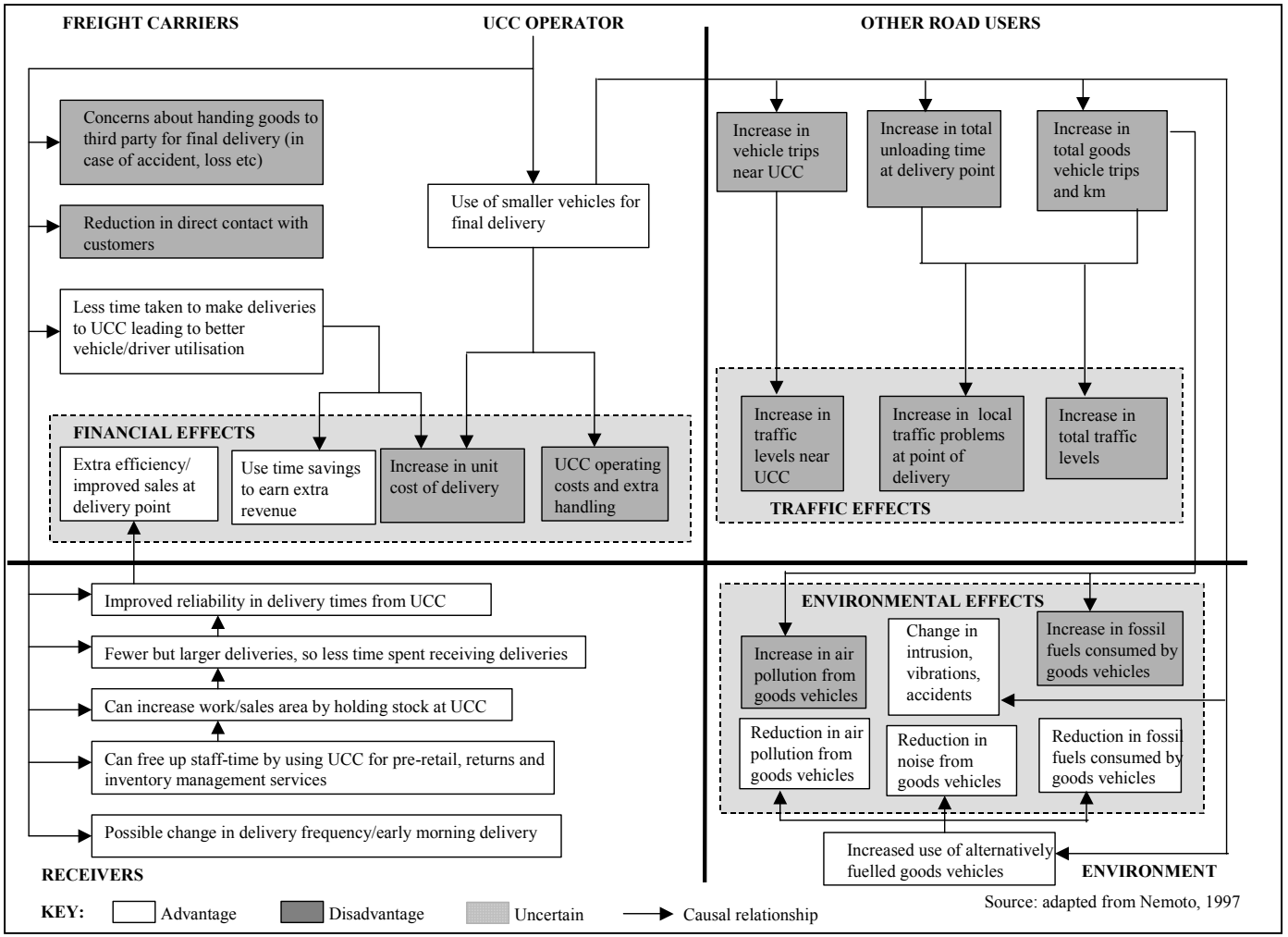


Figure 4.2: Model 2 - Large Goods Vehicles on Direct Deliveries Replaced by Smaller Vehicles from UCC



Figures 4.1 and 4.2 show the main effects of UCCs on the key "parties" involved, these being the UCC operator, freight carriers, receivers, other road users and the environment. Comparison of Figures 4.1 and 4.2 reveal that the effects can be quite different depending on the nature of the UCC. Superficially at least, it seems that the use of better loaded vehicles (which may also be larger than in the pre-UCC period) shown in Figure 4.1 performs better in terms of the balance of advantages and disadvantages than does the transhipment of goods into smaller vehicles as shown in Figure 4.2. Of course, it is not simply the absolute number of advantages and disadvantages that is important, but the relative extent of each and the overall performance that results. The comparison does lend weight to the more recent developments in UCCs, where the emphasis has shifted away from the traditional transhipment model whereby goods are transferred into smaller vehicles for local delivery towards the use of better loaded vehicles to achieve higher levels of utilisation and efficiency.

4.3 Allocation of costs and benefits

Even when the various impacts of UCCs have been quantified (as much as is possible), a critical element in determining the viability of a UCC scheme is the way in which the costs and benefits can be allocated between the parties involved. In theory the quantification should be a relatively simple process, subject to agreement on the costs and benefits to be measured. By contrast, the degree of difficulty in allocating the costs and benefits is largely dependent upon the nature of the centre, and in particular the number and range of parties affected (e.g. numbers of transport providers, suppliers, receivers). Further work is required, particularly in terms of identifying the wider impacts of a centre rather than just very specific changes for the particular flows using the UCC.

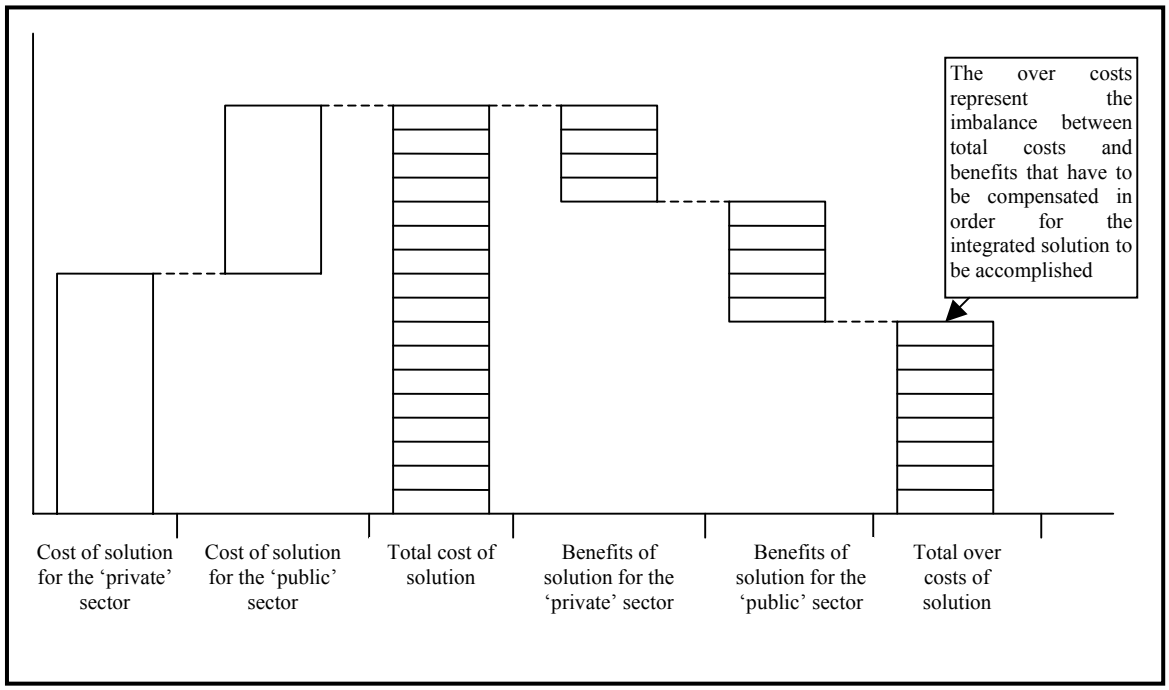
From both the published literature and the project interviews it is clear that the degree of success of a UCC depends critically upon the extent to which the costs and benefits are shared equitably. A three stage process can be applied, as follows:

1. quantification and allocation of costs
2. quantification and allocation of benefits
3. identification of mismatches between costs and benefits for those parties involved in the UCC

Figure 4.3 demonstrates a simplified cost-benefit analysis of a scheme such as a UCC, with costs and benefits accruing to both the private and public sectors. Dependent upon the specific scheme, the costs and benefits will be distributed differently. Indeed, it is by no means certain that the costs will outweigh the benefits, so "over benefits" may accrue instead of "over costs".

A primary challenge is the ability to quantify all the costs and benefits so that this analysis can take place in a thorough manner. It is almost inevitable that for any UCC scheme there will be winners and losers, thus making the allocation of the costs and benefits a key issue. This was an issue identified particularly in a number of the project interviews, where the difficulties of considering the full impacts of a particular scheme were highlighted, since parties involved are generally only concerned about the costs and benefits that directly affect them. Considerable differences have been identified during the course of the study in terms of the ease of quantification and allocation of costs and benefits. In general terms, the monetary costs of establishing and running a UCC and the distribution operation from the centre to the customers are easily quantified and allocated. However, as Table 4.2 illustrates, there may be "costs" that can accrue to the parties involved (depending on the operational arrangements of the UCC) that are less easy to express in monetary terms. The table is only indicative, but is based upon the project interviews and literature review.

Figure 4.3: Example of cost-benefit analysis for a UCC scheme



Source: City Ports (2005)

The evidence suggests that the benefits are more difficult to quantify and allocate than the costs, and this has probably been a factor inhibiting the development of UCCs in the past. It is clear that many of the positive aspects identified in Table 4.2 are very difficult to quantify, certainly in monetary terms. Further work is required to clarify the nature and quantification of benefits, but it is possible that agreement could be reached amongst the parties involved in setting up and benefiting from a UCC as to how benefits should be valued. As an example, it may be possible to set up some form of emissions trading scheme, whereby an agreed sum of money is allocated to the reduction of emissions of key pollutants, similar to the trading schemes being developed for international CO_2 emissions. Hypothecated revenue from transport schemes (e.g. congestion charging) could be used to fund these benefits on a transparent bases, such as per kg of pollutant avoided.

This discussion relating to the allocation of the costs and benefits associated with UCCs suggests that it is critical to ensure that the issue is thoroughly examined prior to trying to establish a scheme, otherwise there is a danger that the UCC will be seen mainly as a financial drain as a result of a focus on the direct monetary costs associated with its operation. The diffuse nature of the costs and benefits certainly presents a challenge that needs to be addressed before it is likely that UCCs will become more widespread – a clear framework for quantifying and assessing all the impacts, both positive and negative, is required, together with an agreed mechanism for ensuring that there is an equitable distribution of the costs and benefits so that certain parties do not become disillusioned by having to shoulder a disproportionate share of the costs without reaping adequate benefit.

Table 4.2: Illustration of the Distribution of Potential "Benefits" and "Costs" of a UCC Amongst Involved Parties (existence and extent of costs and benefits will depend on the operational arrangements of the UCC)

	BENEFITS	COSTS
Supplier	• Less time spent making deliveries in cities, leading to reduced operating costs • Potential to use time savings to generate additional revenue	• Not a single "door-to-door" operation
Transport provider	• Routes involving UCCs allow more deliveries per day • Opportunity for night deliveries • Helps counter WTD driver shortage • Greater efficiency as no time spent slow running in town/parking problems etc. • Less slow running = improved fuel usage	• Security • Loss of control over timed deliveries/responsibility • Perceived increase in damage through extra handling • Additional handling/delivery charges – could be passed to supplier as "surcharge"
Receivers	• Improved delivery reliability • Fewer deliveries/less staff disruption • Ability to call-off orders in parts • Clients able to collect purchases from UCC • Less storage/more selling space • Off-site value-added activities • Improved retailing (street) environment • Continuous waste removal/recycling • Clients avoid travelling to store to collect orders – collect at UCC	• Additional stage when chasing missing/late deliveries
Local Authority	• Potential licensing revenue • Fewer delivery vehicles in zone, leading to cleaner air, less congestion, pedestrian benefits and improved traffic flow • Potential for alternative fuel vehicles	• Cost of policing freight movements
UCC operator	• Profit-making business	• Multitude of IT & paperwork systems to handle <u>but</u> not if UCC is considered final delivery point and operator has own system to cover the "last mile" • Timed deliveries – how to service • Responsibility for identifying losses/damages at intake stage
Developer (new retail sites only)	• A revenue stream, either if managed in-house or additional charge on rent • More rentable space as result of centralised receipt point and less "in-store" storage space • Single UCC makes whole site more attractive with fewer freight vehicle movements	• Cost of establishing UCC if condition of planning consent

In existing schemes it appears that part (or all) of the financial running costs will be met by the final receiver with the longer term expectation that they should accept higher charges because of the improvement to delivery arrangements. However there are examples of schemes where the transport company also meets part of the costs by a payment on a 'per delivery' basis when they leave goods at the UCC for onward movement. There is no evidence that receivers that meet part of the costs are able to negotiate reduced upstream costs with their supply chain partners. The cost of establishing the UCC

may be met in part through support from a range of sources including commercial and local authority (city authority) funding. In some cases EU support may also be provided (e.g. CIVITAS projects and INTERREG funding of the City Ports Project).

4.4 Application of the evaluation framework

One of the best existing examples of UCC evaluation is the Tenjin one identified in Section 3.3.1 (Nemoto, 1997). In common with some of the other more comprehensive evaluations, the Tenjin example is relatively thorough in terms of its analysis of the direct transport impacts but does not fully consider the wider effects discussed earlier in this chapter. The evaluation identified changes in:

- the number of trucks doing the same work
- delivery vehicle parking time in service roads in the city centre
- total traffic along the trunk road to the city centre
- total NOx emissions in Tenjin, though measured only in one location
- total fuel consumption in Tenjin

This is more comprehensive than many other attempts at evaluating UCCs in that it does try to put the scale of change attributed to the UCC into some perspective with the latter three bullet points. However, Tenjin is just one area within the city of Fukuoka so the analysis is still relatively restricted in scope. Nemoto (1997) acknowledged the problems of data collection and availability, which meant that the overall net social benefit could not be calculated. In addition, though, there is no explicit consideration of the financial effects, the winners and losers amongst the parties involved, or any significant assessment of either the upstream supply chain changes or the impacts within the businesses served by the UCC. There is understandably a tendency to focus on the localised traffic impacts (and associated environmental factors) since these are easier to measure and the changes can be more easily attributed to the introduction of the UCC. In terms of reporting successes, the more localised the scale of analysis then the more positive the outcome tends to be. This is the case in Tenjin, where a large reduction was found in the number of trucks doing the same work (61%) and a noticeable decrease in delivery vehicle parking time in service roads (6.8%). By contrast decreases in the other measures, which take a broader geographical perspective, were only a fraction of one per cent.

It seems apparent from the discussion in this chapter that there are many challenges involved in conducting a thorough evaluation of the impacts of a UCC. Even in the better examples from the literature, such as Tenjin, there are large gaps in the implementation of the evaluation methodology that mean that it is extremely difficult to thoroughly evaluate the effects of the introduction of a UCC.

5. CONCLUSIONS

5.1 Introduction

This chapter presents our conclusions about UCCs. These conclusions are based on the literature review carried out, the discussions held with representatives of a range of organisations including local authorities, trade associations, logistics companies and retailers (see Appendix 3 for further details of these discussions), and our efforts to interpret and analyse this information.

5.2 The potential beneficiaries of consolidation centres

The work carried out in this project suggests that, from a logistics perspective, the potential beneficiaries from the establishment of UCCs would be:

- Retailers who are not part of supply chains in which deliveries are already highly consolidated at distribution centres, and/or are receiving full vehicle loads. This will include many smaller stores and independent retailers, together with some larger stores.
- Transport operators making small, multi-drop deliveries for whom the location, parking and unloading time is disproportionate to the size of the delivery.
- Shared-user distribution operations that provide their clients with major economies in both warehousing and long haul transport, but because their final deliveries are invariably multi-drop and geographically spread suffer major inefficiencies as a result of delays in the urban delivery part of their operation.

Meanwhile, organisations that are not envisaged as being beneficiaries of UCCs are:

- Major supermarkets and similar outlets who operate their own stock consolidation centres (regional / national distribution centres) and who essentially transfer full vehicle loads to their own outlets and who will use vehicles of a size that minimises the number of journeys and are also of a size appropriate to the access conditions of the outlet being served.
- Department stores that hold stock at an out-of-town location (an in-house consolidation centre) and provide a shuttle service to the retail store.
- Freight transport companies and some wholesalers who themselves provide a consolidation service for a particular region or urban locality. However, the acid test for such operators will be whether or not their final deliveries are so geographically focused that a high vehicle utilisation for a specific urban centre can be achieved. If it does not they too are potential beneficiaries from UCCs.

5.3 Lessons learned from existing and attempted urban consolidation centres

In this section the lessons that can be drawn from the desk research and interviews undertaken during the project are set-out.

5.3.1 Awareness

It is apparent that there is a significant lack of awareness of the opportunities that UCCs might provide if they were to be established in the right manner and in the right situations, and this appears to emanate from a reliance on a set of pre-conceived notions that UCCs mean additional cost and little else.

Local Government. Reference to UCCs is to be found in Freight Strategies and proposals for Freight Quality Partnerships (FQPs). What is absent is a clear understanding of the nature of UCCs and the role that they can potentially play when associated with developments such as multiple retail complexes and the establishment of pedestrian-friendly streets in historic centres.

There is clearly a need for awareness raising amongst local authorities to enable them to add the UCC concept to their set of possible policy measures for consideration.

Central Government. From discussions with representatives of local government there is clearly a wish to be in receipt of Planning Guidance as to where consideration should be given to the establishment of UCCs when major development proposals are being considered and when town centres are being restructured.

The greater availability of information and the greater ease of determining costs and benefits means that at present it would be easier to produce guidance for a site specific UCC than for a one serving a wider location. As noted in the following chapter there may be considerable merit in undertaking an extended trial in a suitable locality. Part of that trial should include, perhaps for the first time, the undertaking of the very detailed levels of measurement that have been lacking in other trials and which could demonstrate or disprove the true benefits of UCCs.

Consultants. The Local Authorities are major clients of the consultancies when freight and related strategies are being developed, and here too, their understanding of UCCs could be improved to avoid any tendency to simply note the "usual barriers" to their introduction – more vehicles / increased costs / less control in the system / security / products unsuitable for consolidation.

In addition there is a commonly held misconception that there is only one model for a UCC - this is not the case. The evidence indicates that UCCs need to be customised to the requirements of the locality and clients that they serve, and therefore it is regrettable that when, on learning of an unsuccessful scheme, individuals all too readily assume that the concept does not work or is not applicable in their circumstances.

Retailers and logistics companies. The players who are most likely to influence the decision to investigate or trial a UCC and the success of any trial are the retailers and logistics companies. Logistics companies are, in the main, intuitively resistant to such developments as they see them adding to their cost base and reducing their control over, and responsibility for, the products they deliver on behalf of their clients. Retailers are also concerned about the cost implications and whether these costs can be recouped through improved retail efficiency resulting from the UCC scheme or from other supply chain partners.

These are, in themselves, valid objections but they are not insurmountable. What has to be demonstrated is that the additional costs associated with a UCC operation may not have to be borne by the logistics company or retailer, or if they do have to be that there may be significant offsets elsewhere in the operation that can reduce if not eliminate them. For example, in the case of a logistics company, more efficient daytime deliveries through not having to enter a congested city centre and the possibility of night time delivery into the UCC could between them improve fleet utilisation and reduce running costs significantly. And there will also be the opportunity in some localities to avoid congestion charges and similar time or money penalties. Similarly retailers may be able to use UCCs to improve their retail space and product assortment resulting in improved sales, and may also benefit from more reliable and less time-consuming deliveries.

Prospective UCC operators will need to be able to demonstrate their ability and willingness to adopt stock receipt, inspection and control procedures and take responsibility for the "last mile" of a delivery thereby relieving logistics companies of any concerns they may have in that respect.

As indicated in "Central Government" above, by undertaking a carefully measured trial it should be possible to provide the factual data that is needed to enable logistics companies to evaluate the facts and consider the option of routing via a UCC. By this means and through general education on the subject of UCCs it should be possible to make the logistics companies aware of the problems that inner city areas face and thereby engage them in helping to solve those problems.

Urban Freight Myopia. Not unexpectedly there is reluctance on the part of the individual players throughout the supply chain to consider anything but their own aspect of the operation. Consequently the "total picture" – a combination of supply chain and environmental factors – is seldom considered and any potential overall benefits are dismissed.

Such a view does not come as a surprise, but unless solutions are to be imposed on unwilling participants, it is vital that a positive consensus as to the benefits of a UCC be developed before any project will be able to progress.

5.3.2 Organisational considerations

What is clear from the research is that imposed UCC solutions are only successful if the imposing organisation is able to control or strongly influence all the players. Thus at London Heathrow BAA (the landlord) has been able to insist that the retailers in its terminals use its dedicated consolidation centre, and has also determined the ground rules under which Exel manages the centre and the freight operation. BAA is clearly in control. A similar approach could be applicable with new major retail developments.

Voluntary schemes may be loosely constituted and may be made up of a variety of players and vested interests. In some cases these schemes appear to have been established with only limited prior research and analysis. As a result in the absence of early success the arrangements quickly dissolve. Many proposals and even trial projects seem to simply "sink without trace".

From this it is possible to infer, though there is not the evidence to support it, that the most likely successful alternative to an imposed approach is going to be the bottom up / "spontaneous" approach. In this scenario the initiative would come from (say) a street association or the traders in a district or definable locality who wished to improve the retailing environment through controlling the movement of goods vehicles into their locality. Such a group would drive the project by demanding the co-operation of their local authority in terms of traffic regulation and apply pressure to their delivery agents / logistics companies to devise a traffic minimisation scheme that by definition would entail a scheme of consolidation.

Freight Quality Partnerships (FQPs) provide a possible structure within which UCC schemes can be developed in the UK. The statements of intent of FQPs often refer to UCCs but it would appear that they are more part of a checklist of "nice to haves" rather than an area of specific activity. However, FQPs do provide a suitable forum for examining the opportunity for UCCs.

5.3.3 In what circumstances are UCCs most likely to succeed?

Given the relatively low success rate of UCCs, especially in mainland Europe, it is clear that any applications have to be specific with well understood objectives, a clear understanding of the nature and volume of the traffic to be handled and a pre-determined and measurable set of criteria upon which to determine success.

The basis of any proposed UCC has to be a detailed understanding and analysis of the traffic flows into and away from the designated area together with an objective view of the additional services that could be introduced to both financially support the operation but also to enhance the service offering

and thereby further attract end users. This will entail not just extensive measurement, itself no simple matter, but also detailed discussion with all the potential users to both explain the potential benefits that could be available to them and to identify the additional services that they might favour and use. What must be determined from the outset is whether the scheme has the potential to attract a critical mass of users and volume proportionate to its size.

All too often it would appear that UCC projects have been based on intuition rather than hard facts and as a consequence are never likely to be viable. Equally the arguments that suggest that the concept "will never work" are based on a combination of vested interest (prejudice) and intuition, and in the absence of hard facts are not easily refuted.

Many UCCs focus on retail operations. However it is important to be aware of the potential role of UCCs for other sectors including construction, offices, service organisations such as maintenance engineers, hotels and other tourist services and residential homes.

UCCs are likely to be better suited to some types of goods and vehicle movements than others. It is unlikely to be suited to perishable and highly time-sensitive products (such as fresh food and newspapers) and goods with specific distribution and handling requirements. In addition, vehicles that are already carrying full-loads for a single destination will not benefit from having to use a UCC. However in the case of non-perishable goods for delivery to city centre retail premises, using a UCC may well have benefits especially if the centre is designed to handle the wide range of packaging handled by shops e.g. hanging rails for textiles, boxes, roll cages, and pallets.

From the evidence available, UCCs are most likely to be successful in situations similar to those detailed below:

- Specific and clearly defined geographical areas such as historic town centres with a high incidence of small traders / outlets who are <u>not</u> part of a regional / national business with a dedicated and sophisticated supply chain and who are looking for a competitive edge.
- Town centres that are undergoing a "retailing renaissance" and that have transport infrastructure that would be unable to cope with the resultant increase in freight.
- Historic town centres and districts that are suffering from delivery traffic congestion where there is a common interest in improving the street environment, rather than large town-wide schemes.
- New and large retail or commercial developments (both in and out of town) where there is the opportunity to consolidate all the goods receiving and related activities within a dedicated part of the complex from the outset and as part of the total design. From the developers perspective this also provides the opportunity to maximise the amount of rentable space.
- Major construction sites where for the duration of the building programme an organised and disciplined flow of materials both reduces costs and facilitates an uninterrupted building programme.
- Where there is "spontaneous" bottom up pressure for such a development from a group of potential users who have interests and objectives in common. The common elements could be trading in a defined geographical area or trading in a similar range of products over a wider area and not being part of a national organisation.

5.3.4 <u>Funding and financial matters</u>

The general consensus is that in the medium / long term UCCs must be financially successful in their own right and that subsidies are not a viable solution. Although a case might be made for hypothecated funds from other transport related sources such as congestion charging and road pricing being used to underwrite or pump-prime UCC operations within the wider scheme of things. This would certainly need to be the case if environmental improvement were to be the prime / sole reason for establishing a UCC.

What is apparent is that without some initial funding from central or local government to pay for the research work and pilot studies any form of UCC that is not related to a major new property / commercial development is unlikely to proceed let alone succeed.

In order to establish a successful trial it may be desirable for the participating players to keep the initial cost base low. It is important that the trials be fit-for-purpose but that the investment be kept to a minimum. Rather than build a new centre, part of an existing building (with expansion potential) could be used at the outset. The handling systems too could be developed over time. Specialist cool-chain and frozen facilities may add considerably to costs and complexity.

The standard objection to UCCs is that they will lead to increased costs in the delivery operation. It is therefore important to discuss the wider implications of such schemes with the road transport industry and retailers, and to demonstrate that by using such centres costs in other parts of their operation could be reduced. Such reductions will be achieved through less time being spent on (expensive) town deliveries, shorter journey times and increased vehicle utilisation, and the possibility of night-time deliveries (UCCs will be open when their customers are closed) amongst other things.

In this respect one of the key considerations is how to allocate the costs and benefits resulting from a UCC scheme as a whole and not solely the cost impact on a part of the supply chain or a single player. This is not a simple matter and it is suggested here that that the allocation of costs and benefits needs to be the subject of a more comprehensive and detailed study and ideally one based on a fully measured pilot project. Such a study would encompass both the financial costs / benefits along the whole supply chain but also the wider issue of how to handle the environmental costs and benefits.

5.3.5 The operation of a consolidation centre

From an operational perspective a number of "rules" relating to the manner in which UCCs are managed became apparent from the research.

In the same manner that it is proposed that any initial financial investment be minimised the same applies to the operating methods employed during any trial. It is at the pilot stage that the players will be persuaded of the validity or otherwise of the concept and it is therefore important that the issues do not become clouded by operational complexity. It may therefore be entirely appropriate to consider only simple handling and sortation methods at first. In addition, while the vehicles used should meet all the necessary environmental standards it may be inappropriate (and detrimental to the long term goal) to insist on using specific types of vehicle such as battery powered goods vehicles. On the other hand it may be possible to adopt specific technologies if appropriate vehicles are already owned by the organisation, or if external funding is available to test them or a manufacturer is prepared to provide them for demonstration / trialling purposes.

The UCC concept proposed in the UK in the 1970s assumed that all deliveries within the area served by a UCC would be made on small vehicles (<3.5 tonne gvw) so as to exclude hgvs. It is now recognised that there is no benefit, in fact there are environmental and cost penalties, in decanting the contents of a well laden hgv into a greater number of lgvs.

Whereas the primary focus of a UCC is to consolidate loads on the inbound journey, if the transport operation is to be optimised it is equally important that the return loads to the UCC are as highly utilised as possible. To achieve this, inter-store transfers, unsold stock, waste and damaged material for recycling and orders placed by customers (for subsequent collection by the customer from the more easily accessible UCC) are all candidates for return loads.

Having additional services at the UCC may both increase revenue and augment the overall use of the UCC and therefore its role within the urban area. The range of such activities can be various: pre-

retailing operations such as price ticketing and the removal of excess / outer packaging; the assembly of promotional offers; waste recycling; providing a post-sale collection service for the retailers' customers (Pick-Up and Drop-Off points – PUDOs), and field stores for service engineers being typical examples.

Given that one of the non-financial objections to UCCs is loss of control / responsibility for the final leg of the delivery operation, this can be overcome by the UCC operator becoming the "final signatory" for a delivery and then employing, for example, a system of roll cages with computerised contents tracking to ensure that the final leg is undertaken with maximum security. Dedicated roll cages would be provided by the UCC operator and would be in a captive loop with tracking between the UCC and the delivery points. Their use would also serve to speed-up the delivery process as the recipient would only have to sign for a number of sealed cages and not conduct a full item check at the time of delivery.

5.3.6 General

Design and operational aspects of UCCs will need to reflect the scale and type of activity and the range of products being handled. However, this does not preclude the development of a set of good practice guidelines.

The process leading to the establishment of even the most basic UCC trial will require the involvement of many parties – local government representatives, potential UCC operators, trade associations, local logistics companies, police authorities, occupiers of premises in the area to be served to name but a few – and it is essential that everyone who is likely to have any involvement is part of the discussion and planning process. Without such wide and total involvement the prospects of success are disproportionately diminished as it is only through involvement that commitment is gained.

Persistence is also seen as a key element in establishing a successful UCC. Early success is unlikely and it will only be through continually flexing the operation to meet the needs of existing and prospective clients and constantly promoting the idea that success is likely to be achieved as the initial uptake will inevitably be slow.

The location of the UCC in relation to its target market will have important consequences for the traffic and environmental benefits associated with the scheme as well as the commercial benefits of using it. If the UCC is located several miles from the final delivery points this has the advantage that vehicles delivering goods to the area from some distance away would not need to enter into the urban area at all. In addition, the distance over which specially designed environmentally-friendly vehicles were operated could be maximised. However, if small vehicles were used from the UCC, the number of vehicle trips and kilometres may increase. Alternatively, if the UCC was located very close to the area which it serves, this reduces the distance over which environmentally-friendly vehicles from the UCC operate, and hence the environmental benefits of the UCC. There is a clearly a need to carefully balance such issues when deciding upon the location.

It is also important to note that a UCC will generate inbound and outbound goods vehicle movements. Therefore, the area in which the UCC is based may experience goods vehicle traffic growth, while the delivery area served by the UCC will gain the traffic benefits. This implies the need for neighbouring authorities to work closely together in planning UCCs with the objective of mitigating the impact on any one authority. It also suggests that evaluation of the success of UCCs needs to take place over the entire geographical area covered by the UCC.

As beneficial as a single UCC may be to a specific site or locality what it has not been possible to observe or measure to date is the impact, particularly on the haulage industry, if a given region were

to establish a number of UCCs, perhaps even one in each town. Clearly in such circumstances the benefits to the haulage industry could be significant.

Experience in mainland Europe suggests a preference for legally constituted bodies involving all the main players to establish and oversee UCCs, whereas in the UK the approach has been for a commercial organisation to take the sole lead and decide the legal and commercial framework under which it will operate. It would seem that the European approach risks becoming bureaucratic and inflexible whereas the UK approach places responsibility with one organisation that is then responsible for agreeing all the sub-contracts and service level agreements that are required to make the whole process work.

Though the majority of the successful UK schemes are single client site based, the early evidence from Broadmead would suggest that the same approach is equally applicable to multi-user UCCs where the operator (a logistics service provider) takes overall control and responsibility.

In general terms, it appears that UCCs offer the greatest potential if they meet one or more of the following criteria:

- availability of funding, since there is no strong evidence that any truly self-financing schemes yet exist
- strong public sector involvement in encouraging (or forcing) their use through the regulatory framework (e.g. relaxing access time restrictions for vehicles operating from the centre)
- significant existing problems within the area to be served (e.g. poor vehicle access, significant traffic congestion, constrained loading/unloading facilities)
- bottom-up pressure from local interests (e.g. retailers in a Street Association)
- resolving logistics problems associated with a site that has a single manager/landlord (e.g. shopping centre)

6. RECOMMENDATIONS

In the right circumstances and with the right organisation and operational factors resolved there are realistic opportunities for UCCs and the concept should be progressed with vigour and resolve in the areas of greatest potential A number of recommendations associated with UCCs are grouped into three sections below.

6.1 Recommendations for Government action

- The Government should provide advice to local authorities about UCCs. This would help to raise awareness of the concept and to ensure that UCCs are properly considered as part of local sustainable freight transport strategies. This could take the form of ODPM Planning Guidance as to where consideration should be given to the establishment of all types of UCCs (i.e. town/city schemes, single sites, and special projects).

- The Government should promote the use of construction UCCs as these special project UCCs appear to be successful both commercially and in traffic and environmental terms. The Government should consider whether other special project UCCs could be established to handle the flow of publicly procured products (e.g. for government offices or hospitals).

- The Government should also seek to establish town/city UCC pilot schemes in the UK which tend to be more complicated to establish and take longer to work as intended. Such schemes would help to provide more experience and evaluation opportunities to support the case, or not, for UCCs in the longer term. This would help to ascertain the role that UCCs could play in a sustainable distribution strategy (in conjunction with other policy measures). The Government should identify ways in which one or more town/city-based UCC trials could be established. Attempts should be made to ensure that such schemes have a diversity of customers and products flowing through them.

- If the Government believes that UCCs have potential merit in freight transport policy terms, it should keep a record of details concerning UCCs that take place in the UK at the very least. The Government should identify ways in which to encourage operators of UCCs to provide information and reporting. This could extend beyond the UK by working in conjunction with other Governments and could, in part, be aimed at producing a Best Practice Guide to UCCs.

- The Government should determine the ways in which UCCs fit into their wider transport and other policy initiatives (such as Air Quality and CO_2 reduction strategies). UCCs may have a role as part of a package of measures to help meet AQ and CO_2 targets (UCCs offer good opportunities as not all transport operators need to invest in particular environmentally-friendly goods vehicles if using a UCC).

6.2 Recommendations for existing and future UCC schemes

- Although there are many examples of UCC schemes, the reporting of specific schemes and the synthesis of material about all schemes has been far from thorough. Emphasis should be placed on improved reporting of existing and future UCC schemes, as well as efforts to draw comparisons between schemes.

- It is important that those concerned with sustainable distribution policy considerations be aware of not taking a narrow view of what is meant by UCCs. UCCs refer to more than one type of scheme and can be extremely diverse in terms of their objectives, attributes and services offered.

- When a UCC scheme is being considered there is a need for the detailed measurement of traffic and goods flows in the prospective location(s). This should be followed by a period of consultation about the precise nature of the UCC scheme to be tested, and then an extended pilot that is managed and scrutinised by representatives of all the potential players – the local authority, logistics companies, retailers and other users (at both a local and national level), potential UCC operators, and environmentalists.

- Consistent and thorough evaluation of existing and future UCCs should be carried out. This should be in accordance with the approaches outlined in chapter 4 of this report. Strengthening the evaluation methodology used for UCC assessment is important as it helps build a case for the situations in which UCCs are most appropriate. More recent UCCs that have been commercially driven tend to place restrictions on the availability of certain information and data. However, even in these UCC schemes more wide-ranging evaluation should be possible that does not impinge on commercial confidentiality.

- When a UCC is set up it takes time to establish the scheme and sign up users. The gradual build up of goods throughput affects the financial viability and the traffic and environmental impacts of the UCC. It is necessary to ensure that UCC trials have sufficient support and funding to run for a suitable period of time over which to measure and analyse the results.

- Publicly-organised UCCs do not have a good track record in terms of implementation and operation. For UCCs to be attractive to companies and to be successful set-up they should be led and operated by one or several key commercial players that have identified the potential benefits of being involved.

6.3 Recommendation for further research into UCCs

- There is a need for further investigation into the total supply chain costs and benefits associated with the use of UCCs. The traffic and environmental benefits associated with UCCs that are not reflected in existing pricing mechanisms need to be included in this work as well as commercial costs and benefits.

- More work is necessary into the extent that UCCs implemented in conjunction with wider transport policy measures can help to address transport problems in towns and cities.

- Of the UCC research and evaluation that has taken place in the UK, most is focused on the vehicle movements into and out of the UCC. There should be further research into the impact of UCCs and their vehicle operations at the final point of delivery in the urban area (in terms of loading/unloading, queuing and environmental considerations).

- Understanding and quantification of the impact on supply chain operations and costs of having many UCCs rather than a few isolated schemes is needed. This could be achieved by means of simulation modelling.

- Further work is necessary to identify suitable dispensations that could be made available to operators using a UCC to reflect the traffic and environmental improvements that they are contributing to.

REFERENCES

The publications listed below are those directly referred to in Chapters 1 to 6. The full list of literature used during the project is shown overleaf.

BESTUFS (2002) Best Practice Handbook Year 3, Road Pricing and Urban Freight Transport, and Urban Freight Platforms, Deliverable D2.3, www.bestufs.net

City Ports project (2005) Interim report, http://www.regione.emilia-romagna.it/wcm/ERMES/Canali/trasporti/logistica_merci/distribuzione_merci_citta/pubbl_3/City_Ports_vol7_ingl.pdf

Department for Transport (2002) Heathrow Airport Retail Consolidation Centre: BAA PLC, Good Practice Case Study 402, Energy Efficiency Best Practice Programme.

Flämig, H. (2004) The Success Or Failure Of City Logistics In Germany (2004) presentation at Inter and Intra Urban Freight Distribution Networks, Cityfreight Project Conference, Prague 16-17th December 2004.

Foster, I. (2005) The Retail Consolidation Concept and Application at London's Heathrow Airport, presentation at BESTUFS II Workshop: Approaches to Urban Consolidation, 13-14th January 2005.

Huijsmans, J. and Wildeboer, Y. (1997) Freight Distribution into large European cities, Freight and Logistics Leaders Club.

Klaus, P. (2005) German experiences with urban consolidation centres - do they have a future role?, presentation at BESTUFS II Workshop: Approaches to Urban Consolidation, 13-14th January 2005.

Köhler, U. (2001) City Logistics in Germany in Taniguchi, E. and Thompson, R. (ed) City Logistics II, 2nd International Conference on City Logistics, Institute for City Logistics, pp.203-214.

Köhler, U. and Groke, O. (2003) New Ideas for the City-Logistics Project in Kassel, Proceedings of 3rd International Conference on City Logistics, in Madeira, pp.331-343.

McKinnon, A. (1998) Urban Transhipment: International Review of Previous Work in the UK, Report prepared for the Retail and Distribution Panel of the UK Government's Foresight Programme.

Nemoto, T. (1997) Area-wide inter-carrier consolidation of freight in urban areas, in Transport Logistics, Vol.1, No.2, pp.87-101.

Nobel, T. (2005) Development and experiences of city logistics activities in Germany - The example Bremen, presentation at "Goods Management and Strategic Implementation", TELLUS Open Workshop, Gothenburg, 17 June 2005, http://www.tellus-cities.net/media/en/Goods_WS05_City_Logistics.pdf

LIST OF LITERATURE CONSULTED

The full list of literature identified during the project is provided below. A number was allocated to each piece of literature as it was identified, so the list is simply presented in that order.

1. Department for Transport (1997) Energy Savings from Integrated Logistics Management: Tesco plc, Good Practice Case Study 364, Energy Efficiency Best Practice Programme.

2. Department for Transport (2004) Consolidate and Save, TransportEnergy Best Practice Programme, Department for Transport.

3. Department for Transport (2004) Profit Through Partnership, TransportEnergy Best Practice Programme Case Study, Department for Transport.

4. Department for Transport (2002) Heathrow Airport Retail Consolidation Centre: BAA PLC, Good Practice Case Study 402, Energy Efficiency Best Practice Programme.

5. Department for Transport (2004) Home Delivery: Meeting the Needs of Customers and the Environment, Royal Mail case study, TransportEnergy Best Practice Programme.

6. Exel (2003) Heathrow Consolidation Centre presentation, Clearzones Workshop.

7. Exel - Broadmead Freight Consolidation Centre Open Day (2004): presentations
a. Holland, H. (2004) Presentation by Bristol Councillor at Broadmead Freight Consolidation Centre Open Day, 29 July 2004.
b. Hudson, C. and Foster I. (2004) Presentation by Exel at Broadmead Freight Consolidation Centre Open Day, 29 July 2004.

8. Exel (2004) Exel to Operate a Leading-Edge Urban Consolidation Centre in the UK, Exel Press Release, 14 April.

9. Exel (2003) Exel and House of Fraser Bolster Partnership with Multi-Million Pound Contract, Exel Press Information, 22 July.

10. Tibbett and Britten (2002) Tibbett and Britten Launches Retail Offsite Logistics Support Concept for Major Shopping Centres, Tibbett and Britten press release, 4 November.

11. Wilson James Ltd, MACE Ltd and BAA plc (2003) Logistics Consolidation Centre Heathrow Airport, Site Visit Report – Stockholm.

12. Wilson James Ltd, MACE Ltd and BAA plc (n.d.) Logistics Consolidation Centre Heathrow Airport, Outline Briefing Paper.

13. BAA Heathrow Consolidation Centre, Project 362.

14. McKinnon, A. (1998) Urban Transhipment: International Review of Urban Transhipment Studies and Initiatives, Report prepared for the Retail and Distribution Panel of the UK Government's Foresight Programme.

15. McKinnon, A. (1998) Urban Transhipment: Review of Previous Work in the UK, Report prepared for the Retail and Distribution Panel of the UK Government's Foresight Programme.

16. Heriot Watt and Napier Universities (1998) Urban Transhipment Scoping Study, Draft of Full Report prepared for the Retail and Distribution Panel of the UK Government's Foresight Programme.

17. Whiteing, T. (1996) Urban Freight Facilities: A European Comparative Study of the Potential for Urban Freight Trans-Shipment Centres, Rees Jeffrey Road Fund Working Paper.

18. Whiteing, T. and Edwards, S. (1996) Urban Freight Transhipment Facilities: A European Comparative Study, paper presented at Universities Transport Studies Group Annual Conference, Huddersfield University.

19.Whiteing, T. and Edwards, S. (1997) Towards a reappraisal of urban freight policies, paper presented at the Logistics Research Network Annual Conference, Huddersfield University.

20. Whiteing, T. and Edwards, S. (1997) Goods Deliveries in City Centres: Have we got the policy balance right?, paper presented at PTRC Annual Conference, 1997.

21. Edwards, S. (1997) Distribution in city centres: Investigating the logistics impacts of city centre retail strategies, paper presented at Universities Transport Studies Group Annual Conference, Bournemouth University.

22. Whiteing, T.; Browne, M. and Allen, J. (2003) City Logistics: The Continuing Search for Sustainable Solutions, chapter in Waters, D. (ed) Global Logistics and Distribution Planning: Strategies for Management, Kogan Page, pp.308-320.

23. Retail Supply Chain conference (September 2003) Talk by Colin Porter House of Fraser on logistics of the last 50 metres including off-site stockrooms.

24. GLC London Freight Conference (1975) The scope for transhipment and consolidation operations in London: An analysis of available goods vehicle and commodity movement data, Background paper No.8 (April 1975).

25. GLC London Freight Conference (1975) Outline Proposal for System of Public distribution depots in London in parallel with existing depots, Background paper No.10 (April 1975).

26. First Milk/Dairy Farmers of Britain – First Milk and Dairy Farmers of Britain co-operate to achieve savings of over £8 million per year, News release, 5 August 2003.

27. Rodgers, D. (n.d.) Assessing the Viability of Sustainable Freight Distribution in Urban Areas Using Work Bikes with Reference to York, London and Belfast.

28.Workbike (n.d.) Smart Moves for the Last Mile: Logicity,
http://www.workbike.org/logicity/Content.html

29. DTZ (2000) A research study into potential collection points for English Partnerships.

30. Huijsmans, J. and Wildeboer, Y. (1997) Freight Distribution into large European cities, Freight and Logistics Leaders Club.

31. Köhler, U. (1999) City Logistics in Kassel, in Taniguchi, E. and Thompson, R. (ed) City Logistics I, 1st International Conference on City Logistics, 12-14 July 1999, in Cairns: Australia, Institute for City Logistics pp. 261-271.

32. Köhler, U. and Groke, O. (2003) New Ideas for the City-Logistics Project in Kassel, Proceedings of 3rd International Conference on City Logistics, in Madeira, pp.331-343.

33. Nemoto, T. (2003) An experimental cooperative parcel pick up system using the internet in the Central business district in Tokyo, Proceedings of 3rd International Conference on City Logistics, in Madeira.

34. Ljungberg, D. and Gebresenbet, G. (2002) – Investigating the possibility of a coordinated goods delivery service to shopping centres in Uppsala city to reduce transport intensity, paper in L. Sucharov and C. Brebbia (eds) Urban Transport VIII, WIT Press.

35. Sonntag, H (1998) Logistics Information System: A New Telematic Service for SME in City Logistics – The Berlin Experience, presentation at Triangle City Logistics Conference.

36. Sauerbrey, U. (1998) City Logistics: Fantasy or Reality, presentation at Triangle City Logistics Conference.

37. Flanders Institute for Logistics: project on collaboration and consolidation.

38. City Ports Conference (November 2004) Contained several sessions on city distribution solutions (see entries 106 to 114).

39.Cityfreight Conference (December 2004). Includes presentations on Malaga and German city logistics (see entries 87 to 94).

40. EDRUL European project – four test cities. Most relevant seems to be Eindhoven test is to use total vehicle capacity of freight companies in a new way using IT to match supply and demand.

41. European Commission (2000) Good Practice in Freight Transport, European Commission.

42. Woudsma, C. (2001) Understanding the Movement of Goods, Not People: Issues, Evidence and Potential, in Urban Studies, Vol.38, No.13, pp.2439-2455.

43. BESTUFS workshop – La Rochelle (April 2002). Presentations made:

a. BESTUFS (2002) Final Minutes of the BESTUFS workshop on Land Use Planning and Business Models for Urban Distribution Centres, La Rochelle, 25-26 April 2002.

b. Duchateau, H. (2002) Freight transport master plan for Brussels region, presentation and paper at BESTUFS workshop on Land Use Planning and Business Models for Urban Distribution Centres, La Rochelle, 25-26 April 2002.

c. Papageorgiou, K. (2002) Planning an open freight centre in the Port of Thessaloniki, presentation and paper at BESTUFS workshop on Land Use Planning and Business Models for Urban Distribution Centres, La Rochelle, 25-26 April 2002.

d. Strub, B. (2002) Transforming a cement production plant into a logistic centre LGZ Hochrhein, presentation at BESTUFS workshop on Land Use Planning and Business Models for Urban Distribution Centres, La Rochelle, 25-26 April 2002.

e. Mollard, J. (2002) ELCIDIS – Electric delivery vehicles in the city, presentation at BESTUFS workshop on Land Use Planning and Business Models for Urban Distribution Centres, La Rochelle, 25-26 April 2002.

f. Weinberg, L. (2002) Berlin-Brandenburg Integrated Goods Traffic Strategy, presentation at BESTUFS workshop on Land Use Planning and Business Models for Urban Distribution Centres, La Rochelle, 25-26 April 2002.

g. Brisvall, J. (2002) Smart deliveries to Sweden's largest housing project, presentation at BESTUFS workshop on Land Use Planning and Business Models for Urban Distribution Centres, La Rochelle, 25-26 April 2002.

h. Waibel, F. and Eisele, A. (2002) Land use planning and business models for urban distribution centres, presentation at BESTUFS workshop on Land Use Planning and Business Models for Urban Distribution Centres, La Rochelle, 25-26 April 2002.

i. Montero, G. (2002) Urban Distribution Centre in Malaga, presentation at BESTUFS workshop on Land Use Planning and Business Models for Urban Distribution Centres, La Rochelle, 25-26 April 2002.

44. Kjarsgard, S. and Jensen, H (n.d.) Sustainable City Logistics Solutions, http://www.ntn.dk/Aarhus/papers/Sustainable%20City%20Logistics%20Solutions-HenrikJessJensen.doc

45. Forum for City Logistics (n.d.) Project Sustainable City Logistics Solutions, English Summary, http://www2.city-logistik.dk/english.htm

46. Nielsen, G. (2002) City Logistics in Denmark, on Forum for City Logistics website, http://www2.city-logistik.dk/articles/denmark.htm

47. Drejer, C. (2004) Lightening the load: Real progress on HGV traffic reduction, Green Party : http://www.greenparty.org.uk/files/reports/2004/Greening%20HGV%20Traffic.htm.

48. Whitelegg, J. (2003) What is sustainable transport?, presentation at ITELS Integrating Transport Into Supply Chains Conference, July 2003, http://www.itels.org.uk/dissemination/Cardifffreight1.pdf.

49. Browne, M. and Allen, J. (1998) Strategies to reduce the use of energy by road freight transport in cities, in Transport Logistics Vol.1, No.3, pp.195-209.

50. Ambrosini, C. and Routhier, J. (2004) Objectives, Methods and Results of Surveys carried out in the field of urban freight transport: an international comparison, in Transport Reviews, Vol.24, No.1, pp.57-77.

51. Taniguchi, E. and van der Heijden, R. (2000) An evaluation methodology for city logistics, in Transport Reviews, Vol.20, No.1, pp.65-90.

52. Taniguchi, E.; Noritake, M.: Yamada, T. and Izumitani, T. (1999) Optimal size and location planning of public logistics terminals, in Transportation Research Part E, Vol.35, pp.207-222.

53. Taniguchi, E.; Thompson, R. and Yamada, T. (2003) Predicting the effects of city logistics schemes, in Transport Reviews, Vol.23, No.4, pp.489-515.

54. Yamada, T. and Taniguchi, E. (2004) Modelling The Effects Of Urban Co-Operative Freight Transport, paper presented at the World Conference on Transport Research, Istanbul, 4-8 July.

55. Ballis, A. and Golias, J. (2004) Towards the improvement of a combined transport chain performance in European Journal of Operational Research, European Journal of Operational Research, Vol. 152, pp.420–436.

56. Mattfeld, D. and Kopfer, H. (2003) Terminal operations management in vehicle transhipment, Transportation Research Part A, Vol.37, pp.435-452.

57. Wiles, P. and van Brunt, B. (2001) Optimal Location of transhipment depots, in Transportation Research Part A, Vol.35, pp.745-771.

58. Herer, Y.; Tzur, M. and Yucesan, E. (2002) Transhipmments: An emerging inventory recouse to achieve supply chain leagility, in International Journal of Production Economics, Vol.80, pp.201-212.

59. Takahashi, Y.; Sinarimbo, N.; Hyodo, T. and Koike, R. (2004) A Study on Traffic and Environmental Effects of Cooperative Delivery System in CBD: Case Study in Marunouchi Area, paper presented at the World Conference on Transport Research, Istanbul, 4-8 July.

60. Tyan, J.; Wang, F. and Du, T. (2003) An evaluation of freight consolidation policies in global third party logistics, in Omega Vol.31, pp.55-62.

61. Worshipful Company of Carmen (1997) Servicing the City: Distribution Services for the City of London.

62. Dunning, J. (1997) Lorries in town: could transhipment schemes really deliver the goods?, Local Transport Today, 28 August 1997.

63. Freight Transport Association, Local Government Association and COSLA (1997) Delivering the Goods: Best Practice in Urban Distribution, FTA.

64. Battilana, J. and Hawthorne, I. (1976) – Design and cost of a transhipment depot to serve Swindon town centre, TRRL Laboratory Report 741, Department of the Environment.

65. Bevant, W. (1975) Chichester Town Centre interchange depot: An Environmental Assessment, West Sussex County Planning Department.

66. INECO (2004) Work package 4: Scenario Construction, Cityfreight project.
(Information on urban distribution centres in Finland, Preston (UK), Malaga (Spain) and consolidation in the Hague)

67. Weber (2003) Transforming Large socio-technical systems towards sustainability: on the role of users and future visions for the uptake of city logistics and combined heat and power generation, Innovation, Vol.16, No.2, pp.155-175.

68. Robinson, M. and Mortimer, P. (2004) Rail in Urban Freight: What Future, If Any?, Focus, Vol.6, No.2, pp.33-39.

69. Extract from Local Transport Plan for York.

70. Extract from GART report

71. European Commission (2002) ELCIDIS: Electric Vehicle City Distribution, Final Report, European Commission.

72. Jeeninga, H.; van Arkel, W. and Volkers, C. (2002) Performance and Acceptance of Electric and Hybrid Vehicles, ELCIDIS project, ECN-C-02-080

73. van Binsbergen, A. and Visser, J. (2001) Innovation Steps Towards Efficient Goods Distribution Systems for Urban Areas, TRAIL Thesis series no.T2001/5, The Netherlands TRAIL Research School.

74. Tibbett and Britten (2004) Press Release, Storecare Survey, 8 June 2004

75. Visser, J.; van Binsbergen, A. and Nemoto, T. (1999) Urban Freight Transport Policy and Planning, chapter in Taniguchi, E. and Thompson, R. (eds) City Logistics I, Institute for City Logistics, pp.39-70.

76. Trendsetter EU project. This is a current project that is part of the CIVITAS programme. Relevant literature:

a. Trendsetter project (n.d.) Five lorries replaced by one (Stockholm Construction site logistics centre), Trendsetter project, http://www.trendsetter-europe.org/index.php?ID=870

b. Trendsetter project (n.d.) Green city logistics in Graz, Trendsetter project, http://www.trendsetter-europe.org/index.php?ID=869

c. Trendsetter project (n.d.) Logistics centre for Old own of Stockholm, Trendsetter project, http://www.trendsetter-europe.org/index.php?ID=2807

77. TELLUS EU project. This is a current project that is part of the CIVITAS programme. Relevant literature:

a. Tellus project (2004) Inner city logistics centre – tri-modal logistics service, Berlin, Internal Deliverable 9.3a, January 2004.

b. Inner city logistics centre – container track system, Berlin, Internal Deliverable 9.3b, January 2004.

c. Incentives for improving the load rate in inner city freight distribution transport, Internal Deliverable 9.5, Jan 2004.

d. Consumer driven goods management from a Mobility Centre base, Gothenburg, Internal Deliverable 10.5a, January 2004.

78. Peterlini, E. (2003) Italian Case Study, presentation at Cityfreight Project Workshop, Copenhagen 22–23 May 2003.

79. EURETITALIA (2002) Work package 1: Annex report Italy, Comparative survey on urban freight, logistics and land use planning systems in Europe, Cityfreight project.

80. IVU, ISIS, ET&P, STRATEC, STA, and NTU (1998) REFORM project, Final report, UR-96-SC-1212.

81. Loffler, P. (1999) City Logistics: A Contribution to Sustainable Development? – A contribution to the discussion on solutions to freight transport problems in urban areas, paper in World Transport Policy and Practice, Vol.5, No.2, pp.4-10.

82. BESTUFS (2002) Best Practice Handbook Year 3, Road Pricing and Urban Freight Transport, and Urban Freight Platforms, Deliverable D2.3, available from www.bestufs.net

83. Wilson James Ltd, MACE Ltd and BAA plc (2004) Construction Logistics Consolidation Centres: An Examination of New Supply Chain Techniques – Managing & Handling Construction Materials, October 2004.

84. International Road Transport Union (2004) Second Report on Road Transport Best Industry Practices, IRU (pages 4-7 on ECOLOGUS – Ecoefficient Distribution in Évora).
Available at: http://www.iru.org/Publications/PDF/bip04.E.pdf

85. Ecologica Ltd (2003) Final Report: Wisemoves project, Ecologica.

86. Sustrate, V (1997) Economic Transport in the Hanover Area, paper in ECMT Round Table 109: Freight Transport and the City, European Conference f Ministers of Transport., pp.5-27.

87. Duchateau, H. (2004) Introduction, presentation at Inter and Intra Urban Freight Distribution Networks, Cityfreight Project Conference, Prague 16-17th December 2004.

88. Flämig, H. (2004) The Success Or Failure Of City Logistics In Germany (2004) presentation at Inter and Intra Urban Freight Distribution Networks, Cityfreight Project Conference, Prague 16-17th December 2004.

89. Kooijman, S. (2004) Coordinating Urban Freight And Waste Flows In The Hague: A Teamwork Solution, presentation at Inter and Intra Urban Freight Distribution Networks, Cityfreight Project Conference, Prague 16-17th December 2004.

90. Preti, A. (2004) Industrial Districts and Regional Logistics Systems in Italy: Emilia Rogmagna case and experiences. presentation at Inter and Intra Urban Freight Distribution Networks, Cityfreight Project Conference, Prague 16-17th December 2004.

91. Monami, E. (2004) The Hard Facts About City Logistics - A Multiple Scenario Analysis Of Goods Flows in and around Brussels, presentation at Inter and Intra Urban Freight Distribution Networks, Cityfreight Project Conference, Prague 16-17th December 2004.

92. Dellinger. J.C. (2004) Methodology For Urban Freight Solutions Development presentation at Inter and Intra Urban Freight Distribution Networks, Cityfreight Project Conference, Prague 16-17th December 2004.

93. Salanne, I. (2004) The Development Of Underground Deliveries In The Helsinki Metropolitan Area, presentation at Inter and Intra Urban Freight Distribution Networks, Cityfreight Project Conference, Prague 16-17th December 2004.

94. Van Der Zanden, F. (2004) Experiences from City Freight – A Toolbox For Success, presentation at Inter and Intra Urban Freight Distribution Networks, Cityfreight Project Conference, Prague 16-17th December 2004.

95. Woodburn, A. (2005) Overview of consolidation centres for urban and specialist use, presentation at BESTUFS II Workshop: Approaches to Urban Consolidation, 13-14th January 2005.

96. Foster, I. (2005) The Retail Consolidation Concept and Application at London's Heathrow Airport, presentation at BESTUFS II Workshop: Approaches to Urban Consolidation, 13-14th January 2005.

97. Slinn, M. (2005) West London Freight Quality Partnership - placing freight initiatives in context in West London, presentation at BESTUFS II Workshop: Approaches to Urban Consolidation, 13-14th January 2005.

98. Brooks, J. and Sullivan, G. (2005) The role of BAA's construction consolidation site at Heathrow Airport, presentation at BESTUFS II Workshop: Approaches to Urban Consolidation, 13-14th January 2005.

99. Hapgood, T. (2005) Urban Freight Consolidation – The Bristol VIVALDI Project Experience, presentation at BESTUFS II Workshop: Approaches to Urban Consolidation, 13-14th January 2005.

100. de Bruin, N. (2005) Urban Distribution in the Hague and the Randstadt, Holland, presentation at BESTUFS II Workshop: Approaches to Urban Consolidation, 13-14th January 2005.

101. Dablanc, L. (2005) French strategic approach to urban consolidation, presentation at BESTUFS II Workshop: Approaches to Urban Consolidation, 13-14th January 2005.

102. Lewis, A. (2005) Approaches to evaluating urban consolidation centre trials and projects, presentation at BESTUFS II Workshop: Approaches to Urban Consolidation, 13-14th January 2005.

103. Schrampf, J. (2005) Urban Goods Consolidation in Industrial and Intermodal Supply Chain, presentation at BESTUFS II Workshop: Approaches to Urban Consolidation, 13-14th January 2005.

104. Bokor, Z. and Berki, Z. (2005) City logistics in Hungarian transport policies, presentation at BESTUFS II Workshop: Approaches to Urban Consolidation, 13-14th January 2005.

105. Klaus, P. (2005) German experiences with urban consolidation centres - do they have a future role?, presentation at BESTUFS II Workshop: Approaches to Urban Consolidation, 13-14th January 2005.

106. Montero, G., Larraneta, S. and Munuzuri, J. (2004) Solutions Adopted in Malaga and Sevilla, presentation at the joint Merope, eDrul, City Ports Conference, Florence. 15-16 November.

107. Zucca, L. (2004) The Logistics Project in Brescia's Historical Centre, presentation at the joint Merope, eDrul, City Ports Conference, Florence. 15-16 November.

108. Koukouloudi, E. (2004 The KAVALA city case study in the CITY PORTS project, presentation at the joint Merope, eDrul, City Ports Conference, Florence. 15-16 November.

109. Mattesini, L., Benini, F. and Melloni, E. (2004) Feasibility Study on a Transit Point for Florence, presentation at the joint Merope, eDrul, City Ports Conference, Florence. 15-16 November.

110. Ambrosino, G, Liberato, A., Bellini, R., Flori, A., Pucci, F. and Manni, W. (2004) Siena. logistics schemes and ICT services, presentation at the joint Merope, eDrul, City Ports Conference, Florence. 15-16 November.

111. Patier, D. and Routhier, J.L. (2004) Urban Freight Flows and Control in France, presentation at the joint Merope, eDrul, City Ports Conference, Florence. 15-16 November.

112. Burian, G., Beier, R. and Kastelic, M. (2004) City Logistics Solutions in Wien and Graz by means of PPP, presentation at the joint Merope, eDrul, City Ports Conference, Florence. 15-16 November.

113. Caiado, G. (2004) The Lisbon Experience in the eDRUL Project, presentation at the joint Merope, eDrul, City Ports Conference, Florence. 15-16 November.

114. Jensen, H. (2004) Sustainable City Logistics Solutions in Denmark, presentation at the joint Merope, eDrul, City Ports Conference, Florence. 15-16 November.

115. Köhler, U. (2001) City Logistics in Germany in Taniguchi, E. and Thompson, R. (ed) City Logistics II, 2nd International Conference on City Logistics, Institute for City Logistics, pp.203-214.

116. Plowden, S. and Buchan, K. (1995) A New Framework for Freight Transport, Civic Trust.

117. Bastien, O. (2005) Consolidation centres for multi-retailing environments, presentation at the "Towards Sustainable Distribution" Conference, 22 February, London.

118. Nemoto, T. (1997) Area-wide inter-carrier consolidation of freight in urban areas, in Transport Logistics, Vol.1, No.2, pp.87-101.

119. McWilliam, K. and Sonnabend, P. (2004) Year One Final Report: Urban Transport Benchmarking Initiative, Annex A3.2, City Logistics: Site Visits and Case Studies, Urban Transport Benchmarking Initiative.
http://www.transportbenchmarks.org/pdf/Reports/UTB-LOGISTICS-ANNEX-A3.2.pdf

120. Konings, J. (1996) Integrated centres for the transhipment, storage, collection and distribution of goods, in Transport Policy, Vol.3, No.1/2, pp.3-11.

121. Ministère de l'Equipement (2002) Programme national de recherche TMV,
http://www.transports-marchandises-en-ville.org/anglais/experien.htm

122. TRENDSETTER (2005) TRENDSETTER Newsletter No.5, June 2005, EC project funded as part of CIVITAS. Available from: www.trendsetter-europe.org

123. Yorkshire and Humber Assembly (2004) A Regional Freight Strategy for Yorkshire and Humber: Baseline Report, Yorkshire and Humber Assembly.

124. City Ports project (2005) Interim report,
http://www.regione.emilia-romagna.it/wcm/ERMES/Canali/trasporti/logistica_merci/distribuzione_merci_citta/pubbl_3/City_Ports_vol7_ingl.pdf

125. Vaghi, C. and Grea, G. (2005) Business Models and policies to foster the participation of operators in Italian city logistics experiences, presentation made at BESTUFS Workshop, Kaposvar, Hungary, 29-30 September 2005.

126. the eDrul (eCommerce Enabled, Demand Responsive Urban Logistics) project (2002) Siena, http://srv-sia-01.softeco.it/edrul/siena.html

127. the eDrul (eCommerce Enabled, Demand Responsive Urban Logistics) project (2005) Newsletter 5, http://srv-sia-01.softeco.it/edrul/Project%20Documents/NL5.pdf

128. Maier, W. (2002) Logistics Centre South – city friendly construction logistics for the Potsdamer Platz building site complex, in OECD (2002) Report of the Workshop on Innovation for Environmentally Sustainable Transport: Mobility Services and Logistics for Passenger and Freight Transport, report ENV/EPOC/WPNEP/T(2001)6/FINAL.

129. Attlassy, M & University of Westminster (2005) The tricycle experimentation in Paris "la Petite Reine", University of Westminster.

130. Debauche, W. and Duchateau, H. (1998) Urban Freight Transport Strategy In Brussels, paper presented at the PTRC Annual Conference in Loughborough in September 1998.

131. Buck Consultants International (2004) Deliverable 6: Best practices Guidelines, City Freight project: Inter - and Intra-City Freight Distribution Networks, European Commission Fifth Framework Programme.

132. Degenkamp, M. (2005) Freight Logistics in Utrecht, presentation made at BESTUFS Workshop, Kaposvar, Hungary, 29-30 September 2005.

133. SMILE (2003) Programme of the Study Tour in Groningen, SMILE, http://www.smile-europe.org/demonstration_projects/groningen/catalogue_groningen.pdf

134. Menuzuri, J. (2005) State of the Art in Urban Freight Data Collection in France, BESTUFS Roundtable, Lyon, France, 22-23 September 2005.

135. Valentini, M., Lacquaniti, P. and Valenti, G. (2001) Methodology and Results of a Study on Logistics Schemes in Siena in Taniguchi, E. and Thompson, R. (ed) City Logistics II, 2nd International Conference on City Logistics, Institute for City Logistics, pp.185-199.

136. Gragnani, S., Valenti, G. and Valentini, M. (2003) City Logistics in Italy: A National Project, Proceedings of 3rd International Conference on City Logistics, in Madeira, pp.289-301.

137. Lewis, A. (1996) Alternative Strategies for Urban Freight Transport, Management, Interim Report no.2, Alternative Urban Freight Strategies Project, THERMIE Type B Action No. DIS-0154-95-FR, funded by the EC DGXVII (Energy).

138. Pettersson, M. (1999) Innerstadens varudistribution - förutsättningar för en samordnad distribution. Licentiatuppsats, rapport STACTH 1999:4, Institutionen för stads- och trafikplanering, Chalmers Technical University, Sweden. Available from: http://www.arch.chalmers.se/tema/stad-trafik/mona.html.

139. Alcatel Austria (project co-ordinator) (1999) LEAN project final report, EC-funded project under the RTD Programme of the 4th Framework, Contract No.: PL97-2113.

140. PTV (project co-ordinator) (2002) Innovative Distribution with Intermodal Freight Operation in Metropolitan Areas (IDIOMA), EC-funded project under the RTD Programme of the 4th Framework, Contract No. JC-98-5028.

141. OECD (2002) Report of the Workshop on Innovation for Environmentally Sustainable Transport: Mobility Services and Logistics for Passenger and Freight Transport, report ENV/EPOC/WPNEP/T(2001)6/FINAL.

142. TRENDSETTER (2001) Technical Annex, TRENDSETTER EU-funded project, CONTRACT No: NNE-2001-00323.

143. York and County Press (2002) Wheel Alternatives Ltd.
Available at: http://www.thisisyork.co.uk/york/library/2002/businessawards2002/wheelatl.html

144. Davis, P. (2005) Developing a Freight Consolidation Scheme Serving City Centre Retailers, presentation at Delivering Urban Transport Innovations, Vivaldi National Conference in Bristol, 14-15 September 2005.

145. VIVALDI (2005) Demonstrator Fact Sheet: City-Logistics in Bremen, VIVALDI EU-funded project. Available at: http://www.vivaldiproject.org/pdf/fact_sheet_City-Logistics-Bremen.pdf

146. Jeske, J.C. (2005) City-Logistik und städtischer Wirtschaftsverkehr, PTV.

147. Claix - Citylogistik (2005) Claix - Citylogistik,
http://www.aachen.de/DE/stadt_buerger/verkehr_tiefbau/claix/index.html

148. Nobel, T. (2002) City-Logistik in Bremen im Rahmen des EU-Projekts “VIVALDI”, presentation made to Das Netzwerk Stadtlogistik, 9 July 2002.
http://www.netzwerk-stadtlogistik.de/download/nobel-2002-07-09.pdf

149. Reglog (2005) Reglog - Regensburg Citylogistik, http://www.reglog.de/1_reglog/reglog.html

150. Hoelser , T. (2002) City-Logistik – eine Strategie von gestern?, IHK WirtschaftsForum,
http://www.frankfurt-main.ihk.de/presse/ihk-wirtschaftsforum/2002/0208/city_logistik/index.html

151. Abelmann, P. (2001) Innovative Angebotsausweitung als Ausweg aus der Kostenfalle, presentation at Veranstaltung des Netzwerkes Stadtlogistik, in Aachen, 4.December 2001, http://www.netzwerk-stadtlogistik.de/download/abelmann-2001-12-04.pdf

152. Nobel, T. (2005) Development and experiences of city logistics activities in Germany - The example Bremen, presentation at “Goods Management and Strategic Implementation”, TELLUS Open Workshop, Gothenburg, 17 June 2005,
http://www.tellus-cities.net/media/en/Goods_WS05_City_Logistics.pdf

153. Foster, I., McWilliam, K. & Lewis, A. (2005) Consolidation Centres and their Role in Delivering Sustainable Freight, paper presented at 29th UK Transport Conference "Transport Excellence Through Practical Delivery", University Nottingham, published as Hills V (eds.), Transport Excellence through Practical Delivery, CICC Publications, Cambridge, 2005, pp.59-69.

LIST OF ORGANISATIONS

The organisations that participated in discussions and interviews during the research include:

- London Borough of Southwark
- London Borough of Lewisham
- London Borough of Camden
- Lancashire County Council
- North Yorkshire County Council
- City of York Council
- Bristol City Council
- Transport for London
- Terminal 5 Logistics Centre at Heathrow
- York Business Pride
- British Retail Consortium
- Exel
- Federation of Wholesale Distributors
- Association of Convenience Stores
- Town and Country Planning Association
- Road Haulage Association
- Freight Transport Association
- DHL
- Faber Maunsell
- NISA Today

The following organisations either participated in a meeting about the draft version of this report or provided comments after the meeting:

- Association of International Courier and Express Services
- Association of London Government
- Bristol City Council
- DEFRA
- Department for Transport
- Exel
- Faber Maunsell
- Freight Transport Association
- Town and County Planning Association
- Transport and Travel Research
- Transport for London
- University of Newcastle

In addition, the objectives of the study were presented at the BESTUFS Workshop held in London in January 2005 and comments and information were received from many of the participants. The organisations participating in the workshop included:

ARUP, UK
BAA, UK
Belgium Road Research Centre
Brimsdown Freight Quality Partnership, UK
Bristol City Council, UK
Cardiff University, UK
Chalmers University, Sweden
City of Aalborg, Denmark
City of Gothenburg, Sweden
City of Hague, the Netherlands
City of Paris/IMPACTS, France
CSST, Italy
Department for Transport, UK
Deutsche Post / DHL
ECONSULT, Austria
European Commission

Exel, UK
GLA, UK
Heriot Watt University, UK
INFORM
INRETS, France
IVECO, Italy
Lancashire County Council, UK
LET, France
Mace Ltd, UK
Ministry of Economy and Transport, Hungary
MVA, UK
NEA, the Netherlands
Nurnberg University, Germany
Peter Brett Associates, UK
POLIS
PTV, Germany
RAPP Trans, Switzerland
SCS Azioninnova
Steer Davies Gleave, UK
Sweltrac, UK
TDG, UK
Technical University of Hamburg, Germany
TFK, Sweden
Tracon, Estonia
Transman Consulting, Czech Republic
Transport and Travel Research, UK
Transport for London, UK
Trinity College Dublin, Republic of Ireland
TRL, UK
University of Newcastle, UK
Wincanton, UK

APPENDIX 1: Summary Review of Literature

Table A1.1 contains a review of all the items of literature identified during the project. Each piece of literature has been summarised under the following headings:

- number (refers to the number allocated to the piece of literature. Further details of the author/s, title and date of publication are provided in the "List of Literature Consulted" section)
- discussion of consolidation centres
- definition
- method of working
- advantages/disadvantages
- impacts on transport operations
- and other supply chain activities (i.e. impacts on other supply chain activities)

Table A1.1: Full Review of Literature

No.	Discussion of consolidation centres	Definition	Method of working	Advantages/disadvantages	Impacts on transport operations…	and other supply chain activities
1	Nothing on centres - supplier collection and onward supply only (i.e. integration of primary/secondary distribution)	-	-	-	-	-
2	Nothing on centres - groupage only	-	-	-	-	-
3	Nothing on centres - haulier consortia only	-	-	-	-	-
4	Yes	Retail consolidation centre	Exel operate Consolidation Centre for BAA 1.5 miles from Heathrow Airport (Hatton Cross), serving Terminals 1-4, handling 10% of retail throughput within 6 months	Advantages: reduction in no. of vehicles into terminals; improved security resulting from fewer airside movements; faster deliveries into consolidation centre; more frequent shuttle deliveries to terminals	Reduced congestion within airport area resulting from the decrease in no. of vehicle movements; quicker turnaround of vehicles at consolidation centre; better vehicle utilisation; less pressure on drivers' hours, etc. - little detail provided	Centre can be used for overnight stocking, buffer stock, inventory monitoring, break bulk activities, pre-retailing activities, seasonal stockholding, etc.
5	Nothing specific - introduction of locker banks at key locations, but no real details of consolidation	-	-	-	-	-
6	Powerpoint presentation slides, but focused on consolidation centres	Retail consolidation centre	See 4	Better planning of logistics operation, with improved information systems; many specific benefits listed (e.g. meeting policy targets; improved security; better in-terminal operations; etc)	Single point of delivery for suppliers; no vehicle restrictions; delivery windows; immediate off-loading and checking, etc. - helps suppliers to improve efficiency of their supply chain - approx. 60% reduction in vehicle movements for retailers served	See 4, plus greater control over and transparency of logistics operation - potential for further added value services such as remote stock rooms, inter-store transfers

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
7	Powerpoint presentation slides, fairly general but with some detail	Urban retail consolidation centre	Retail consolidation centre on strategic approach to Bristol, taking deliveries from suppliers to Broadmead Centre - EURO IV vehicle makes deliveries to retailers	Several benefits to suppliers, retailers and communities identified (e.g. single delivery point with no vehicle restrictions; reliable supply chain, potential for added value services; reduced traffic levels; increased recycling); can be linked to transport policy measures and targets	51% reduction in vehicle trips into Bristol city centre for retailers using scheme; benefits include out-of-town delivery point, no vehicle restrictions, immediate off-loading so better vehicle utilisation, agreed delivery time windows	Many positive impacts identified, but not quantified - improved information flows, staff planning/productivity, product availability, etc; remote stock room with added value capabilities; collections for recycling/returns; inter-store transfers
8	Yes, though brief	Urban retail consolidation centre	Central hub used to streamline deliveries to retailers	Means of coping with the predicted 40% increase in retail space at Broadmead Centre in next 5 years - benefits as for 7	Expected that vehicle movements to retail premises will decrease by over 50%	Retailers will benefit from "definite delivery times, more effective stock replenishment and improved staff planning and productivity"
9	Yes, though brief	Offsite logistics support concept	Logistics operation for Bluewater established in nearby existing T&B DC	New web-based warehouse management system which allows better stock control and visibility, while offsite centre helps to reduce vehicle movements at shopping centre	Expected to lead to reduction in number of drops to shopping centre, resulting in fewer HGVs and less congestion	Flexible offsite storage and replenishment support, together with other value-added/pre-retailing services; fast stock replenishment, with visibility of local offsite stock
10	Not really consolidation - offsite stockroom for London area in Barking	-	-	-	-	-
11	Yes	Logistics centre for construction of large development area	Construction materials delivered to logistics centre for short-term storage, then onward (coordinated) movement to site when required	Minimisation of impact of long-term construction traffic; reduction in theft and damage to goods; trade contractors can focus on core activities; use of "green" vehicles around site	Removal of lorries touring the area in search of drop-off location, through better control of transport operations - typically 4-5 trucks inbound to centre is reduced to 1 truck outbound, reducing congestion	Better coordination of arrivals across construction site

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
12	Yes	Construction consolidation centre	Inbound consignments delivered to offsite centre at Hatton Cross, with covered and open storage space, then delivered direct to workface from there as required; storage should be no more than 7 days	Greater predictability and certainty for construction project; adoption of barcoding, with greater pick accuracy; contractors can concentrate on core tasks; achievement of higher performance targets; productivity gains of up to 5%	Separation of transport operations gives greater flexibility, especially since many site deliveries are required at night; consolidated loads to delivery sites, reducing vehicle movements; ease of airside deliveries; all deliveries coordinated to avoid congestion	Management of supply chain right through to point of use, ensuring that the process is coordinated; quality and quantity checking on arrival at consolidation centre allows early identification of problems; minimisation of on-site materials storage, but with local buffer stock
13	Yes	Construction consolidation centre	No additional material than contained in 12			
14	Yes	Urban transhipment - not really defined, but discussion of "the traditional break-bulk form of transhipment being implemented at an urban level on a communal, shared-user basis"	Basic information relating to schemes in several countries	Few successful/ongoing examples from abroad; impacts depend upon regulatory framework for road haulage industry, level of state intervention in freight, retail planning policies, nature and control of supply chain	Some analysis of impacts of German initiatives, which found HGV traffic reduction impacts to generally be less than 1%; little analysis of impacts elsewhere	No specific consideration, but much criticism of some schemes (e.g. in Netherlands) over issues such as control of operations, lack of economic benefit, etc.
15	Yes	Basically as in 14, with recognition that terminology is vague and there are various urban scales that can be considered	No specific trials, but details of several studies provided	Studies generally showed an increase in delivery costs, with economics dependent upon severity of vehicle restrictions and usage of the transhipment facilities; apparent particular disadvantages for large retailers	No concrete evidence as a result of analysing studies rather than trials	Some general consideration of changes to logistical operations and likely effects/impacts of transhipment, but no concrete data/evidence; load consolidation viewed more positively than break-bulk - importance of information flows as well as physical product handling

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
16	Yes	Chapter 2 focuses on concepts and propositions - section on consolidation-type centres focuses upon classic urban transhipment centre, where loads are transferred into small vehicles for delivery within towns	Focuses both on physical consolidation-type centres and improvements to vehicle utilisation	Bleak future for classic textbook transhipment depot, which tend to be ineffective with disadvantages outweighing advantages; unlikely to be viable for populations less than 150,000; review very similar to material in following refs (17-20) possibly scope for integrating rail into consolidation through separation of trunk and local haulage; recommends virtual urban distribution system, matching spare capacity with demand in real-time; not clear whether UDCs are best way of helping environment - if so, then more work needs to be done on costs of operation; for transhipment, need mechanism by which costs and benefits can be set off against each other to create net policy evaluation; not clear if more smaller vehicles better than fewer large ones - though this assumes classic type of operation	Some discussion, but little based on evidence from operational schemes - most detail is already covered in other references	Some general discussion of issues. Particularly important to consider handling costs in the supply chain, but they are not always transparent and easily-identifiable

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
17	Yes	Focus is on transhipment facilities - referred to as "classic textbook trans-shipment depot", meaning publicly owned and operated facility where freight is forced to transfer to small vehicles, with load consolidation, for the urban delivery	General details about existing schemes (and those proposed but not implemented) - mostly involving forcing some or all freight to pass through a public terminal for transhipment.	Classic examples in UK and other European countries generally not successful, with bleak future - arrangements generally not acceptable for businesses, who have different interests and priorities to LAs. Extra costs typically outweigh benefits; other problems also highlighted. Needs more than 150,000 inhabitants for viability. Need knowledge of consumer demand patterns, distribution objectives of business, range of planning policies available and priorities of different sections of society. Possibly less scope in UK than mainland Europe due to different structure of retail sector and greater commercialisation and sophistication of road haulage	Focuses mainly on the alleviation of urban transport problems caused by freight vehicles through consolidation and other urban freight policies. Some details of case studies in France and Netherlands, but no quantifiable changes to transport operations - focuses mainly on the nature of policies implemented (e.g. vehicle weight restrictions, access times). Some market potential studies in Neths suggested large reductions in freight vehicle kilometres, but no evidence of achievement, mainly due to low uptake of use of centres.	Emphasises that modern logistics management needs to be taken into account - this has generally been ignored in those schemes pursued (or evaluated) by the public sector. Neths schemes originally intended to cater for range of logistics activities scaled down to be class trans-shipment centres instead - for success, the centres really need to be incorporated into supply chains though
18	Yes, but essentially the same as ref. 17 - discussion of Germany is only significant additional information	As for 17.	As for 17.	Some details of costs for German schemes, and how they have been funded (e.g. Bremen was 60% private and 40% public, with neutral development company - potential business model? (though it deals mainly with long distance movements from port rather than city centre deliveries))	As for 17.	As for 17.

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
19	Yes, though fairly generally within the context of urban freight policies	Goods distribution centres (i.e. transhipment centres), possibly rail-connected	Different solutions likely to be needed for the different categories of urban area - metropolitan cities, industrial cities suburban centres, market towns and historic towns/resorts. Argues that metropolitan cities, industrial towns and historic towns in most need of attention - no detail of consolidation centre solutions for these types though	Need adequate research before designing and implementing solutions. Typical problems in agreeing nature of transhipment schemes have related to: ownership (public sector or private enterprise), their status (voluntary or compulsory) and the nature of licensing systems for operators wishing to use them (together with restrictions on vehicle size, type and hours of operation for operators remaining outside scheme). Maastricht - disappointingly low volumes through depot. Fig. 1 suggests that consolidation likely to be better for some supplier deliveries (e.g. furniture to dept. stores) and express parcels/courier services. Weak case for public transhipment centres; cooperative ventures more likely to succeed, but difficult to establish	Consolidation of deliveries and reduced delivery frequencies viewed as offering greatest scope for reduction in urban freight activity - some data on existing situation in different city types, but no evaluation of potential reductions as a result of consolidation centres. Small historic centres tend to have more independent retail outlets, so may offer greatest benefits, but volumes are too low to make centre commercially viable; large cities likely to be more viable, but greater proportion of deliveries are already consolidated	Not explicitly considered
20	Yes	Urban freight transhipment depots	Freight destined for urban area would be consolidated at depot on city periphery and transhipped into small vans for final delivery, either through voluntary or compulsory schemes	Nothing more than in ref. 19	-	-
21	Not directly, but perhaps some relevant data	-	-	-	-	-

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
22	Yes, within wider context of potential policy/operational measures for urban freight - consolidation can be achieved in many ways, not necessarily with a physical centre	Urban freight trans-shipment centres	Crucial difference between compulsory (or penalty) and voluntary schemes - importance of link to other policy and regulatory measures	Generally low uptake of schemes, so volumes are fairly insignificant; difficulties in agreeing precise nature of schemes (e.g. public or private; voluntary or compulsory; licensing systems for operators in delivery area; restrictions for non-participants; exemptions from restrictions for specific commodities, etc.). High costs of transhipment and loss of control by shippers seem to be biggest obstacles. Advantages may include ability to integrate with other modes, to integrate with wider transport policies, to allow dedicated vehicles for urban work, etc. Schemes tend not to be self-funding.	See previous column - use of vehicles better equipped for urban task is perhaps one major potential benefit which can reduce impacts (e.g. smaller vehicles, alternative fuel vehicles)	No specific consideration, other than mention of loss of control suffered by shippers of goods
23	No explicit consideration of consolidation centres evident from the programme	-	-	-	-	-
24	Yes	Distinction between break bulk, transhipment, groupage and consolidation, with the latter effectively utilising the former three	No specific trials, really just a scoping study	Cost penalties of transhipment likely to restrict attractiveness - only likely to attract long distance movements, and then perhaps only with severe restrictions on vehicle movements in urban area; potential to link with rail for trunk haul; much transhipment already occurs in existing operations in any case; transhipment likely to introduce delay/cost, plus problems of security, unsuitability of goods, etc.	Greater use of larger vehicles may result, which may reduce total vehicle movements but increase the problems on a per vehicle basis	Some manufacturers/distributors saw transhipment as potential way to expand their business, by utilising the networks set up; much reluctance to concept though unless it can be proved to be efficient and economical

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
25	Yes, referred to as public distribution depots	Public distribution depots serving radius of 5 - 6 miles	No trial, but proposal for 10 public distribution depots	Perceived advantages - more economical distribution; better service to small retailers, lower stock in shops, faster response for out-of-stocks, channel for large items avoiding retail outlet, access to distribution network for small manufacturers, reduction in traffic levels, alternative modes for trunk haul, etc. Disadvantages - extra costs for transhipment and storage, additional stock if 10 depots, duplication of existing networks, modest overall capacity, etc.	Reduction in traffic movements in urban area; potential to use non-road modes for trunk haul	Network available for small companies to use, which may affect competitiveness; changes in stockholding policies and locations, with better product availability and reduced lead times
26	Nothing on centres - coordination and rationalisation of haulage operations	-	-	-	-	-
27	No explicit consideration of consolidation centres, but some mention of edge-of-centre depots with onward distribution by bike	-	-	-	-	-
28	Yes - discussion of PUDOs (pick up drop off depots) in a ring around central London	Network of PUDOs at inner city locations, involving break-bulk and load consolidation	Deliveries/collections within central London made by non-motorised or low emission means - not clear about extent of implementation (if any); couriers deliver into and collect from PUDOs; some storage at PUDO if required	Perceived benefits: cost savings through contracting out "last mile"; better reliability; value-added services at PUDOs (e.g. warehousing), order tracking, green corporate image, etc.; environmental benefits	Use of bikes allows faster deliveries; couriers can avoid delays in central London (and congestion charge)	Can offer local buffer stock holding, thus improving product availability/customer service
29	Yes, in context of collection points for home delivery	Collection points within urban areas for delivery of online purchases	Various business models involving the use of secure delivery locations	Reduces costs and impacts of "last mile" delivery for delivery company, though there are still the costs/impacts associated with the customers collecting their goods	Fewer drop locations, so more efficient and cheaper transport operations; no need for subsequent visits to attempt to make drop to specific customer	-

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
30	Yes	No clear definition, but consideration of a number of different projects involving urban distribution centres (or similar terminology)	Varies - some public, some private centres	None particularly successful - some have ceased, others continue but with relatively small volumes; lots of organisational and contractual problems - difficult to get sufficient number of companies involved. Importance of regulations/policies (and their enforcement) in effecting use of centres; difficult to encourage competition	Fairly small, but potential to enforce use of low emission vehicles etc.	In some cases, may be restrictive in terms of when deliveries can be made, so can lengthen lead times; perception that service levels are lower
31	Yes	Coordination and bundling of goods in urban areas	Neutral carrier paid by 10 forwarding agents to collect consignments from their local branches, take them to a terminal near city centre, bundle them and deliver to CBD	45% reduction in vehicle mileage for flows using consolidation centre; doubling (or more) of capacity utilisation for delivery vehicles; 15% increase in delivery weight per drop; 13% fewer deliveries per retailer; higher operating costs though	See previous column - only 1% reduction in total (goods?) vehicle mileage in Kassel though, due to low penetration of scheme	No specific impacts mentioned
32	Yes	-	As described in 31	City logistics projects such as this have tended to cover only 2-5% of total freight flows in an inner city, so minimal impacts; list of requirements for successful City Logistics, mainly organisational in nature	Nothing specific	Lack of logistical services at Kassel terminal
33	No explicit consideration of consolidation centres	-	-	-	-	-
34	Some discussion of "coordinated delivery", but no discussion of fixed infrastructure	No definition	-	Issue over implementation strategies and management of start-up and running costs, together with allocation of cost savings	-	-

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
35	Not explicitly considered, but mention of successes and obstacles of City Logistics	No definition	No information	Successes: focus on problematic customers, districts or branches; easy access to city-zones; bundling of goods leads to savings up to 50%; test new technologies; facilitates pull logistics; PR benefits; increased awareness. Obstacles: difficult to integrate some types of operation; extra costs of handling; under representation of SMEs; poor integration into supply chains; conflicts of interest	Nothing specific	Nothing specific, apart from mention of lack of integration of projects into supply chains
36	Yes, though only a Powerpoint presentation so lacks detail	Use of hub to consolidate deliveries to cities	No specific information	Seems to offer most potential for "special clients" - many existing courier/parcels companies are already efficient. Almost no effect for consignees, but loss of contact to clients for transport service providers; monopolistic situations	Nothing specific	Nothing specific
37	Yes, but extremely limited information	-	-	-	-	-
38	No specific papers referring to "consolidation centres" but some likely to be relevant (e.g. transit point in Florence)	-	-	-	-	-
39	No specific papers referring to "consolidation centres" but some likely to be relevant	-	-	-	-	-
40	Very little information	-	-	-	-	-

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
41	Yes, under discussion of city logistics	Partnerships and styles of cooperation between all those involved in the logistics chain and in delivering/receiving goods in city centres	Some discussion of working of Kassel scheme, but nothing more	See next column - generally a brief, positive gloss on situation - lacks any real balanced analysis	Freiburg - reduction in total journey times from 566 hours per month to 168 hours per month; no. of truck operations per month down by 33%; time spent by lorries in city almost halved; Kassel - 70% fewer vehicle kms, 11% fewer trucks making deliveries, with lower costs (not specified)	Nothing specific
42	No discussion of consolidation	-	-	-	-	-
43	Yes	Various - urban freight centres; distribution platforms; urban distribution centres; GVZ	Some details of specific schemes (both existing and proposed) in various European cities - considerable detail about operating and regulatory context for some (e.g. La Rochelle, Malaga, Stockholm); some schemes are more regional/strategic, with little about consolidation	Many issues identified and discussed, most of which are contained in other pieces of literature. In general, identification of both advantages (e.g. environmental benefits, reduced vehicle movements and operating costs) and disadvantages (e.g. difficulties of establishing partnerships, high set-up costs, problems of encouraging participation). Questions over public-private organisation, degree of enforcement of use, integration with on-road transport modes and land use planning, etc.	General impacts as identified in wider literature	Some schemes highlight attempts to integrate into supply chain and offer value-added activities
44	Nothing specific - collaboration rather than consolidation	-	-	-	-	-
45	Nothing specific - collaboration rather than consolidation	-	-	-	-	-
46	Nothing specific - collaboration rather than consolidation	-	-	-	-	-

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
47	Yes	No definition	No definition	General discussion of environmental, economic and societal benefits, though lacks any evidence or referencing; unsubstantiated claim that "city logistics solutions benefit not only the environment but also the companies involved through reduction of costs, increased competitiveness and improved reputation"	Nothing specific	Nothing specific
48	Very limited coverage - few Powerpoint slides with little detail	-	-	-	-	-
49	Yes - Scenario 3 covers load consolidation and Scenario 6 assesses urban transhipment centre	Refers to "consolidation centres and shared-user urban transhipment depots"; includes modelling of urban freight scenarios	No specific definition, though modelling for London assumed just one consolidation centre	Improved vehicle loading of 20% (i.e. from 50% up to 60% of capacity) assumed, based on Basle case study; may involve replacement of large vehicles with smaller ones (perhaps specifically designed for urban operations); UK retail distribution strategies, with largely dedicated services, tend not to lend themselves to transhipment centre operation	Scope for reducing total number of trips within urban area; much retail freight already consolidated in-company, so scope for further consolidation may be limited; Scenario predicts 15% increase in vehicle-kms compared to base case (though perhaps savings if more than one centre, as trip lengths would reduce)	Nothing specific

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
50	Yes (for Germany, Switzerland and Netherlands), plus some mention of cooperation	Main focus on public urban distribution centres (UDCs), but some mention of freight platforms	Little specific detail	Kassel - loading rate of vehicles doubled in volume and multiplied by 1.5 in weight, with vehicle mileage down by 45%, but this has saved only 1% of urban freight mileage due to low usage; extra costs when using consolidation centre. Zurich - mixed results, with high implementation costs, low throughput, lack of customer motivation, regulation and railway partnership lacking, traffic congestion limited in city. Dutch examples relative failures - need subsidy; problems relate to location of UDC, its services offered, lack of flexibility, operators' lack of interest, etc. Move to more flexible freight platforms?	See previous column	
51	Yes - public logistics terminals and cooperative freight transport systems	No clear definitions	Monaco platform - provided by government and operated by private freight carrier, with subsidy to ensure costs are lower than when not using terminal; Kassel scheme as described in other references; Osaka - 2 department stores set up collocated DCs and share transport resources to make deliveries to urban area	Kassel - only 5 out of original 10 carriers remain in scheme. In general, potential to reduce no. of vehicles required and distance travelled	Kassel scheme - reduction in vehicle travel and queuing time	
52	Yes - public logistics terminals, though very heavily modelling based; of limited relevance	"multi-company distribution centres" assumed to be synonymous with "public logistics terminals"	-	Examination of trade-offs between land prices (generally higher nearer to urban centres) and transport cost benefits for the urban distribution (generally greater the closer to the urban centre)	Modelling shows reduction in distance travelled when centres are implemented	-

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
53	Yes - cooperative freight systems and public logistics terminals	-	-	Construction of freight terminals, together with arrangements for ensuring they operate smoothly (e.g. standardisation of slips and pallets) and implementation of information systems, plays important role in encouraging cooperative freight systems	-	-
54	Yes, though more of a focus on vehicle consolidation than physical centres	-	Theoretical - little detail, other than use of public terminals	Few cases of successful implementation despite some evidence of reduced environmental impacts and logistics costs; paper is highly mathematical, with little of relevance - costs often lower for direct delivery rather than using centre even though vehicle travel time less (4 out of 6 modelled cases); needs strong customer base within concentrated area for financial benefits	Less vehicle travel time, so transport benefits	See two columns previous for cost issues
55	Yes, particularly rail trunk haulage - not specifically urban related though, plus very theoretical	Focus on rail-road terminals	Rail-road terminal typically featuring storage sidings, transhipment sidings, intermodal unit storage, road network, etc. but also recognising potential of value-added services on site	Benefits of using rail for long distance movements; cost and availability of land in suitable locations; also problem of time involved for transhipment, but this can be reduced by new technologies	-	-
56	Not really any discussion of urban consolidation	-	-	-	-	-
57	Not really - very theoretical, with focus on agricultural produce for processing, but some discussion of transhipment costs	-	Theoretical scenario - assumptions bear little resemblance to "real life"	Overall potential cost benefits resulting from better resource utilisation for onward movements from depots; modelling reveals potential for up to 8 or 9 depots in a circular region, at distances of 70% of the radius - this applies to low value bulk commodities	Net reduction in transport costs as long as transhipment freight rate is less than around 85% of collection freight rate	-

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
58	Transshipment referred to is the movement of stock between storage locations to meet supply chain demands - may be role for transhipment centres within the concept though	Paper focuses on leagility, combining lean supply chains and customer responsiveness and agility. Consolidation centres may be the "decoupling points" where buffer stock is held.	No real discussion, other than of need for decoupling points in supply chain	Potential to improve supply chain, in particular customer service improvements at same time as inventory reduction	Focus is on inventory levels and customer service - nothing on transport impacts of proposed system	Could assist with implementation of supply chain strategies such as postponement, assemble-to-order, make-to-order, lead time reduction, ECR, etc.
59	Yes	Cooperative Delivery System (CDS), served by a nearby Stock Point (SP)	Tokyo trial and simulation, with CDS in small CBD area, served by SP also in/near to CDS. Freight carriers take freight to SP for consolidation and onward delivery. Also a focus on arrangements at the delivery points (large buildings)	Trial involved 5 big carriers and 13 small ones for one month, covering 22% of consignments to target area; use of natural gas vehicle for deliveries from SP; reduction in delays at unloading point (with dedicated unloading bays); only 30% of freight handled by carriers went through SP	33% fewer trucks outbound from SP than inbound; average unloading time reduced from 15 mins to 2.35 mins, though partly to do with parking enforcement, etc. Simulation benefits - freight could be delivered in just 5% of existing no. of trucks , which would lead to 15% reduction in total vehicle volume and other local area benefits	Nothing much, other than issues of receiving goods in the large buildings
60	Not urban-focused, but some relevant discussion	Focus is on consolidation at global level, for long-distance aircraft movement	-	-	-	-

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
61	Yes	Makes distinction between transhipment centres and consolidation centres, the former being simple transhipment to smaller vehicles and the latter involving consolidation of loads from multi-drop carriers.	Idea of consolidation centre on fringe of City (e.g. near Liverpool St.)	"Multi-occupancy of large office buildings creates particular problems and single receiving points should be encouraged and made mandatory in all new developments" - not necessarily consolidation though; "transhipment centres with loads being transferred to smaller vehicles would add to pollution, congestion and cost". No evidence of benefit even from consolidation centres, though more work required	Some data on existing City of London situation, but no real attempt to quantify impacts of a centre	Too many different requirements for different products (e.g. timing of delivery; handling; temperature control; food hygiene, etc.)
62	Yes	Closest UK examples are Royal Mail and major supermarket chains	Assumption that a larger fleet of small vehicles would replace a smaller fleet of larger ones	Potential to link with planning policies; European evidence suggests transhipment doesn't work; substantial additional costs; questionable environmental benefits of more smaller vehicles; concerns over admin, definition of responsibilities, capital/operating costs; policy implications of building new centres on green belt	More vehicles would result in a need for more drivers, fuel, etc.	Risk of stock damage as result of extra handling; storage at common depot would increase insurance costs; possible arguments amongst retailers over order of drops from vehicle

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
63	Yes	Out of town transhipment depots or Urban Distribution Centres (UDCs)	Transferral of goods into smaller less intrusive vehicles for urban deliveries, as part of wider policy and regulatory initiatives - considered specifically for Chester and Aberdeen	Many reasons for not using UDCs: specific product handling/control required; customer service levels; loss of competitive edge; bespoke IT systems not compatible with third parties; need for customer signature for security control; erosion of service levels through additional handling; security/insurance problems; deliveries already consolidated elsewhere in supply chain; need for specialist driver training/expertise for some products. Most respondents to survey were not in favour of UDCs; even supporters were doubtful about actual viability. May be some scope for UDCs to replace large vehicles making small deliveries, but only likely to succeed if established by operators on commercial basis and with value-added services	No specific information - detailed modelling required	Importance of integrating schemes into supply chain to have any chance of success - see previous columns re value-added services and other issues
64	Yes	Transhipment depots, with transfer from large to small vehicles	Assumption that all vehicles over 3 tons would deliver to transhipment depot (TSD) on edge of town, with light vehicles making deliveries; TSD wouldn't handle unsuitable commodities	Expensive - estimates of £9/ton for handling plus £2/ton for loss and damage (1975 prices). For most firms it would be cheaper to use their own light vehicles rather than use the TSD (assuming no public subsidy). Other studies had mean handling cost of £7.80/ton	See previous column	-

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
65	Yes	Interchange depot - basically a transhipment centre	Various options examined, either with limited throughput or full throughput through depot of goods destined for town centre, with use of small vehicles for onward deliveries - consultants favoured limited options, council favoured full throughput	Heavy focus on environmental advantages of reducing lorry movements (combined with measures such as pedestrianisation), with limited consideration of any wider issues. Limited throughput options were seen to offer better value for money, but at the expense of environmental advantage. Calculations seem basic and outdated, though cost report not included	Little of direct relevance	Nothing specific
66	Yes	Some definitions for specific proposed schemes (e.g. logistics centre, travel coordination centre, urban transhipment centre, transport centre) - mostly relating to typical consolidation activities	Not much detail, but some proposals. Helsinki - basically just an area dedicated to logistics activity. Tampere - coordination of internal (municipal) flows in combination with passenger transport, with fixed timetable routes. Preston - partially loaded vehicles to be unloaded at consolidation centre for onward movement to new shopping centre. Malaga - consolidation centre being developed for historic city centre, linked with pedestrianisation and electric vehicles	Little information, since schemes only at the proposal stage. General advantages perceived, e.g. reduction in vehicle movements, less congestion, fewer emissions. Little consideration of practicalities.	Little of direct relevance, other than general claims shown in previous column.	Mention of additional activities, e.g. warehousing, but nothing specific

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
67	Yes	No specific definition, but quite a bit relating to the setting up of two schemes	Coordinated deliveries from freight distribution centres at periphery of cities, making possible a significant reduction in no. of trips; no "protection" from existing ways of working, so had to compete with established methods of distribution with only voluntary participation	Improved transport efficiency; drawbacks - additional loading and unloading at distribution centre, cooperation required between freight forwarders, shop owners may have to adapt patterns of reception and collection of goods. Problems can be overcome if correct incentives and regulations are in place, and the actors are willing to learn. Both featured schemes failed due to lack of involvement of forwarders and retailers in design phase - claimed benefits didn't materialise	0	Main reasons for failure identified: i) implied change from established stocking and delivery patterns, ii) no pressure to participate, iii) scheme didn't develop in response to poor initial phase. Part of failure reason was the lack of additional benefits - potential to offer storage, or direct delivery to customers, wasn't developed; scope of projects was really too limited to offer these wider benefits - potential though to link in with home delivery and reduce flow of goods through retail outlets
68	Yes	"Central goods sorting point" (Dusseldorf) - not clear what its non-rail role is though	Potential for rail to deliver to either edge-of-city or edge-of-centre terminals - not much discussion of consolidation centres	Potential for modal shift for trunk hauls to/from cities	-	Role for value-added services (e.g. secure storage, order preparation)
69	Yes, but extremely brief	Transhipment - use of large commercial vehicles for major part of journey and smaller vehicles for local delivery and collection	Applications for transhipment facilities in York will be approved provided they are suitably located in relation to local environment, traffic generation can be accommodated locally and they are located on or close to major or radial routes	-	-	-
70	Yes, but brief	Discussion of "urban distribution centres" (UDCs)	Identification of three models: "Monaco model", "Dutch model" and "German model", with different frameworks (e.g. nature of ownership and operation, links with wider regulatory framework)	Use of electric vehicles in some cases; problems of quasi-monopolies; financial support generally required	"Monaco model" has strict vehicle weight limits (Monte Carlo)	Mention of other services in "German model" (e.g. home deliveries, collect and recycle service, short term storage) but no further details

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
71	Yes	Discussion of "urban distribution centres" (UDCs), but not clearly defined - seems company-specific (e.g. Rotterdam) other than La Rochelle which is public terminal	Only public terminal is La Rochelle - 7 electric vans deliver to city centre area, which is historic with poor road access; max. payload of 900kg, so parcels and packages - management of UDC outsourced	Not commercially viable - operator remunerated on basis of no. of parcels carried, but rates still considered too high by customers; relative success due to ban of vehicles more than 3.5t GVW other than between 0600 and 0730, rigorously enforced; as result 58% of businesses in central area receive deliveries from UDC; vehicles not suited to certain methods (e.g. hanging clothes, roll-tainers)	Time saved per day and per lorry estimated at 3 hours	Possible areas of development include creation of new services (buffer inventory, home delivery, etc.) - some storage already occurs, plus some auxiliary services (e.g. business-to-business and business-to-consumer deliveries in city centre area)
72	Nothing specific	-	-	-	-	-
73	Yes - fairly useful summary table (36-2) comparing attributes in Germany, France, Netherlands and Japan. Different approaches, such as research/analysis in France and experimentation in Neths	Mainly Urban Distribution Centres (UDCs) and City Logistiks/GVZ	Different concept in different countries (e.g. consolidation terminals in Neths, but area-wide freight centres in Germany); centres usually implemented as part of wider urban policies	Tendency to focus only on current situation, rather than forecast future, in defining such schemes; underlying problems often not well-defined; scheme objectives and correlation with existing situation often missing; focus on short-term problems and solutions; little attention paid to principles of facilitation or accommodation - usually left to private sector, but fails; general lack of success with consolidation schemes; relationship between urban freight and longer distance freight is often ignored; need long-term policies	Some mention of specific regulations and restrictions, but no analysis of impacts - descriptive; many schemes operate fairly stringent weight limits for the city centre (e.g. Monaco)	Nothing specific
74	Not really	-	-	-	-	-

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
75	Yes - older version of No. 73, but with more detail	Overview of public policy and planning in urban freight. Attempt to identify key factors in implementation of measures for urban freight transport - useful summary table for number of European cities, though not specifically related to consolidation centres. Discussion of city logistics, freight centres, etc. Table showing classification of freight centres	Discussion of complexity of urban freight, particularly the large number of "actors" involved. Reference to "the introduction of transfer points at the border of urban areas" as one of many policy measures and instruments. Some mention of distinction between public, private and public-private terminals. City logistics - combination of terminal consolidation and route consolidation. General move away from public terminals towards areas with "concentrations of logistics activities and multimodal transhipment facilities"	Advantages of freight centres - to facilitate logistics activities and to consolidate goods flows by developing certain transport services. Overview of typical advantages, broken down by country (Germany, France, Netherlands, Japan), much relating to consolidation within wider urban freight measures	General claims of trip reductions, with a specific detailed table relating to schemes in Germany and Switzerland - many schemes claim reductions in no. of trucks, veh-kms, trips, deliveries, etc. At least one scheme involved the use of "ecological" trucks, presumably of low or zero emissions. Some general material on schemes in the other countries, but little or no quantification of impacts.	No explicit consideration - paper is heavily focused on the policy dimension rather than supply chain
76	Yes	Logistics centres for construction site (Stockholm, 2001-2004) and Old Town (Stockholm); also Graz delivery centre (but only in planning stage)	Construction: 8 vehicles used to deliver from logistics centre to construction area, with average of 70 tons of materials per day. Old Town: logistics centre nearby where goods from several delivery companies are consolidated	Construction: general improvements in supply chain through greater coordination. Old Town: reduced vehicle movements (and congestion) in narrow streets of Old Town (but not quantified); deliveries made between 0600 and 1500; doesn't yet cater for chilled produce; marketing not very good	Construction: 1 vehicle movement replaced 5; inward deliveries could be scheduled online, reducing delivery delays. Both centres: vehicles to EURO IV standard	Construction: Buffer storage, with fairly large quantities often being delivered by suppliers and some stored at centre until required; reduced theft and sabotage

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
77	Yes	Trimodal logistics centre (Berlin); office materials consolidation project (Gothenburg)	Berlin - use of rail/water/road planned inward, with CNG vehicles outward. Gothenburg - 5 suppliers and 12-15 customers involved in consolidation, but no mention of a consolidation centre so method unclear	Reduced transport usage (Gothenburg). Infrastructural and operational difficulties for rail and water (Berlin)	Gothenburg - some customers have realised a 50% reduction in transport demand. Overall impacts on urban freight likely to be negligible.	Nothing specific, though Gothenburg scheme refers to coordination of orders as well as deliveries, so perhaps more significant changes to supply chain are involved
78	Yes, but not too specific and only a Powerpoint presentation	Mention of "clean distribution systems", "transit points" etc, but mostly only in planning stages so not much detail	Not much detail, but seems to focus on electric vehicles for urban distribution, combined with wider policies and restrictions; Genova system to cover experimental area with single delivery company awarded tender to make deliveries from pre-identified freight platform	Nothing specific, given early stages of development of the various schemes	Nothing specific	Nothing specific
79	Yes, though little of substance specifically related to actual consolidation centres; much background info about freight issues in Italian cities	Platforms planned for a number of cities, particularly Vicenza and Siena; 4 transit points planned for Parma; intermodal centre (CIM) for Genoa etc.	Few details - proposals seem to involve a mix of centres close to city centres and ones outside of cities (to serve wider areas); intention is to have mixed public-private operation	Risk of further fragmenting deliveries through forced use of consolidation centres, leading to greater problems. Seems to be limited/no interest in logistics platforms from commercial sector, so can probably only be implemented with strict operating regulations within cities. Focus (and greatest chance of success) seems to be in historic, cramped city centres. Limited detail provided though, mainly due to the early stages of development	Nothing specific	Nothing specific

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
80	Yes, lengthy report particularly focusing on the evaluation of measures - emphasis on: financial and organisational impacts on efficiency of platforms; impact of technology, equipment and design on efficiency; impact on urban traffic; and impact on environment	Concerned with Freight Platforms of differing scales (e.g. freight villages, city terminals)	Different freight platforms in Berlin, Brussels, Rome and Madrid. Berlin - focus on City Terminal Ostguterbahnhof, with rail connection to large freight village on edge of city; Brussels - implementation of city terminal; Rome - large intermodal terminals on outskirts and light freight centres within city; Madrid - internal design of large intermodal freight platform	Generally difficult to quantify the impacts of freight platforms, since data are complex and not easily obtainable, though report does attempt cost-benefit analysis. "Handbook" section in particular attempts to provide overview of the role for consolidation/transhipment centres. Some general issues raised - important to harmonise goals associated with creation of platform (esp. between public and private sectors). Each situation is different, but some general recommendations are provided relating to centre size, location, type, network integration, traffic and environmental effects, etc. Freight platforms can enhance competitiveness of railways and combined transport, together with encouraging urban delivery schemes with higher load factors and perhaps alternative fuel vehicles. Degree of success will depend on specific goals and on local characteristics.	Potential for both reduction in long distance road transport due to modal shift and reduction in urban transport through more efficient urban deliveries (plus possibly greater concentration of logistics activities at site of terminal). Difficulties of calculating traffic effects, but attempts made to examine changes in no. of trips, mileage and regional distribution.	Nothing particularly specific, though considerable emphasis on integrating platforms into networks, which could be seen as encouraging supply chain integration (though most emphasis is on transport issues). Some discussion of the types of activities located at a platform (e.g. forwarders, warehouses, industries, logistics services), but not much detail. Section 7.10 examines viability of freight platforms, but there is little here relating specifically to supply chain issues. Some detail of issues in the analysis of the four case studies (Chapter 4).

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81	Yes	City logistics defined as better organisation of freight transport in urban areas, so not necessarily including consolidation centres		Limited current use - large scale implementation would require different economic incentives for private actors. Claims that ecological and social advantages can be gained at same time as greater economic profit. Lack of appropriate data to guide decision-making - in Germany, probably less than 5% of cities have clear understanding of freight patterns. Many flows are already optimised (e.g. for large retailers, wholesalers, parcels carriers). Lack of experience with City Logistics - uncertainty/risk, long-term payback, etc. Problems of land use and local traffic generation for centres on periphery of cities. If freight paid full costs (incl. externalities) there would be more incentive for consolidation centres. Need to link consolidation centres with broader regional networks	Use of consolidation centres offers potential to reduce urban freight transport by between 30% and 50% - no details as to how.	Nothing specific

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
82	Yes, in Section 4 - Urban Distribution Centres (UDCs) and freight villages	Table 1 (p.83) provides useful overview of classification - multi-company urban distribution centre (or city terminals or urban consolidation centres) and freight village are of relevance, but don't necessarily involve consolidation. UDCs are places "of transhipment from long distance traffic to short distance (urban) traffic where the consignments can be sorted and bundled" to achieve distribution efficiency	Discussion of various types of system - classification criteria include company structure, spatial orientation, transport modes/intermodal access, institutional solution and main aims	Considerable detail about experiences in European cities/countries. Boom in UDCs in 1990s, but many have since been abandoned due to range of problems. Main barriers to participation have been: increases in product transhipment raise costs, risks and delays; fear of losing competitive advantage and contact with customer; fear of new dependencies; large initiation and coordination efforts required; difficulties in splitting costs, jobs and responsibilities; lack of support from public sector (both financially and in legal framework terms); and reluctance of retailers to change delivery systems. Some factors offering potential for success were identified: PPP (at least in informal stakeholder partnership sense); technology (telematics/IT) networks (integration of different systems); local knowledge; location of consolidation centre; intermodal access; and high share of own-account transport (since generally less consolidation than 3PLs). Importance of legislation, both restricting and supporting. Considerable volume (perhaps 2,000 shipments per day) required to achieve profitability.	Some information relating to case studies (Kassel, Fukuoka, Leiden, Stockholm, York, Graz, Zurich, Heathrow) - most are dealt with in other literature. Most schemes anticipated reductions in no. of vehicle-kms, vehicle trips, increases in vehicle utilisation, etc., but not all achieved these impacts.	Considerable detail about supply chain issues - "advantages/disadvantages" column summarises key issues, but specific information is also provided in the case studies

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
83	Yes - much overlap with refs. 12 and 13, but considerably more detail	Logistics Consolidation Centre	See refs. 12 and 13	Considerable scheme evaluation, reporting mix of economic, environmental and social benefits - difficult to quantify cost savings though. Economic benefits - reductions in project costs; reductions in delivery costs for suppliers; improved reliability of project plans; improved workforce productivity; better planning; improved delivery certainty; reduced theft of materials; collection of unused materials for use elsewhere. Environmental benefits - reduced pollution; reduced local vehicle movements; reduced congestion; reduced waste; recovery of reusable materials. Social benefits - minimise impacts of construction work; improved safety; improved security. Transferability is likely to be to: major city centre developments; urban regeneration schemes; live operational sites with limited possession working; major capital projects; security-sensitive sites; multiple projects with common supply chains.	See previous columns. Waiting times for off-loading deliveries reduced by 53 minutes on average; impact of congestion charges can be mitigated; CO_2 deliveries for local delivery journeys can be reduced by up to 40%; significant reductions in vehicle kms in local area; reduced congestion.	See previous columns. Net project construction costs can be reduced by 2% through better efficiency, transparency and control of supply chain. Plan reliability improved by up to 5% due to "production buffer" at centre; 99% successful for delivery certainty. Need more work on cost identification, particularly cost savings from better utilisation of suppliers' vehicles, reduced need for supplier storage, increased productivity/less requirement for material handlers on site, and reduced damage to goods - limited understanding of impacts further back up the supply chain.

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
84	Yes	Central warehouse forming part of Ecoefficient distribution system for Évora	Central warehouse, located outside of city centre, for grouping deliveries to defined historic city centre area - 9 transport companies involved	New system to be introduced as part of wider changes to goods vehicle regulations for historical centre. As part of scheme, biodiesel vehicles will be used, an autonomous legal identity will be created for the operation, as well as the central warehouse; reduced vehicle emissions; new organisational model needed in any case to prevent collapse of distribution system as result of new policies on access; improve image of transport sector	Anticipated results - distribution costs per tonne will increase by around 25%, but this would have been around 90% without the new system but with the new regulations; no. of vehicle trips should decrease by 35%	Nothing specific, but scheme designed to protect distribution requirements in face of drastic access restrictions
85	Yes, within consideration of new scenarios for goods distribution	Discussion of City Logistics (Germany/Switzerland)	Shared networks (Germany), whereby participating partners leave goods at premises of one partner for consolidated onward delivery; in some cases, neutral carrier is used to increase uptake. Different models shown in Fig. 7.	Many transport benefits (see next column); benefits to companies through better vehicle utilisation - argued that this is an economic benefit to the logistics companies; practical implementation may rely on use of neutral companies to operate (and deliver from) consolidation centres; changes such as increasing road congestion and Working Time Directive may lead to restructuring of supply chains in any case, so may provide opportunity to develop consolidation centres	Freiburg - 33% reduction in no. of trips; big decreases in travel time for deliveries. Kassel - 40% reduction in mileage towards inner city, 60% reduction in mileage within city, 60% decrease in average distance between shops, 15% increase in delivery weight per stop, 13% decrease in delivery frequency per retailer, 100% increase in vehicle volume utilisation, 140% increase in vehicle weight utilisation	
86	Yes	Different scales of consolidation activity referred to, including GVZ (regional intermodal freight villages) and city/district terminals	Useful diagram (Fig. 6) showing practicalities of consolidation centre type terminals (using Hanover example)	Only 3 carriers involved in the Hanover scheme in its first year, so limited extent of operation	Hanover scheme resulted in reduction of vehicles used from 6 to 2 in first year (with planned expansion likely to lead to reduction from 9 to 3) through grouped shipments amongst the carriers	

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87	Mentioned, but no detail - brief Powerpoint presentation	Table of urban freight scenarios, many of which may involve consolidation centres but not clear from slide	Categorises scenarios into technical solutions, organisational solutions, operational solutions and regulatory solutions, though some of them involve a mixture of solution types. Not clear how many of the scenarios (or schemes) are actually in existence rather than simply planned	No detail provided	No detail provided	No detail provided
88	Yes, within the context of City Logistics in Germany	No specific definition, but presentation is concerned with German City Logistics	Wide range of City Logistics schemes highlighted, but little detail on the specifics of the working methods - some clearly involve freight distribution centres, but not clear whether these are consolidation centres	General reasons for limited success of City Logistics - commercial traffic not really considered in planning; lack of evaluation; discrepancies between theory and practice; lack of implementation strategies; need for greater regulation; complexity of solutions. Big decrease in no. of urban logistics schemes in Germany since mid-1990s	Some quantification of impacts, though not clear which scheme(s) they relate to - 137% increase in load per trip; 56% reduction in no. of trips; 54% decrease in distance per trip; and 58% decrease in no. of vehicles	No detail provided
89	Yes, within wider analysis of city freight	Overview of 23 City Freight initiatives around Europe, some of which involved consolidation centres	Various different types of urban freight scheme are considered - no detailed examination though	Some useful info on methodology for assessing degree of success/failure, together with success and failure factors. Recommended criteria for selection of projects includes: acceptable division of drawbacks and benefits between the actors; support by all actors; and sustainability of the solution. Criteria not recommended include: maximum reduction of negative effects; maximum benefit to one actor; funding of a specific initiative; availability of a technology/technique; and success of a solution in another city	No detail provided	No detail provided

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
90	Mention of regional platforms, but no information provided	-	-	-	-	-
91	Yes, within the Brussels context	Reference to both an Urban Distribution Centre (UDC) for Brussels historic centre and retail delivery stations	UDC - was proposed to limit the no. of HGVs in historic centre by use of UDC in harbour area and fleet of electric vehicles, with products in targeted sectors as well as ban on other lorries in area; alternative of retail delivery stations, basically a network of local micro-warehouses	UDC - largely negative, including traffic/emissions impacts, high costs of assets and operations, technological risk, complexity and inflexibility, and radical change to existing operations. Retail delivery systems seen as alternative, with network of sites geared to transhipment of goods at off-street or dedicated street delivery areas; not clear how much consolidation is planned	Retail delivery stations intended to make deliveries easier, but no quantification of likely impacts	Some wider discussion about delivery channels, but no specific relevant detail
92	Not specifically about consolidation centres, but general discussion about solutions for urban freight problems	No definition	No details provided, other than in terms of how to draw up a methodology for successful scheme implementation - emphasis on interrelation between elements	Development of successful methodological approach includes a number of aspects, including: identifying actors and their goals, recognising importance of people as well as (or instead of) technology and asking who, why, where and with what when it comes to developing solutions	No detail provided	No detail provided
93	Yes, mentioned in context of planned centres in Helsinki and Tampere but presentation overwhelmingly about underground delivery tunnels	Distribution centres to serve urban areas, presumably linked to tunnels (in Helsinki) - no detail	Detail about proposed use of tunnels, not consolidation centres	Logistics centres seen as important accompanying measure for underground tunnels, but no evidence of detailed analysis	No detail provided	No detail provided

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94	Consolidation mentioned fairly generally, but much emphasis seems to be on cooperation and coordination deliveries - not clear what role (if any) is proposed for consolidation centre, although Platform on Urban Freight Distribution is one participant in cooperation agreement	No definition	Example is of cooperation regarding day of delivery into specific area rather than use of consolidation centre	Objective to improve shopping area by reducing goods vehicle movements. Attempts to deal with problems of delivering to high-quality shopping area, with lots of fashion, antique and catering outlets, many of them independent. Problems include tight time windows, congestion, insufficient unloading facilities and high number of small shipments delivered by many companies. Problems hoped to be eased by cooperation and consolidation, but implementation and operation not clear	Nothing specifically relating to consolidation centres	No detail provided
95	Yes, overview of general role for consolidation - summary provided by member of project team based on lit review, so no new material	-	-	-	-	-
96	Yes, though essentially same as refs. 4 & 6	Retail consolidation centre	See refs. 4 & 6	See refs. 4 & 6. Terminal 5 planning application required BAA to reduce traffic congestion and environmental impact - consolidation centre is one measure that can assist. Terminals 1 to 4 not designed for retail logistics, so consolidation centre can assist with increasing throughput	See refs. 4 & 6. T5 expected to reduce delivery vehicles by 70%, meeting BAA's commitments. Some quantification (in table) - 70% reduction in vehicle movements for participating retailers; 87000 km saved (2003) and 144000 km saved (2004). Some quantification of emissions savings	See refs. 4 & 6. Reverse logistics - 106 tonnes cardboard recycled (2003) and 152 tonnes (2004)
97	Seems to feature in FQP Action Plan, but only as a bullet point	-	-	-	-	-

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
98	Yes, though much overlap with refs. 12, 13 and 83	Construction consolidation centre	See refs. 12, 13 and 83	See refs. 12, 13 and 83. 99% distribution success (i.e. right goods, location and time); increased ability to complete tasks as planned; overall project plan reliability improved by over 4% - significant cost savings (both on total project budget and cost per delivery from consolidation centre). Other benefits - improved productivity, better planning, reduced shrinkage, re-use of materials, reduced waste, reduced emissions. Concept should be transferable to other locations (e.g. urban regeneration schemes)	Better use of transport for deliveries, but also a wider decrease in the number of journeys into centre since suppliers are more likely to deliver larger volumes to there than direct to work sites (reduction not quantified though)	See previous columns. May also help to overcome skills shortage within construction (and transport?) sectors
99	Yes, though much overlap with ref. 7	Urban retail consolidation centre	Retail consolidation centre on strategic approach to Bristol (operated by Exel after public procurement process), taking deliveries from suppliers to Broadmead Centre - EURO IV vehicle makes deliveries to retailers. Trial set up through VIVALDI, and is free to participating retailers	Only 21 retail outlets out of 324 (i.e. 6%) are taking part, though attempting to achieve 40 participants in extended trial phase. Retailer satisfaction survey - 75% chose scheme because of improved service/cost reduction opportunities; 94% would recommend service to other retailers; more than 50% say delivery time has improved and that overall service is excellent; no retailer has experienced loss or damage to stock. Hoping to liaise with developers to incorporate consolidation into expansion of retail area, but need to develop business model which identifies contributions from beneficiaries (incl. retailers); likely to require some on-going public support	Delivery vehicle movements reduced by 66% for participating retailers. Some figures given for distance and emissions saved, but not within a specified time period	Aim to generate revenue through offer of value-added activities (e.g. remote stock rooms, peak/seasonal storage, pre-retailing services, waste/packaging collection/recycling.

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
100	Yes, though not much detail - some is general discussion of consolidated loads rather than specific use of centres	Collection/delivery point proposed for The Hague; terminals on outside of cities for cross docking goods	Seems that proposed scheme will focus on fashion (clothing/shoes), bars (beers/beverages) and jewellery, at least in pilot stage; proposed to use small (electric) trucks in cities	General discussion of reasons for trying to influence delivery patterns, but no real detail	Predicted reduction in no. of trips of 5%, but not clear what total this is out of or how much is due to use of consolidation centre	Role for different distribution structures to co-exist, but with consolidated networks being part of overall solution
101	Yes	Urban Distribution Centres	Public transhipment depots from which goods are despatched in a coordinated/consolidated way (and sometimes with clean delivery vehicles). La Rochelle - 400 parcels delivered daily from UDC in electric vans to historic centre	Numerous public centres (i.e. open to any user, rather than necessarily publicly operated) planned in 1990s, but only La Rochelle has been added to the earlier Monaco one. Main difficulty is finance - UDCs need high subsidy (e.g. La Rochelle required €2.1 per parcel (2001) and €0.8 per parcel (2002); Monaco required €2.59/100kg subsidy. Transport companies reluctant to use UDCs - official reason is fear of unequal competition, but also due to high prices; prefer instead to continue to subcontract to small transport operators. Municipalities do not enforce strict traffic/delivery regulations. Legal issues need to be resolved - issues relating to competition and equity. Probably only a limited market for UDCs - tourist cities, cities willing to set an example (and pay the price) and cities located away from main flows and without private transhipment facilities.	Strict regulations for other vehicles - vehicles less than 3.5 tonnes allowed at any time, but larger vehicles only allowed between 6am and 7.30am - no evaluation of effects of this	No detail provided

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
102	Yes	Consolidation centres	No specific detail, but focuses on the Heathrow and Bristol centres	Important to specify objectives, so that evaluation can be carried out; objectives vary according to situation and partner organisations, together with budget. Objectives generally revolve around improved efficiency. Some detail on recommended evaluation process, covering scope of evaluation, means of describing impacts, etc., with indicators, data requirements and type of measurement for different desired impacts/objectives. Important to have ongoing evaluation. Suitability Index devised to allow targeting of retailers most suitable for consolidation centres	Details provided about how impacts on transport operations can be measured	No specific detail

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
103	Yes	Logistic Centre (traditional approach)	Freight transhipped and consolidated at a LC at edge of urban area. Specific case study of intermodal hub for industrial facility within Graz, with consolidated shuttle service linking the intermodal hub to the factory - attempts to introduce consolidation further back up supply chain, utilising rail for trunk haul	Expected benefits - bundling of goods; consolidation of delivery tours; harmonisation of deliveries over time; fewer truck-kms in urban areas. Schemes have generally failed due to: difficulties in managing different expectations and demands of stakeholders (e.g. competitors' problems); and general financing and operations issues. Further reasons for failure - transhipment costs are higher than savings from consolidation (esp. where pre-carriage distance is short); focus is mainly on parcels, since wholesale/retail logistics usually already well-organised; difficulties of consolidating heterogeneous products; high demands on IT, track and trace, etc.; and parcel services/direct delivery have to follow customer demands on delivery times. For success, need the following criteria: long transport distances inbound to urban area; critical mass of homogeneous products; supply chain integration; and fairly stable demand/service provision. Graz scheme identifies potential for rail/tram use for consolidated urban shuttle.	No specific detail - see previous column for general issues. Graz case study shows theoretical reduction in vehicle-kms of 79%, though calculation and assumptions not explicit	Importance of supply chain integration highlighted - see previous columns
104	Not really - main focus is on national transport policies and modal shift, but some reference to city logistics	Logistics centres (for combined transport)	No real detail, other than developing network of national and regional distribution centres	Main aims are to ensure sustainable development, improve quality and utilisation of existing transport schemes and strengthen cooperation between modes - nothing specific about consolidation in urban areas	No detail provided	No detail provided

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
105	Yes, linked in with City Logistics, GVZs, etc.	Urban consolidation centres	Various consolidation concepts, though slides not particularly clear	Generally not very successful - of about 30-40 trials (100+ proposed projects?), no more than 5 still exist. Main problems have been time and cost of cooperation and pre-delivery consolidation. Greatest potential perhaps for "difficult" scenarios (either commodities or geographical areas with limited access). Loss of interest from public sector in dealing with urban freight problems due to economic downturn and consequent funding difficulties - consolidation may be more likely to occur through commercial pressures, but perhaps not with physical centres	No detail provided	For success, it is key to look at commercial (supply chain) issues - first generation consolidation centres failed to do this, and generally failed.
106	Yes, though Powerpoint presentation so not much detail	No real definition, but mention of freight village connected directly to city centre by high capacity road	Freight village and central city delivery service - not certain that the deliveries are conducted from freight village, but seems likely	Malaga - cooperation between transport firms, using electric vehicles exempt from regulations; consolidation part of wider package of measures; seems like problems of cooperation between freight carriers, together with limited capacity of electric vehicles, inability for temperature controlled goods, additional costs, etc.	Malaga - opened in 2003, but no detail on transport impacts; seems like they're probably negligible	Malaga - concept includes storage management for short intervals, together with value added services packing disposal services, bundling and picking for retailers, integration of IT/telematics
107	Probably (focused on Brescia), but all in Italian	Not clear what, if any, type of consolidation centre exists or is/was planned	-	-	-	-
108	No, though some evidence of attempts to quantify problem areas (e.g. intensity zones, traffic flow classification)	-	-	-	-	-

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
109	Probably (focused on Florence), but all in Italian	Seems to refer to a feasibility study for a Transit Point for the city	-	-	Seems that some statistics are presented, but difficult to work out the context - seems to be based on a simulation rather than an actual scheme	-
110	Not clear - some mention of logistics base, but unclear what it is; also cooperation between transport service providers, presumably using existing carrier networks.	-	-	-	-	-
111	Yes	Urban distribution centres (with and without cooperation); also some discussion of Urban Logistics Box and "last mile" deliveries	Modelling of Lyon seems to assume 4 UDCs by 2020, with road and rail connections. 2 scenarios modelled, one without cooperation and one with it. Also looks at Monaco and La Rochelle existing operations.	Some data relating to La Rochelle and Monaco Urban Delivery Centres - not totally clear what some of the data refer to, but seems to have been reductions in pollutants; some details of subsidy levels, which seem fairly high per parcel - around 21-26% of turnover. Potential to link in with innovative "last mile" delivery systems, such as tricycles and electric trolleys	Scenario 1 (without cooperation) predicts a 1% reduction in vehicle kms; Scenario 2 (with cooperation) predicts a 9% reduction in vehicle kms - modelling process seems to look at relationship between activity and land use, logistics chains and goods movement	No specific discussion
112	Yes	Hubs for City Courier Systems (CCS); also discussion of delivery boxes (eTrans), perhaps in conjunction with CCS	CCS - network of hubs around city (Vienna?), with lorries linking the hubs with consolidated loads, and small delivery vans distributing out from hubs; idea is to consolidate across different parcels carriers	CCS advantages - minimises trip length through hub and spoke system, which leads to: reduced transport costs through shorter routes, same day delivery, system flexibility, carriage of documents and parcels up to 30kg, and reductions in congestion and environmental impacts	See previous column	No specific discussion, though does mention possibility of better service through same day deliveries

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
113	Mention of a proposed Urban e-Logistics Platform, but doesn't seem to involve a physical consolidation-type centre - more an IT project	-	-	-	-	-
114	Not really - closest is mention of single shop receiving joint deliveries for a number of other shops in Aalborg trial	-	-	-	-	-

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
115	Yes	Within the City Logistics concept - reference to city terminal, cooperation, bundled goods, etc.	Six types of cooperation identified, of which 3 seem to involve some sort of city terminal: 1) forwarding agents who are partners in city logistics take goods to terminal for onward distribution by neutral freight carrier (e.g. Freiburg); 4) forwarding agents instruct neutral carrier to deliver in inner city on their behalf, with use of city terminal (e.g. Kassel); 6) forwarding agents deliver to city terminal close to city centre for pre-sorting, bundling and delivery (e.g. Nurnberg)	Reduced traffic impacts for participants, but negligible overall; low uptake means high fixed costs of schemes spread amongst small no. of companies with relatively low volumes, so unit costs are high; higher uptake would increase benefits and reduce unit costs; many retailers already receive optimised deliveries, so no scope for consolidation. Participants didn't gain economic benefits due to: current suitability for only some consignments (but range could be expanded); difficulties in setting up contracts and cost distribution between partners; suitable cooperation partners not always in proximity; lack of adoption of route optimisation software and telematics; difficulties of making decisions; lack of interest over time if cost reductions aren't apparent; cooperation partners are also often competitors. Overall, need to make cost savings evident to encourage participation	Freiburg - 33% reduction in no. of trips; 68% reduction in travel time to/from city centre; 73% reduction in travel time in city centre; 48% reduction in total time in city centre (for participants). Kassel - 40% reduction in mileage towards inner city; 60% reduction in mileage within inner city; 60% decrease in average distance between stops; 15% increase in weight delivered per stop; 100% increase in vehicle volume utilisation; 140% increase in vehicle weight utilisation; 13% decrease in no. of deliveries per retailer (for participants)	No specific consideration
116	Yes	Range of activities that would encourage consolidation, including consolidation centres themselves	Considers consolidation centres within the context of wider policies and/or restrictions to influence urban goods movement, essentially through greater cooperation within modified distribution systems that can allow greater cooperation and consolidation (i.e. move towards common-user depots rather than dedicated ones)	General benefits in terms of transport impacts and reduced distribution costs - not quantified	No detail provided - claims that there would be cost savings and reduced transport usage and impact	No detail provided, though alludes to benefits for retail outlets through receiving fewer deliveries thus simplifying their operations, together with benefits to suppliers in supplying to well-equipped depots at more flexible times and without delivery restrictions or congested loading bays

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
117	Yes, though very similar details to refs. 4 & 6	See refs. 4, 6 & 96	See refs. 4, 6 & 96	Similar to refs. 4, 6 & 96. Relates benefits clearly to issues affecting stakeholders (landlords, retailers, suppliers) who are often distracted from their core activities - argues that consolidation centres can have role to play in bringing together stakeholders for mutual benefit. Generally positive case put forward in presentation, with lists of benefits accruing to different stakeholders, based largely on Heathrow retail centre, but also some Bristol material	Can improve transport operations where delivery areas are restricted and/or congested. Same quoted transport benefits as in refs. 4, 6 & 96. (for participating retailers, vehicle movements have reduced by 70% - no data on this reduction as proportion of total freight movements in the area)	Links to requirements of business, in context of airports, shopping malls and city centres - common theme is that consolidation centres may allow space to be better utilised for retail activity rather than storage. Consolidation centres can have many supply chain benefits: improved product availability/sales; small stockrooms can support large stores; in-store stock management systems; waste disposal/management; collections and returns; security control; reduced supply chain costs; pre-retailing; home delivery, etc.
118	Yes	Consolidation system, based on two urban terminals - one handles inbound and one outbound consignments; terminals are approx. 2 km from area served	29 shippers participate in scheme, contributing financially per parcel to support its operating costs. Three consolidated deliveries per day made into scheme area - 3,500 parcels delivered daily and 700 collected; 2 ton trucks used	Trucks tend to get stuck in congestion en route between terminal and scheme area. Load efficiency has been improved, with associated benefits in no. of vehicles, vehicle mileage, etc. Modelling undertaken to examine the equity argument (i.e. who should pay what, based on their benefit received?) - only minor social benefits are identified; seems that greatest benefits accrue to businesses	Model predicts considerable reductions in traffic volumes for freight deliveries to the area, but that this has minimal impact on traffic congestion, pollution, energy consumption etc. when looking at the bigger picture of total transport activity in the area; potential to reduce no. of vehicles required for freight deliveries	No specific discussion - focuses more on the policy dimension

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
119	Yes (plus related discussion of locker banks)	Consolidation centre	Consolidation centre on NE edge of Bristol, on strategic road network. EURO3 emission vehicle for consolidated runs to Broadmead area (including shopping mall and traditional retail streets) - scheme operated by Exel on contractor basis	Trial operation with following aims: reduce no. of delivery vehicles in scheme area; help reduce traffic; reduce conflicts at delivery bays; improve air quality; reduce supply chain costs; provide enhanced delivery service; offer value-added services. Preferred type of retailer (i.e. who could benefit most from consolidation) identified from questionnaire survey - ambient/non-perishable goods suitable; gas canisters, cooking oils, kegs, very high value products not suitable at initial stage, but could be added later	Transport impacts mentioned in previous column - not evaluated/quantified	Aims: reduction in supply chain costs; enhanced delivery service; offer value-added services for retailers, e.g. waste and package collection, item level inventory management, seasonal/peak storage facilities
120	Not really - mainly focused on encouraging intermodal transport with a regional/strategic focus, but does look at some relevant issues relating to transhipment. No specific consolidation discussion	-	-	Some relevant discussion of the benefits of having added-value activities at point of transfer, to compensate for additional handling costs	-	-
121	Yes	Includes definition of German, Dutch and Monaco models				

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
122	Yes, newsletter from the TRENDSETTER EU-funded project that provides an update on progress at three UCCs: Broadmead in Bristol (retail UCC), Hammerby (construction UCC), and the Old Town in Stockholm (restaurant UCC)	Refers to “Logistics Centre” and “Freight Consolidation Centre”.	Briefly explains how each of these three UCCs operates, and how and why each was established. Stockholm Old Town trial set up to reduce daily vehicle deliveries to each restaurant from 6 to 1. Centre set up close to the Old Town. Vehicles making deliveries from centre powered by biogas. Restaurant traffic comprises the majority of goods vehicle movements in Old Town. Majority of restaurants signed up to scheme by June 2005.	Provides a brief overview of the advantages of each UCC, and the traffic and environmental problems they are helping to alleviate. Aims of the scheme are to reduce goods vehicle movements in sensitive locations (to reduce interactions with tourists and inhabitants), and also to reduce environmental impacts from vehicle operation by using biogas in Stockholm Old Town.	Stockholm Old Town: estimated 65% reduction in mileage and 17% reduction in fuel use and vehicles. Hammerby: 80% reduction in goods vehicle trips to construction site. Broadmead: vehicle mileage reduced by 65% for retailers involved (20,350 vehicle km saved in the urban area).	Nothing specific.
123	Yes – of Meadowhall Accelerated Response Centre (ARC)	Consolidation centre offering range of pre- and post-retail services to users	Scheme offered to retailers by Meadowhall Shopping Centre Management and run by Exel. Goods can be delivered to the CC which is located several hundred metres from shopping centre. Exel then deliver goods on to retailer from centre as required. Retailers can make use of a range of services including stock crisis line and pricing/ticketing services.	Aims of the scheme are to reduce the goods vehicle transport pressures at the shopping centre unloading area and on surrounding roads. Vehicle trip reduction will contribute to traffic and environmental advantages. Also offer retailers opportunity to reduce stockholding space in store and use this as additional retailing space.	Fewer goods vehicle trips on roads surrounding shopping centre and at loading bays of shopping centre.	Stockholding and retailing services offered may provide retailers with opportunities to increase retail sales. This could result from being able to offer rapid replenishment from the centre to store, freeing up retail staff time to serve customers and altering product assortment strategies.
124	Yes – of range of UCC schemes across Europe.	Yes	Provides summary of 13 UCCs trialled or operated on on-going basis in Europe in the last 15 years. Project purpose was to consider potential for UCCs and other freight transport policies in Italian cities.	Some relevant discussion of the advantages and disadvantages. Also provides summary of economic aspects of the different UCC schemes summarised.	Results of transport impacts provided for those UCC schemes where available.	

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
125	Yes, includes Italian UCCs in Padua, Vicenza, Ferrara and Genoa. Also refers to policy measures used to provide incentives to use UCCs, and some legal issues. Also refers to the conditions for participation in such a scheme.	Refers to each of these Italian schemes as a "UDC (Freight Village)".	Presents the different organisational structures used in these four Italian schemes.	Refers to the advantages and disadvantages of the policy incentives that can be used to encourage the use of UCCs including permission to use bus lanes, lifting vehicle access time restrictions, priority parking space, exemption from road pricing.	Provides following details for each scheme: types and number of vehicles used, transport policy incentives provided, start up date, level of goods throughput, and number of participating companies.	Nothing specific.
126	Yes, discusses the scheme started in Siena, Italy in 1999, and which is now being studied as part of the EDRUL project. This includes coordination of urban deliveries among different operators, and distribution to shops by emission-free vehicles	Refers to a "freight distribution platform"			Discusses the policy incentives used in Siena to encourage use of environmentally friendly vehicles in historic city centre including the introduction of a Restricted Traffic Zone (RTZ), access time restrictions for goods vehicles making deliveries, and entry charges plus ITS and technology used to enforce this.	Nothing specific.
127	Yes, provides details of progress in the EDRUL project in which ITS is being implemented to enhance the service provision at the existing UCC in Siena, Italy. This will improve co-ordination of goods flows vehicles both using and not using the UCC.	Refers to "logistics base" for transhipments.				

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
128	Yes, discusses the background to, establishment and operation of the UCC at Potsdamer Platz in Berlin for the major construction project that took place between 1992-2002.	Refers to the UCC as "Baustellenlogistik Potsdamer Platz GmbH". This is abbreviated to "baulog". Also refers to it as a "logistics centre".	Explains that the site was road, rail and water connected, with significant use made of non-road modes. Explains the joint working between public and private sector to set up this scheme, and well as the objectives of the scheme.		Discusses the road-based freight vehicle movements that were avoided through the use of rail and water-based transport of goods both to and from the UCC. Explains that this helped to avoid road traffic difficulties in central Berlin during this major construction work.	Nothing specific.
129	Yes, provides details of a tricycle-based home delivery and consolidation centre scheme established in Paris in 2003. Explains how the scheme operates, and results to date as well as discussing the feasibility work that proceeded the live scheme.	Refers to the "consolidation centre" located in the centre of Paris. This is based inside a car park.	Explains that the scheme has grown substantially in terms of goods throughput during its 24 months of operation, now having 16 drivers and 13 tricycles. Tricycles have electrical assistance to increase speed and range. Consolidation centre has proved to be most popular aspect of scheme. Most common product type is parcels.	Explains the growing popularity with users and the service aspects they think are most important in the success of the scheme. The three most important aspects in survey work were the quality of the service provided, the price, and the consolidation centre located in the centre of the city of Paris.	Provides details of the savings in goods vehicle traffic (156,248 km - 22,000 hours of van activity), energy consumption savings (43.3 tonnes of oil equivalent), nd emissions savings (112t of CO_2 1.43t of CO, 280 kg of NOx, 44 kg of particulates).	Nothing specific.
130	Yes, this paper provides details of a project that assessed the potential traffic and environmental impacts of traffic restrictions combined with the implementation of an UCC in Brussels.	Refers to an "urban transhipment centre (UTC)".	Calculated the likely effects of a compulsory UCC with storage facilities covering either the Pentagon area of Brussels or the entire area inside the Ring Road. Heavy good vehicles could then be prohibited from entering these areas and made to use the UCC.	The results indicated that establishing a UCC and banning of heavy vehicles from the either the area inside the Pentagon or the Centre Ring Road would have negative impacts on traffic conditions and environmental impacts.	Both scenarios would increase the traffic flows to the UCC, and also in the UCC delivery area (due to the use of smaller vehicles from the UCC). It was calculated that travel times would increase as a result of the greater traffic flow. Fuel consumption and vehicle emissions were also predicted to worsen due to lower traffic speeds. Both scenarios were also forecast to have an adverse effect on loading/parking in the restricted areas due to the greater number of delivery vehicles required.	Nothing specific.

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
131	Yes, refers to several UCCs that are either being considered or are trials/operations. These include Brussels study, La Rochelle and Malaga scheme, and Tampere, Preston and Strasbourg UCC considerations.	Several different terms used including: “Urban Distribution and Storage Centre”, “Municipal Logistics Centre”, “Urban Distribution Centre” and “Construction Traffic Consolidation Centre”	Briefly discusses the current status of each of the proposed or existing UCCs.	Explains advantages and disadvantages of the different schemes where information is available.	Provides results of these UCC studies, trials and operations where available.	Nothing specific.
132	Yes, provides an overview of urban freight policy measures in Utrecht with a brief reference to the two UCCs that operate in the city to try to help limit heavy good vehicle activity in the historic centre.	Refers to them as “Urban Distributions Centres (UDCs)”.	No explanation provided.	Not covered.	Not covered.	Nothing specific.
133	Yes, provides a summary of transport policy in Groningen. This includes a brief description of the UCC scheme that operates in Groningen to try to help limit heavy good vehicle activity in the inner city.	No specific terminology included. Instead it refers to a “a special arrangement with freight transporters”.	As part of this “special arrangement”, freight transport operators can deliver outside the restricted delivery hours, if they make at least 100 deliveries per day in the city to 20 or more addresses, using environmentally friendly vehicles.	Not covered.	Not covered.	Nothing specific.

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
134	Yes, brief mention of the UCC in Malaga as part of a presentation about the state of the art in freight data collection in Spain.	Refers to the “Urban Distribution Centre” in Malaga.	Not covered.	Not covered.	Not covered.	Nothing specific.
135	Yes, paper about a range of transport measures implemented in Siena, Italy, including two UCC. Discusses the feasibility work and implementation of these measures. Also discusses an initial energy and environmental assessment of the schemes.	Refers to two “logistics bases”.	Explains that one UCC accepts food and the other non-food that is destined for the historic centre of Siena. It is a Pedestrian Area and a Limited Traffic Zone and goods vehicle access is only allowed at specific times in the morning and afternoon. Electric vehicles are exempt from these time restrictions, including those operated from the UCCs..	Work was carried out to study the likely impacts of the UCCs and vehicle access restrictions on distribution operations.	Results of the pre-UCC modelling suggested that vehicle trips would be substantially reduced as a result of the UCC. It was estimated that this would result in fuel consumption and vehicle emissions reductions of approximately 60% for those goods flowing through the UCC.	Nothing specific.
136	Yes, a paper reviewing several urban logistics projects in Italy, including the UCCs in Siena,and Vicenza .	Refers to two “terminals” in Siena and a “logistics centre” in Vicenza.	Explains the organisation of the Vicenza scheme (with a private company operating it but the company is controlled by public bodies, trade and transport associations. Explains that telematics applications will be used in the UCC to help with routeing, scheduling and product visibility in the last mile. The UCC is also to handle reverse product flows.	Not covered.	UCC expected to improve load factors and reduce goods vehicle trips and total distance travelled in the urban area. The UCC is expected to result in a 20-30% reduction in vehicle emissions, and 40-50% reduction in fuel consumption for those goods flowing through the UCC. Other transport policies will be introduced with the UCC to help further reduce congestion, noise and vehicle emissions.	Nothing specific.

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
137	Yes, THERMIE project report on European urban freight transport strategies including several UCCs. Case studies of UCC studies, trials and operations in Monaco, Leiden, Kassel, Zurich, Winchester included.	Several terms used including “Freight Platform”, “Urban Distribution Centre”, “City Logistics”, and “Transhipment Depot”.	Explanation of the way in which each of these UCCs operated is included, together with details of pre-UCC feasibility studies and also results of UCC trials and operations.	Provided for each UCC case study.	Provided for each UCC case study.	Nothing specific.
138	Yes, describes studies and trial carried out in the inner city area of Gothenburg between 1991-1998. These projects focused on attempts to introduce a coordinated distribution system for food deliveries that were not well consolidated	Referred to as “Coordinated Distribution”.	Was based on suppliers working closely together to consolidate their deliveries using existing depot infrastructure.	The scheme was supposed to bring about traffic and environmental benefits. Few suppliers participated in the coordinated distribution experiment and it ended in 1998. The suppliers did not perceive sufficient benefits from the co-ordinated distribution scheme.	The concept was to reduce goods vehicle traffic and its related environmental impacts in an inner city area of Gothenburg (the Linnestaden district).	Nothing specific.

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
139	Yes, urban freight research carried out in several European cities (Cordoba, Halle, Norwich, Regensburg, Sevilla, Wien and Wr. Neustadt). Purpose of the project to improve efficiency and flexibility of goods distribution in urban areas. UCCs considered as one of the possible solutions.	Refers to “City Freight Centre”, “Freight Village Centre” and “City Terminal”.	Considered a range of possible urban freight initiatives in each urban area studied including UCCs. Recommendations were tailored to the specifics of each urban area.	Covered briefly for those cases in which UCC were suggested as a possible solution.	Covered briefly for those cases in which UCC were suggested as a possible solution.	Nothing specific.
140	Yes, IDIOMA (EU project) demonstrated innovative urban freight solutions in several European cities (Nuremberg, Randstad, Öresund and Zürich). In Nuremburg a “city logistics multi-format scanner” was developed for the existing UCC.	Refers to “City Logistics Project” in the case of UCC in Nuremburg.	The project aimed to develop and demonstrate a multiuser tracking and tracing system so that the goods delivery carried out from the UCC could be compatible with the information chain of the companies using the UCC. Each user receives a txt-file including the following information: number of shipment(s), date and time of loading, time of unloading	Did not discuss UCC advantages and disadvantages directly. Instead focuses on the equipment developed.	Did not quantify any impacts on transport operations.	Nothing specific.
141	Yes, provides some details of the UCC at Potsdamer Platz in Berlin for the major construction project.	No.	Brief summary of the objectives and operation of the scheme.	Explains that the scheme reduced goods vehicle trips by road and hence goods vehicle kilometres.	Reduced goods vehicle kilometres by 50,000 lorry kilometres per day.	States that scheme helped to reduce the time taken for the construction project by six months.

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
142	Yes, describes plans for UCC demonstrations at Hammerby, Stockholm Old Town and Graz as part of the TRENDSETTER project.	Refers to “Material Logistics Centre” and “Logistics Terminal”	Brief description of the work planned over the course of the demonstration project.	Mentions that traffic and environmental benefits are expected.	Not established at this stage.	Nothing specific.
143	Yes, describes the operations offered by cycle distribution company in York, including their consolidation services for the city centre..	Refers to “Base”	Explains the types of cycles used, their payload and the area over which the company operates. Also explains that cycles are exempt from the goods vehicle access time restrictions in the city centre.	Mentions improvements in noise and emissions.	Nothing specific.	Nothing specific.
144	Yes, presentation of the latest results of the UCC trial in Broadmead, Bristol.	Refers to “Freight Consolidation Centre”	Provides explanation of the UCC, the services offered, its location, vehicle types, and number of customers.	Summary of advantages offered by scheme.	Reported that 31,800 vehicle km, 3.9 tonnes of CO2, 0.6 kgs of NOx and 8.4 kgs of particulate (PM10) emissions were being saved annually as a result of the scheme.	Refers to value-added services offered. Also provides details of survey into customer satisfaction with the UCC. This includes finding that more than half of the customers save 20 minutes per delivery when using the UCC. Also 38% of customers can spend more time with customers due to UCC.
145	Yes, discusses the UCC in Bremen as part of the Vivaldi EU-funded project.	Refers to “City-Logistics” scheme.	Explains that UCC still performs consolidated city deliveries but also now making deliveries in hinterland. It has been difficult to gain new delivery work in the city since 2000/2001 due to competitive pressures.	Explains transport and environmental benefits.	Goods vehicle savings of approximately 9,000 km per month reported as a result of the UCC. This is equivalent to 70 goods vehicle round trips using a 7.5 t goods vehicles. Approximately 1,100 litres of diesel are also saved every month.	Nothing specific.

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
146	Yes, reviews the status of German CC schemes.	Refers to "City Logistics" schemes	Only a very brief review of method of working where available.	No, it is a review of schemes.	Provides details of transport impacts where information is available.	Nothing specific.
147	Yes, explains the CC operation in Aachen, Germany.	Refers to "City Logistics".	Explains the Aachen scheme. It comprises a CC scheme operator who runs the consolidation centre and vehicles, and the participating transport companies.	Explains advantages of the scheme for transport companies (in terms of time and cost savings) and for retailers (in terms of freeing up staff time, fewer deliveries, the possibility to transform storage space, and cost savings).	See advantages/disadvantages column	See advantages/disadvantages column
148	Yes, provides information about the CC scheme in Bremen, Germany. Also provides details of the VIVALDI EU project as developments at Bremen CC are part of this project.	Refers to "city logistics".	It briefly describes the Bremen CC scheme which is based at Bremen freight village.	Nothing specific	Nothing specific	Nothing specific
149	Provides details of the CC scheme in Regensburg, Germany which is referred to as "Reglog"	Refers to "city logistics"	Explains that the Reglog scheme involves a CC operator and participating transport companies. The operator collects goods from participating companies and then delivers them in the city (usually destined for the 1km^2 historic core).	Discusses how the scheme has helped to reduce goods vehicle trips and make deliveries more efficient.	The scheme saves approx. 17 goods vehicle km per day in the city. It has saved approx. 20,000 goods vehicle km between 1998 and 2005.	Nothing specific.

No.	CC discussion	Definition	Method of working	Advantages/disadvantages	Impacts on transport ops.	Supply chain impacts
150	Provides an overview of the CC scheme in Frankfurt am Main, Germany.	Refers to “city logistics”	This scheme is different from some other German CC schemes in that it is based on bilateral agreements between 11 transport/forwarding companies with similar work to help improve delivery efficiency.	The scheme is intended to result in lower delivery costs as well as environmental improvements.	Nothing specific.	Nothing specific.
151	Yes, provides details of the CC scheme in Essen, Germany.	Refers to “Stadtlogistik”	Overview of services offered.	Nothing specific	Nothing specific	Nothing specific
152	Yes, provides information about the CC scheme in Bremen, Germany. Also reviews CC schemes in Germany and general problems.	Refers to “city logistics”.	It explains that the CC scheme is based at Bremen freight village. Environmentally friendly vehicles are planned to be used for deliveries from the CC to the city centre.	Nothing specific	Nothing specific	Nothing specific
153	Yes, provides brief overview of CCs in the UK. Plus detailed information about Broadmead CC in Bristol, and its evaluation.	Refers to “consolidation centres”	Explains the purpose, location and number of customers for the Broadmead CC scheme. It also sets out the evaluation of the scheme from May 2004 to February 2005.		Notes that roll cages passing through CC rose from 101 in May 2004 to 401 in December 2004.Shows that the scheme is achieving approx. 60% reduction in vehicle movements for goods passing through the CC. Also shows that vehicle utilisation of approx. 60% is being achieved.	Nothing specific.

APPENDIX 2: UCC Data Sheets

Table A2.1 contains summary details by country for each of 67 UCC schemes identified in the literature as having work carried out on them. Each UCC scheme has been identified in terms of i) the type of work carried out on the UCC (either Research/Feasibility, Pilot/Trial, or Operational), and ii) the area served by the UCC scheme (either site specific, district, or town-wide). The start date of each UCC project, trial or operation is also included.

Table A2:1: LITERATURE REVIEW – MASTER DATA SHEET

	Type of work carried out on the UCC			Area served by the UCC scheme			
Country/Location	Research/Feasibility	Pilot/Trial	Operational	Site Specific	District	Town-wide	Start Date
AUSTRIA							
Graz	X					X	2000
BELGIUM							
Brussels	X					X	1998
CANADA							
Vancouver	X					X	mid-1970s
FRANCE							
Arras	X					X	1990s
Bordeaux	X					X	1990s
Dijon	X					X	1990s
La Rochelle			X		X		2001 **Still operating**
Lille	X					X	1990s
Marseilles	X					X	1990s
Paris I		X			X		1971
Paris II		X			X		2003 **Still operating**
GERMANY							
Aachen			X		X		1997 **Still operating**
Potsdamer, Berlin			X	X			1992
Bremen			X			X	1994 **Still operating**
Cologne			X			X	1994
Dusseldorf		X			X		1997
Essen			X			X	1997 **Still operating**
Frankfurt			X			X	1995 **Still operating**
Freiburg			X		X		1993-97
Kassel			X			X	1994 **Still operating**
Munich	X					X	1993-94
Nuremburg			X		X		1996 **Still operating**
Regensburg			X			X	1998 **Still operating**
Stuttgart			X			X	1993-94
Ulm			X			X	1995

	Type of work carried out on the UCC			Area served by the UCC scheme			
Country/Location	Research/Feasibility	Pilot/Trial	Operational	Site Specific	District	Town-wide	Date
ITALY							
Ferrara			X			X	2002 **Still operating**
Genoa		X			X		2003
Padua		X				X	2004 **Still operating**
Siena			X		X		1999 **Still operating**
Vicenza		X				X	2002 **Still operating**
JAPAN							
Marunouchi,Tokyo		X			X		2002
Osaka		X		X			?
Tenjin			X		X		1978 **Still operating**
MONACO							
Monaco			X			X	1989 **Still operating**
NETHERLANDS							
Amsterdam			X		X		96 /'00 **Still operating**
Arnhem	X				X		1989
Groningen			X		X		1995 **Still operating**
Hague	X				X		2002
Leiden			X			X	1994 or 1997
Maastricht	X				X		1989-91
Utrecht			X			X	1994 **Still operating**
PORTUGAL							
Evora		X			X		2000 **Still operating**
SPAIN							
Malaga			X		X		2002 **Still operating**
SWEDEN							
Gothenburg		X			X		1996
Hammarby - Const			X	X			2001 **Still operating**
Stkholm Old Town			X		X		2000 **Still operating**
Uppsala	X			X			2001

	Type of work carried out on the UCC			Area served by the UCC scheme			
Country/Location	Research/Feasibility	Pilot/Trial	Operational	Site Specific	District	Town-wide	Date
SWITZERLAND							
Basel		X				X	1993
Zurich		X				X	1994
U.K.							
Aberdeen	X				X		1997
Barnsley	X					X	1976
Bluewater, Kent			X	X			2002 **Still operating**
Bradford	X					X	1975
Bristol		X			X		2004 **Still operating**
Camberley	X					X	1975
Chester	X				X		1997
Chichester	X				X		1975
City of London	X				X		1997
Hammersmith	X				X		1974
Hull	X					X	1976
Heathrow - Const			X	X			2001 **Still operating**
Heathrow - Retail			X	X			2000 **Still operating**
Meadowhall,Yorks			X	X			2001 **Still operating**
Swindon	X				X		1976
Winchester	X					X	1994
Worcester	X					X	1980s
U.S.A.							
Columbus, Ohio	X					X	1972

Notes:
Type of work carried out on the UCC
"Research/ Feasibility" refers to UCC schemes that did not progress beyond an initial research/feasibility project.
"Pilot/Trial" refers to UCC schemes that were trialled but did not progress beyond this trail stage.
"Operational" refers to UCC schemes that extended beyond the trial stage.

Area served by the UCC scheme
Site Specific = UCC scheme serves a single site or commercial unit
District = UCC scheme serves part of a town/city - usually historic core or central business district.
Town-wide = UCC scheme serves the whole town

Table, A2.2 lists those UCC schemes that are mentioned in passing in the literature but for which no further information is available, or are only at the discussion stage or which did not proceed beyond initial consideration to detailed research/feasibility.

Table A2.2: UCC Schemes for Which Details are not Available

Country	UCC Scheme
Czech Republic	Prague
Finland	Tampere, Vaasa
France	Lyon, Lille-Douai-Arras, Castelnau d'Estretefonds (Toulouse), Rouen-Le Havre, Strasbourg (Park & Ride)
Germany	Augsburg, Bielefeld, Dortmund, Duisburg, Gutersloh, Hamburg, Koblnz, Keulen, Neuss,
Italy	Brescia, Rome, Turin, Parma, , Modena, Florence, Terni
Netherlands	Eindhoven, Den Bosch, Den Helder, Dordrecht, Gouda, Nijmegen
Spain	Maribou, Madrid
U. K.	Preston

The following pages contain a datasheets for each of the 67 UCC schemes listed in Table A2.1 (with one UCC datasheet per page). Each datasheet contains the following information (where available):

- Location (i.e. town/city and country)
- Study/Trial/Operational
- Justification
- Description
- Kms to Delivery Area
- Voluntary/Compulsory
- Permanent/Temporary
- Start / Duration
- Involved Parties
- Users/Clients
- Measured outcomes
- Other outcomes / lessons
- Observations
- Research File # (relevant number of the piece/s of literature referred to – see "List of Literature Consulted" section for details of literature)

The datasheets are listed alphabetically by country, and alphabetically by location within each country (the same order as used in Table A2.1.

Location	**AUSTRIA - Graz**
Study/Trial/Operational	Study
Justification	The UCC for the city centre is expected to result in a reduction in goods vehicle trips and unloading stops. This will help to relieve freight traffic congestion. It will also reduce environmental impacts of freight transport, through trip reduction and also through the use of low-noise and low-emission vehicles.
Description	In 2000 the government in the province of Styria initiated the planning and design process for Styrialog, a UCC located within an existing the freight village (called Cargo Centre Graz - CGZ). The site is to the south of the city of Graz and is directly connected to the motorway and is rail connected. The Airport Graz-Thalerhof is 4 km away, and the Airport Business Center is located within 2 km. The UCC is intended to integrate road and rail transport and to cover an area of around 2000m^2. The UCC is intended to provide transhipment, storage/stock management, bundling and distribution functions, including goods returns, reverse logistics and home deliveries). It is planned that in future the deliveries for the hospitals in Graz and the surrounding area will be consolidated at the UCC.
Kms to Delivery Area	12 km
Voluntary/Compulsory	
Permanent/Temporary	
Start / Duration	Planning started in 2000
Involved Parties	Province of Styria, railway operator, logistics and parcel companies all involved in the planning process. The province of Styria supported the foundation of a organisation named Styrialog which has been established to set up the UCC within the Cargo Centre.
Users/Clients	Transport operators
Measured outcomes	It was estimated that the UCC would result in an 80% reduction of the number of vehicles required, a 70% reduction in vehicle trips, a 70% reduction in total delivery time, and a 50% reduction in the time vehicle spend unloading in the inner centre.
Other outcomes / lessons	
Observations	Appears that the scheme has not progressed beyond the initial planning and study stage to an operational stage due to difficulties in obtaining agreements from companies to use it.
Contacts	
Research File #	82, 142
Sort Code	

Location	**BELGIUM - Brussels**
Study/Trial/Operational	Study (carried out as part of the EU funded REFORM project)
Justification	A study was carried out as part of the reformulation of the freight transport policy in Brussels. The objectives were to analyse the existing freight transport situation and to assess the potential traffic and environmental impacts of freight transport restrictions combined with the implementation of an urban consolidation centre.
Description	Truck traffic is a major contributor to congestion, air pollution, noise and stress in the "Pentagon" area of Brussels, the city's historic centre. On a typical weekday, an estimated 180 trucks enter this 4 sq. km. area between 08:00 and 09:00. The Pentagon contains one of the most popular shopping districts in the country as well as a large number of restaurants and cafés. It is a popular area with tourists. Brussels regional authorities decided to consider the possibility of establishing an urban consolidation centre approximately 1 km from the Pentagon area, in the harbour area. It would contain storage facilities. Heavy good vehicles could then be prohibited from entering the Pentagon area and made to use the consolidation centre. Analysis was also carried out into the effects of operating the consolidation centre over the entire area within the city centre ring road. A freight model compatible with the passenger model was designed, in order to evaluate the freight traffic impacts of the consolidation centre on the general traffic conditions. Other scenarios in which restrictions on heavy goods vehicles would be imposed without the introduction of a UCC were also investigated.
Kms to Delivery Area	1 km
Voluntary/Compulsory	
Permanent/Temporary	
Start / Duration	1998
Involved Parties	Brussels Capital-Region.
Users/Clients	
Measured outcomes	The results indicated that establishing a UCC and banning of heavy vehicles from the either the area inside the Pentagon or the Centre Ring Road would have negative impacts on traffic conditions and environmental impacts. Both scenarios would increase the traffic flows to the UCC, and also in the UCC delivery area (due to the use of smaller vehicles from the UCC). It was calculated that travel times would increase as a result of the greater traffic flow. Fuel consumption and vehicle emissions were also predicted to worsen due to lower traffic speeds. Both scenarios were also forecast to have an adverse effect on loading/parking in the restricted areas due to the greater number of delivery vehicles required. It was concluded that the benefits of the type of UCC investigated would be outweighed by the traffic, economic and environmental costs resulting from such a scheme.
Other outcomes / lessons	
Observations	The projected increase in vehicle traffic suggests that the vehicle size used in the modelling may not have been appropriate.
Research File #	43b, 87, 130

Location	**CANADA – Vancouver**
Study/Trial/Operational	Study
Justification	To investigate the impact of a consolidation centre on urban freight.
Description	Loads below a certain weight limit (not identified) to be consolidated at a centre for urban delivery.
Kms to Delivery Area	
Voluntary/Compulsory	
Permanent/Temporary	
Start / Duration	mid 1970's
Involved Parties	
Users/Clients	
Measured outcomes	
Other outcomes / lessons	The study concluded that "the value of consolidated terminals was found to be inconclusive" and that there was little justification for "a significant outlay of public funds to build and operate a terminal".
Observations	A similar study in Saskatoon reached a similar conclusion.
Research File #	14,

Location	**FRANCE - Arras**
Study/Trial/Operational	Study
Justification	
Description	An experimental "urban freight platform". Nothing further known.
Kms to Delivery Area	
Voluntary/Compulsory	
Permanent/Temporary	
Start / Duration	1990's
Involved Parties	
Users/Clients	
Measured outcomes	
Other outcomes / lessons	No evidence of the project proceeding
Observations	
Research File #	14,

Location	**FRANCE - Bordeaux**
Study/Trial/Operational	Study
Justification	Government recognised need to rationalise the movement of freight in urban areas but had little information on freight flows to enable it to develop and implement new initiatives.
Description	3 major studies (Bordeaux, Dijon & Marseilles) to collect large amounts of primary data. New distribution model (FRETURB) developed that is anticipated as providing a basis for initiatives involving the transhipment and consolidation of retail goods.
Kms to Delivery Area	
Voluntary/Compulsory	
Permanent/Temporary	
Start / Duration	1990's
Involved Parties	
Users/Clients	
Measured outcomes	
Other outcomes / lessons	FRETURB now fully developed urban freight model using data from these three studies.
Observations	
Research File #	14,

Location	**FRANCE - Dijon**
Study/Trial/Operational	Study
Justification	Government recognised need to rationalise the movement of freight in urban areas but had little information on freight flows to enable it to develop and implement new initiatives.
Description	3 major studies (Bordeaux, Dijon & Marseilles) to collect large amounts of primary data. New distribution model (FRETURB) developed that is anticipated as providing a basis for initiatives involving the transhipment and consolidation of retail goods.
Kms to Delivery Area	
Voluntary/Compulsory	
Permanent/Temporary	
Start / Duration	
Involved Parties	
Users/Clients	
Measured outcomes	
Other outcomes / lessons	FRETURB now fully developed urban freight model using data from these three studies.
Observations	
Research File #	14,

Location	**FRANCE – La Rochelle**
Study/Trial/Operational	Operational
Justification	ELCIDIS project to assess the efficiency and environmental impact of electrical vehicles in urban goods distribution systems.
Description	Inner city is banned to delivery vehicles >3.5t except between 06:00 and 07:30. Deliveries made from the UCC use 7 electric vehicles. The target throughput, based on preliminary research, is 600 parcels per day with 6 parcels per customer per day. The same research states that the average parcel weight is estimated to be 12 kgs, has a size of less than 1 cu. m. and 83% are expected to be foodstuffs. The project has as its objectives: to make better use of delivery space; improve adherence to traffic regulations; reduce congestion and pollution; demonstrate the effectiveness of the electric vehicles and rationalise the urban distribution of goods. Additional logistics services that could be offered from the UCC including home deliveries, storage of freight, and sorting of waste packaging are being investigated as part of the PREDIT project.
Kms to Delivery Area	1 km.
Voluntary/Compulsory	Voluntary
Permanent/Temporary	Permanent
Start / Duration	2001. The trial period is scheduled to end in 2005.
Involved Parties	The manager is Transports Genty (a private company) following a competitive tender. The promoter / coordinator is Communaute d'Agglomeration de la Rochelle. Partners: Chamber of Commerce, Craft Associations, shopkeepers, logistics companies
Users/Clients	Premises in the delivery area
Measured outcomes	Cost per parcel / item delivered = Euro 3.75 (excl-tax) after a subsidy of up to Euro 0.7 (initially it was Euro 2.08. per parcel). 127 – 356 parcels delivered per day (highly seasonal). Later data suggests that the deliveries are now 450 items (parcels) and 5-10 pallets a day.
Other outcomes / lessons	For the initiative to continue the daily throughput has to be raised to the target figure of 600 parcels per day.
Observations	From the outset, the UCC benefited from public funding from La Rochelle City (a fixed amount per package), free premises (partially equipped) and vehicles (including maintenance).In the initial planning of the project, it was emphasised that, although the scheme would be initially subsidised, it should aim to become financially viable.
Research File #	43, 73, 124,

Location	**FRANCE – Lille**
Study/Trial/Operational	Study
Justification	
Description	An experimental "urban freight platform". Nothing further known.
Kms to Delivery Area	
Voluntary/Compulsory	
Permanent/Temporary	
Start / Duration	1990's
Involved Parties	
Users/Clients	
Measured outcomes	
Other outcomes / lessons	
Observations	
Research File #	14,

Location	**FRANCE - Marseilles**
Study/Trial/Operational	Study
Justification	Government recognised need to rationalise the movement of freight in urban areas but had little information on freight flows to enable it to develop and implement new initiatives.
Description	3 major studies (Bordeaux, Dijon & Marseilles) to collect large amounts of primary data. New distribution model (FRETURB) developed that is anticipated as providing a basis for initiatives involving the transhipment and consolidation of retail goods.
Kms to Delivery Area	
Voluntary/Compulsory	
Permanent/Temporary	
Start / Duration	1990's
Involved Parties	
Users/Clients	
Measured outcomes	
Other outcomes / lessons	FRETURB now fully developed urban freight model using data from these three studies.
Observations	
Research File #	14,

Location	**FRANCE - Paris I**
Study/Trial/Operational	Trial
Justification	Restriction of 3.5t carrying capacity on delivery vehicles entering Paris, with exemption for bulk materials, led to need for break bulk and the opportunity to consolidate.
Description	Freight complexes established by the government – Sogaris (south of Paris) and Garanor (north-east) – with public transhipment centres. The transhipment centres were seen as temporary until sufficient break-bulk / consolidation capacity had been developed by the private sector.
Kms to Delivery Area	
Voluntary/Compulsory	Compulsory based the load restriction.
Permanent/Temporary	
Start / Duration	1971
Involved Parties	
Users/Clients	
Measured outcomes	None.
Other outcomes / lessons	Garanor closed in its designated role after a few years and Sogaris continued but at low levels of activity. Both sites are now major integrated freight complexes.
Observations	
Research File #	14,

Location	**FRANCE - Paris II (cycles)**
Study/Trial/Operational	Trial
Justification	The objective was to test an alternative to motorised vehicles for final delivery of goods and reduce the impacts of urban freight transport.
Description	"la Petite Reine" Two types of tricycles with electrical assistance have been used during the experiment to provide delivery services: tricycle-type vehicles (with the carry-case behind the cyclist) and triporteur type (in which the case is in front of the cyclist). The tricycles have a maximum payload of 100 kg, maximum volume of 450 litres (triporteur model), and maximum speed of 20 km/h. The four central arrondissements have been serviced by la Petite Reine in the experiment. Three types of delivery service have been offered by la Petit Reine during the experiment: - Ad hoc deliveries from businesses to customer's homes - Driver and tricycle dedicated to a business for deliveries to customers (dedicated shop-based service) - Consolidation and final delivery of goods entering Paris (using a consolidation centre located in the centre of Paris offered by the Mairie de Paris at low rent). Products targeted by la Petit Reine during the experiment have included: food products, flowers, non-food products (including parcels) and equipment and parts. In the 24 months since the experiment started the number of tricycles has increased from 7 to 19.
Kms to Delivery Area	Consolidation centre located in centre of Paris
Voluntary/Compulsory	Voluntary
Permanent/Temporary	
Start / Duration	2003
Involved Parties	The mairie de Paris has been supporting la Petite Reine company in the experimentation of deliveries using tricycles since May 2003. This experiment has been also supported by the ADEME (Agence gouvernementale De l'Environnement et de la Maîtrise de l'Énergie / French Agency of Environment Management) providing financial aid representing 50% of the feasibility study and evaluation reports, and 15% of the investment in tricycles.
Users/Clients	Transport operators, retailers and other Paris-based businesses
Measured outcomes	Use of the delivery services has been increasing during the trial. The number of trips in the 24th month (14 631) is 18 times higher than in the 1st month (796). Parcel freight has become the most important type of freight during the course of the trial. It has increased from 51% of all items handled at the beginning of the experiment to 97% after 2 years. 156 248 km of diesel van activity have been avoided as a result of the trial. This has saved 43.3 toe (tonnes oil equivalent) of energy consumption, and helped to avoid 112 tonnes of CO_2, 1.43 tonnes of CO, and 280 kg of NOx.
Other outcomes / lessons	The consolidation centre located in the centre of the city has proved to be the most successful of the three services offered (in terms of goods throughput).
Observations	A similar type of scheme using cycles has also been developed in York (UK). The company operates a delivery/consolidation service on behalf of its contracted parcel carrier customers in the historic centre of York (which is subject to a goods vehicle ban from 11:00-16:00). In 2002, the company employed seven riders, was working with several national courier networks, and provided local courier services to 100 York-based businesses.
Research File #	27, 82, 129, 143

Location	**GERMANY - Aachen**
Study/Trial/Operational	Trial and Operational
Justification	An initial study was carried out into the role of users and future visions for the uptake of City Logistics (and combined heat and power generation). The operational scheme aims to improve goods vehicle load factors and generate benefits for transport companies and retailers. It is intended to help reduce congestion, noise and air pollution.
Description	The approach employed was essentially "bottom up". The scheme was not protected in any way and had to compete with the conventional distribution systems and finance was only available for monitoring and evaluation. Unlike Dusseldorf the users, who were supportive, were involved in the design and implementation of the trial and their expectations and requirements were understood. Again unlike Dusseldorf a marketing campaign was undertaken to raise awareness of City Logistics in anticipation of the trial. The operational scheme is referred to as "Claix Citylogistik Aachen e.V." (City-Logistik-aix-la-chapelle). The scheme is operated by a transport company (Vent Transporte). Currently the CC scheme operator uses 4 x 7.5 t goods vehicles with Euro III engines. The CC vehicles are allowed to enter pedestrian zones over a longer time window than other goods vehicles. Each vehicle has the "Claix" livery. The CC has 650m^2 of storage space. The operator carries out morning collections from the forwarders using the CC and then consolidates them at the CC. Deliveries from the CC are then made on the same day. The delivery area includes the cities of Aachen, Herzogenrath, Wuerselen and Alsdorf and is arranged according to postal zip codes. There is a tariff, arranged according to postal zip codes and weights, however individual tariff arrangements are typically made with the participants.
Kms to Delivery Area	
Voluntary/Compulsory	Voluntary
Permanent/Temporary	Permanent
Start / Duration	Planning started in 1995. The trial and subsequent operation started in 1997 – after the Dusseldorf trial. (see Dusseldorf sheet)
Involved Parties	A "working circle" of involved parties including the participating forwarders, Aachen and Wuerselen city authorities, and city-based trade associations.
Users/Clients	Forwarders and premises in the delivery area (users include manufacturers, processors, wholesalers and retailers)
Measured outcomes	Growth in use of the CC has risen from approximately 40 deliveries per month in 1998 to 700 deliveries per month in 2003.
Other outcomes / lessons	The need to involve the users at an early stage was identified as being crucial for success. The possibility of operating home delivery services from the CC was investigated but there was not sufficient interest from retailers to warrant it.
Observations	
Research File #	67, 146, 147

Location	**GERMANY - Potsdamer Platz, Berlin**
Study/Trial/Operational	Operational
Justification	To reduce the lorry traffic that would have otherwise been generated by the construction sites in the redevelopment of Potsdamer Platz.
Description	In post-reunification Germany, the reconstruction of the Potsdammer Platz area in Berlin would have potentially created significant lorry traffic associated with the construction sites. The building included offices, commercial and residential buildings, a theatre, department stores, hotels, transport facilities including railways and a road tunnel. Between 1992-2002, approximately 6 million tonnes of excavated soil and 200,000 tonnes of building refuse had to be transported away from the site, and 1.7 million m^3 of concrete and 2 million tonnes of general cargo delivered. The private and public sectors decided to devise a joint logistical solution to the problems and established Baustellenlogistik Potsdamer Platz GmbH (referred to as baulog) in August 1993. An engineering firm Emch+Berger was appointed to provide technical management services. A logistics consolidation centre was built which was adjacent to the Potsdamer Platz building sites. An infrastructure of 5 km of rail facilities, a 2.5 km internal transport road, and 5 bridges had to be built. The Potsdamer Platz building site could only be accessed via the logistics centre. The logistics consolidation centre provided the following services: 1. Removal of all excavated material from the site by rail or water 2. Manufacture and delivery of ready mixed concrete to the site (cement and aggregates delivered to the concrete factory by rail) 3. Organisation of the delivery of general cargo by rail, transfer and transport to the building sites by lorry 4. Collection of sorted building refuse, transfer and rail transport out 5. Acceptance and discharge of all ground water from the excavation pits on the site
Kms to Delivery Area	On-site
Voluntary/Compulsory	Compulsory
Permanent/Temporary	Temporary
Start / Duration	1992-2002
Involved Parties	Wide range of private companies and public organisations including including Daimler-Benz InterServices GmbH, Sony Berlin GmbH, Asea Brown Boveri, Deutsche Bahn AG and the federal state of Berlin.
Users/Clients	All the companies involved in the building projects.
Measured outcomes	The Potsdamer Platz construction consolidation centre resulted in the avoidance of 50,000 lorry kilometres per day (through the use of other modes) and the completion of the building work six months ahead of schedule.
Other outcomes / lessons	Since this scheme, logistics co-ordination has become mandatory for large construction sites in Germany.
Observations	
Research File #	128, 141

Location	**GERMANY - Bremen**
Study/Trial/Operational	Operational
Justification	An extension into "City Logistik" of the operations currently undertaken at the Bremen GVZ (multi-modal) site.
Description	Within the GVZ a separate City Logistik project has been set up to serve a variety of shops in the city centre by means of consolidation. The advantages are seen as: more efficient use of delivery vehicles / fewer journeys within inner city / less environmental damage. This was one of the first schemes established in Germany. It operates 7-8 goods vehicles and has 20 clients.
Kms to Delivery Area	
Voluntary/Compulsory	Voluntary
Permanent/Temporary	Permanent
Start / Duration	UCC established in 1994. GVZ established in 1984.
Involved Parties	
Users/Clients	The 20 clients include GVZ-based shipping companies, and a range of other businesses.
Measured outcomes	12.7% reduction in vehicle journeys into the city centre / 28% increase in load factor reported in 1997. In 2005 goods vehicle savings of approximately 9,000 km per month reported as a result of the UCC. This is equivalent to 70 goods vehicle round trips using 7.5 t goods vehicles. Approximately 1,100 litres of diesel are also saved every month.
Other outcomes / lessons	Convincing both carriers and retailers of the advantages was a major exercise. The carriers who were co-located on the GVZ appear to have been more cooperative than is the norm. A common platform – GVZE – was established to co-ordinate activities and discuss different interests.
Observations	Reported in 2005 that as a result of strong increase in express parcels services and new logistics concepts in the retail sector, it has not been possible to increase goods throughput destined for the city centre at the UCC. Instead the UCC has become increasingly involved in delivery work in the hinterland around Bremen. There are also plans to acquire a 12 t CNG-powered goods vehicles for the UCC in 2005.
Research File #	30, 73, 115, 145, 146, 148

Location	**GERMANY - Cologne**
Study/Trial/Operational	Operational
Justification	Co-operation of spedition companies to consolidate their retail supplies and having them delivered by a "neutral" carrier. Similar initiatives in Cologne, Stuttgart and Ulm.
Description	Products channelled to an urban transhipment terminal, consolidated and despatched on medium sized rigid vehicles with a "City Logistiks" livery. 12 spedition companies involved but only responsible for 3% of retail deliveries. Opportunities for further development identified as home deliveries, vehicle tracking and route planning, waste recycling, use of low emission vehicles
Kms to Delivery Area	
Voluntary/Compulsory	
Permanent/Temporary	
Start / Duration	Mid 1990's (1994?)
Involved Parties	
Users/Clients	Premises in the delivery area
Measured outcomes	
Other outcomes / lessons	Transport cost savings resulting from consolidation are less than the additional handling costs making the economics of the operation marginal and the environmental benefits were partly offset by an increase in total operating costs. But operators claimed improved operating efficiency and an improvement in their image. Large retailers and parcel carriers reluctant to participate for reasons of competition and protecting their own logistics operations.
Observations	No evidence of the project continuing
Research File #	14,

Location	**GERMANY - Dusseldorf**
Study/Trial/Operational	Trial
Justification	A study into the role of users and future visions for the uptake of City Logistics and Combined heat and power generation.
Description	The approach employed was essentially "bottom up". The scheme was not protected in any way and had to compete with the conventional distribution systems and finance was only available for monitoring and evaluation. The users were not involved in the design and implementation of the trial. There was little information exchange between the main users (retailers) and the forwarders of whom one provided the co-ordination. The physical nature of the trial is not described.
Kms to Delivery Area	
Voluntary/Compulsory	
Permanent/Temporary	
Start / Duration	1997 – 5 week trial
Involved Parties	Research Institute = facilitator. Other parties: Local Authority, forwarders and the Chamber of Commerce but not individual retailers.
Users/Clients	Premises in the delivery area
Measured outcomes	
Other outcomes / lessons	The need to involve the users at an early stage was identified as being crucial for success. Because there were no pressing logistics problems the users did not see any necessity to move to City Logistics and no pressure was exerted to make them do so. Discussion as to the possible role of a UCC as a stockholding point for the retailers.
Observations	
Research File #	67,

Location	**GERMANY - Essen**
Study/Trial/Operational	Operational
Justification	To improve the efficiency of goods vehicle delivery and reduce environmental impacts.
Description	Essen is one of the 20 towns and cities included in the "city logistics" programme established in the state of Northrhine-Westphalia in Germany in 1995. The scheme is based on cooperation between transport companies delivering in Essen in order to achieve improved goods consolidation on delivery vehicles. This cooperation first started in October 1997. A formal "city logistics" company was formed in 1999. Goods are consolidated at the depot of one of the participating transport companies in Essen. Deliveries are then made to customers in the city using the "city logistics" delivery vehicles. Vehicles used for delivery services include an 18 t lorry, a 7.5 t vehicle and a 3.5t vehicle. Customers typically used to receive deliveries from several different transport companies on a frequent basis. Six transport companies are involved in scheme together with offices and retailers including department store and small shops. Logistics services provided include consolidation and delivery, storage, disposal and home delivery.
Kms to Delivery Area	
Voluntary/Compulsory	Voluntary
Permanent/Temporary	Permanent
Start / Duration	1997
Involved Parties	Regional and city government, six transport companies
Users/Clients	Retailers and offices
Measured outcomes	Approximately 10 tonnes of goods are handled, on average, per day.
Other outcomes / lessons	
Observations	
Research File #	146, 151

Location	**GERMANY - Frankfurt am Main**
Study/Trial/Operational	Operational
Justification	The scheme is intended to reduce congestion and vehicle emissions through the consolidation of goods which results in better load factors, and the need for fewer goods vehicle trips.
Description	Frankfurt is one of the 20 towns and cities included in the "city logistics" programme established in the state of Northrhine-Westphalia in Germany in 1995. The scheme started in 1995 and was set up by 11 forwarding companies. From the beginning it was established as a private initiative. Public funding was made available for studies and research, but not for supporting the running of the scheme. Studies carried out showed that centralised consolidation centres could lead to localised increases in traffic flows, and that several decentralised centres would not be economically sustainable. Therefore the forwarding companies participating in the scheme based it on bilateral agreements to work together by transferring loads between themselves at night for delivery the following day. A range of logistics services are offered as part of the scheme including delivery, storage of goods for retailers (including seasonal goods and promotions), and the disposal of packaging and waste.
Kms to Delivery Area	
Voluntary/Compulsory	Voluntary
Permanent/Temporary	Permanent
Start / Duration	1995
Involved Parties	11 forwarding companies including Baumann Spedition GmbH, Birkart Systemverkehre GmbH, Dachser GmbH & Co., Danzas GmbH, G.L.Kayser GmbH, GEFCO KN GmbH & Co. KG, August L. König GmbH, ABX Logistics GmbH, Schenker Eurocargo AG
Users/Clients	Retailers and other companies receiving deliveries
Measured outcomes	
Other outcomes / lessons	
Observations	It is referred to as a special form of "city logistics" scheme that is different to those practised in other German cities - due primarily to the lack of a single consolidation centre.
Research File #	146, 150

Location	**GERMANY - Freiburg**
Study/Trial/Operational	Operational
Justification	A private initiative of logistics companies encouraged to consider centralized management of deliveries by the Chamber of Commerce and Industry.
Description	12 partners in the scheme. 3 of the partners leave city centre deliveries at the premises of a fourth who delivers all the goods involved in the city centre area. A second group of 5 partners delivers all their goods to one depot located near the city centre from where an independent carrier delivers them to city centre customers. A third group (only 2 service providers) specialises in chilled fresh product. All the partners form an unbroken relay chain – one partner collecting the goods from the other for delivery to the city centre. No subsidies were provided nor regulatory assistance given.
Kms to Delivery Area	No single consolidation point.
Voluntary/Compulsory	Voluntary
Permanent/Temporary	Permanent
Start / Duration	1993-97
Involved Parties	
Users/Clients	Premises in the delivery area
Measured outcomes	Journey times reduced from 566 to 168 hours per month. 33% reduction in delivery runs. 50 % reduction in number of vehicles travelling into the city centre / day. Vehicle loading increased from 45% to 70% Time spent in the city by lorries reduced from 612 to 317 hours. 70% reduction in distance travelled by the trucks and an 11% reduction in the number of trucks
Other outcomes / lessons	During the period there was no change in the number of customers serviced and the number of consignments remained constant.
Observations	
Research File #	41, 115, 124,

Location	**GERMANY - Kassel**
Study/Trial/Operational	Operational
Justification	Co-operation of forwarding companies to consolidate their retail supplies and having them delivered by a "neutral" carrier into the Kassel cbd.. Similar initiatives in Cologne, Stuttgart and Ulm.
Description	Products channelled to an urban transhipment terminal, consolidated and despatched on medium sized rigid vehicles with a "City Logistiks" livery. Initially 12, but eventually only 10, forwarding companies involved but only responsible for 3% of retail deliveries. One of the 10, the largest, took the role of lead agency and the 10 appointed an additional forwarder who was not previously delivering into the cbd to act as the neutral carrier for them all. The other carriers pay the neutral carrier against an agreed tariff. Neutral carrier used 3 new "city lorries"(7.5t). Neutral carrier collects nightly from the 10 / sorts by loads / delivers twice daily into cbd . Opportunities for further development identified as home deliveries, vehicle tracking and route planning, waste recycling, use of low emission vehicles and increasing range of products handled. **N.B.** According to City Ports Project 2005 the scheme is still in operation and now has 7 members. This has not been verified. Meanwhile another 2005 source suggests that the Kassel scheme was stopped approx. two years ago for financial reasons.
Kms to Delivery Area	
Voluntary/Compulsory	Voluntary
Permanent/Temporary	Permanent
Start / Duration	1994
Involved Parties	Chamber of Commerce and Industry, retail business organisation, City Council, University of Kassel, the 10 forwarders + the neutral carrier who meet regularly at a round table to discuss and resolve issues.
Users/Clients	Premises in the delivery area
Measured outcomes	Vehicle fill for operators using the scheme increased from 40% to 80% by volume and from 25% to 60% by weight. Other measured data: Delivery miles to the city reduced by 40% / mileage within the cbd reduced by 60% / average distance between drops reduced by 60% / delivery weight per drop increased by 15% / number of deliveries per retailer per year reduced by 13%. Indications of no significant change in forwarders costs, but no evidence.
Other outcomes / lessons	Transport cost savings resulting from consolidation are less than the additional handling costs making the economics of the operation marginal and the environmental benefits were partly offset by an increase in total operating costs. But operators claimed improved operating efficiency and an improvement in their image. Large retailers and parcel carriers reluctant to participate for reasons of competition and protecting their own logistics operations.
Observations	The "round table" was important to the management of the project.
Research File #	14, 22, 31, 32, 51, 75, 82, 115, 124, 137, 146

Location	**GERMANY - Munich**
Study/Trial/Operational	Study
Justification	To maximise the loading capacity of goods vehicles and to reduce the number of deliveries through consolidation of shipments of "some specific lines of industry".
Description	The feasibility study covered: development of existing distribution centres into UCCs for consolidating shipments of cooperating shippers, logistics companies and retailers / establishing telematics networks between the UCCs / development of efficient transhipment systems / testing and usage of environmentally friendly vehicles. It was only in 1997 that the co-operation was extended beyond shippers to retailers within the model. Potential products (lines of industry) were identified as: personal care products, stationery, food-stuffs, home appliances, clothing and building supplies / materials.
Kms to Delivery Area	
Voluntary/Compulsory	
Permanent/Temporary	
Start / Duration	1993/4 (?)
Involved Parties	
Users/Clients	
Measured outcomes	The simulation model suggested the following could be achieved: 29.2% reduction in number of deliveries / cost savings of between 18 and 25% / 18% reduction in drops per delivery run / a 31 minute reduction in store delivery times / increase in vehicle loading from 70 to 81% / 29% reduction in city pollution.
Other outcomes / lessons	
Observations	The predicted outcomes do appear unduly optimistic and whereas the literature states that the project will be evaluated in 1999 no evidence has been identified to state that it ever started. The evaluation may only be of the research.
Research File #	30, 75, 115,

Location	**GERMANY - Nuremburg**
Study/Trial/Operational	Operational
Justification	An initiative from the shopkeepers of the city centre to reduce congestion and the costs of distribution.
Description	A city logistik scheme (ISOLDE) that transports loads from the GVZ area to inner city retail stores and other locations. 1 x electric powered and 3 x conventional vehicles used for the delivery. The majority of the deliveries take place in the pedestrian-only areas. Value-added activities such as parcel and pallet pick-up / delivery; storage services; reverse logistics; home shopping deliveries and on-vehicle advertising for the city. It should be noted that in June 2002 the operation became solely a parcels consolidation and delivery service. It is operated by DPD (Deutscher Paket Dienst GmbH & Co.)
Kms to Delivery Area	1.6 km.
Voluntary/Compulsory	Voluntary
Permanent/Temporary	Permanent
Start / Duration	1996 and still in operation
Involved Parties	The owners are the cooperation of companies (logistics companies and shopkeepers) that forms the Advisory Board. They pay a monthly fee towards the warehouse costs.
Users/Clients	
Measured outcomes	Each delivery costs (is charged at) Euro 8.00. 1000 parcels per day are delivered. City Ports Project 2005 suggests 3000 parcels a day which represents 10% of the total city centre traffic.
Other outcomes / lessons	Older people are a major user (home deliveries?) but the price is the issue. All retailers want delivery at the same time – before 08:00 - which is a major issue. Project managed by the "independent" Advisory Board to ensure a coordinated approach. The intention is to manage the operation profitably but in 2002 there were large public subsidies.
Observations	The fact that this is currently a parcels consolidation service would appear to suggest that the objections to the use of a consolidation centre by UK parcel carriers may not be as insurmountable as would at first appear.
Research File #	43, 115, 124,

Location	**GERMANY - Regensburg**
Study/Trial/Operational	Operational
Justification	The scheme was intended to help assist the accessibility problems and negative impacts associated with goods vehicle deliveries (safety, noise, air quality etc.).
Description	The Regensburg scheme is known as "Reglog". It was established in order to address the difficulties posed by making deliveries in the 1km^2 historic centre of Regensburg. However, deliveries are also made to addresses outside this area. The scheme was established to respond to business needs and environmental regulations. Retailers were reducing their on-site storage space and requiring ever-more frequent deliveries. Also, traffic noise abatement had resulted in goods vehicles being restricted in the times at which they are allowed to enter the city centre. BMW are based in Regensburg and were involved in establishing Reglog. The company has helped to initiate concepts to optimise traffic in urban areas in which it has production facilities which are intended to serve as model cities with innovative solutions. BMW started research into goods vehicle traffic in Regensburg in 1996 and devised the Reglog concept in 1997. Reglog started operating in 1998. The scheme is based on morning collection rounds from transport companies using Reglog, followed by consolidation of goods and then same day delivery in Regensburg. The collection of goods from transport companies need to be efficient and fast so it has been carefully organised. Participating companies pre-sort all goods to be delivered by Reglog as well as the associated paperwork so that the Reglog driver can quickly and easily locate and load it. A decision is made about whether to return to the Reglog depot for consolidation with other users' goods or whether to make a direct delivery - this is based on the number of delivery addresses involved and the size of delivery for each. Sometimes it is more efficient to consolidate at the Reglog depot, in other cases it is better to make direct deliveries after collection. Other services offered include storage, collections of goods from addresses delivered to, as well as the disposal of packaging materials.
Kms to Delivery Area	
Voluntary/Compulsory	Voluntary
Permanent/Temporary	Permanent
Start / Duration	Study in 1997. Started operating in 1998.
Involved Parties	BMW devised the Reglog concept. BMW passed control of the Reglog scheme to the Regensburg GVZ in 2000, but remains actively involved.
Users/Clients	One company operates the Reglog depot and vehicles. Six forwarding businesses participate in Reglog.
Measured outcomes	The scheme helps to reduce the work of 7-8 delivery vehicles onto one or sometimes two Reglog vehicles. Approximately 4-5 tonnes of product are delivered each day in Regensburg by Reglog. Approximately 20,000 goods vehicle kilometres has been saved between 1998 and 2005 as a result of Reglog.
Other outcomes / lessons	IT developments are planned for Reglog including on-line data exchange. It is also hoped that zero pollution delivery vehicles can be used in future. This has not been possible to date because of the lack of suitable larger goods vehicles.
Observations	It was considered whether Reglog could be used to handle parcel traffic, but the existing level of parcel consolidation was found to be high. Also guaranteed delivery times would have made it difficult. Therefore it was decided not to include parcels companies in the scheme.
Research File #	146, 149

Location	**GERMANY - Stuttgart**
Study/Trial/Operational	Operational
Justification	Co-operation of spedition companies to consolidate their retail supplies and having them delivered by a "neutral" carrier. Similar initiatives in Cologne and Ulm.
Description	Products channelled to an urban transhipment terminal, consolidated and despatched on medium sized rigids with a "City Logistiks" livery. The spedition companies involved (2 or 3) were only responsible for a small % of retail deliveries. Opportunities for further development identified as home deliveries, vehicle tracking and route planning, waste recycling, use of low emission vehicles
Kms to Delivery Area	
Voluntary/Compulsory	
Permanent/Temporary	
Start / Duration	1993/4
Involved Parties	
Users/Clients	Premises in the delivery area
Measured outcomes	
Other outcomes / lessons	Transport cost savings resulting from consolidation are less than the additional handling costs making the economics of the operation marginal and the environmental benefits were partly offset by an increase in total operating costs. But operators claimed improved operating efficiency and an improvement in their image. Large retailers and parcel carriers reluctant to participate for reasons of competition and protecting their own logistics operations.
Observations	No evidence of the project continuing
Research File #	14, 75,

Location	**GERMANY - Ulm**
Study/Trial/Operational	Operational
Justification	Co-operation of spedition companies to consolidate their retail supplies and having them delivered by a "neutral" carrier. Similar initiatives in Cologne and Stuttgart.
Description	Products channelled to an urban transhipment terminal, consolidated and despatched on medium sized rigid vehicles with a "City Logistiks" livery. The spedition companies involved (2 – 4) were only responsible for a small % of retail deliveries. Opportunities for further development identified as home deliveries, vehicle tracking and route planning, waste recycling, use of low emission vehicles
Kms to Delivery Area	
Voluntary/Compulsory	
Permanent/Temporary	
Start / Duration	Mid 1995
Involved Parties	
Users/Clients	Premises in the delivery area
Measured outcomes	
Other outcomes / lessons	Transport cost savings resulting from consolidation are less than the additional handling costs making the economics of the operation marginal and the environmental benefits were partly offset by an increase in total operating costs. But operators claimed improved operating efficiency and an improvement in their image. Large retailers and parcel carriers reluctant to participate for reasons of competition and protecting their own logistics operations.
Observations	No evidence of the project continuing
Research File #	14,

Location	**ITALY - Ferrara**
Study/Trial/Operational	Operational
Justification	To start up a logistics platform that aims to achieve economic profit together with efficiency and reduced environmental impact in the distribution of goods in the urban area and across a region.
Description	The scheme is referred to as "EcoPorto". It comprises a 20,000m^2 of which 7,500m^2 is currently built on, 2,500-3,000m^2 of which is refrigerated depots. The development of the UCC has been carried out by CoopSer (a private company), which has invested 6.7 million Euro to purchase the land, build the consolidation centre and purchase vehicles. There has been no public financial contribution but the Municipality has introduced measures to favour transport by environmentally-friendly vehicles. CoopSer uses 60 vehicles within the Ferrara urban area, approximately 50 of which are powered by methane. Ferrara has Limited Traffic Zones and Pedestrian Zones of Ferrara. Goods vehicles entering these areas are subject to vehicle access time restrictions and also have to pay a tariff. Environmentally-friendly vehicles (including those operated from EcoPorto) are allowed to enter these area for the entire working day (06:00-17:30) while other third party operators can only enter between 06:00-11:00 and 15:30-17:30). Environmentally-friendly vehicles also receive an 80% discount on the entry tariff.
Kms to Delivery Area	Approx. 2 km outside the city
Voluntary/Compulsory	Voluntary
Permanent/Temporary	Permanent
Start / Duration	June 2002
Involved Parties	
Users/Clients	Fifteen transport operators are using the UCC. In the month of September 2005, 140,000 consignments were handled at EcoPorto in total.
Measured outcomes	
Other outcomes / lessons	
Observations	As well as making deliveries within the city, the UCC is also used to make deliveries within the entire region. This explains the scale of the scheme in terms of the size of the distribution centre and the monthly consignments handled.
Research File #	124,125

Location	**ITALY - Genoa**
Study/Trial/Operational	Trial
Justification	To help resolve the problems faced by trades people with regards to access to and mobility within the historical city centre.
Description	The pre-trial scenario was: 10,250 boxes per day are delivered in the city centre excluding perishables – 36% general goods / 9% office supplies / 8% clothing and textiles. City centre logistics in Genoa have 2 components – goods delivered to the shops in the centre and deliveries made by shopkeepers to their customers. Goods are supplied to the shops throughout the morning (but not many early deliveries) and 30% also receive afternoon deliveries. The majority of the deliveries are made in small vans and consist of <5 boxes. 40% of the boxes weigh 15 Kg or less. Deliveries to customers are made throughout the whole day despite specific time restrictions, and are made in small vans, cars and motorcycles. The average delivery is <5 boxes. The UCC was 1,400 sq. m (half covered) with 42 staff (incl. 30 drivers) and 10 delivery vehicles (8 x electric 2 x methane). It was estimated that there would be 1800 shipments a day. Consideration was given to value-added activities. The trial was extended to the whole city centre in 06/2003 (2000 retail outlets) to achieve the forecast 1000 deliveries / day. Only 150 / day in the "Demo" area. The UCC trial finished in December 2004 due to national funding coming to an end. Twenty-five transport operators used the UCC with 68 consignments being handled per day during 2004.
Kms to Delivery Area	5 km.
Voluntary/Compulsory	Voluntary
Permanent/Temporary	
Start / Duration	2003-2004. Initial trial (Demo) was of 20% of the centre & 17% of activities
Involved Parties	The management was provided by Genoa-Eco Distribuzione Merci Srl – a joint venture of the Chamber of Commerce, Trades Unions and Municipality of Genoa. The initial investment is estimated to be Euro 2.5m
Users/Clients	Businesses in the city centre.
Measured outcomes	
Other outcomes / lessons	It is considered that the uptake by logistics companies is dependent on the charges levied by the UCC, whereas the retailers while wanting better loading and unloading and delivery times are not optimistic regarding the benefits that the UCC will bring. Especially if they own their own vehicles.
Observations	
Research File #	79, 124, 125

Location	**ITALY - Padua (Padova)**
Study/Trial/Operational	Trial
Justification	Set up as part of the efforts to improve air quality in Padua and neighbouring towns (based on an agreement signed by the Municipality and Unions in 2003). The objectives of the UCC are to: - consolidate the distribution of goods so as to reduce freight traffic inside the historical centre of the city, - use environmentally-friendly delivery vehicles to reduce vehicle emissions - maintain the city's dynamism and vitality by offering reliable delivery services
Description	The scheme is referred to as "Cityporto Padova". It is based inside the Interport and operates from a 1000m^2 distribution centre. Deliveries destined for the city's businesses are consolidated in a warehouse located in Interporto di Padova SpA It started operating in April 2004. The pilot phase will run from 2004-2005 and this is expected to be followed by a second phase with the creation of a company. In order to encourage transport operators to use Cityport, The City of Padova Council has introduced some operating incentives. These include that vehicles operating from the UCC are allowed 24-hour access to the city, can use bus-only lanes and have reserved loading areas. Four natural gas powered vehicles currently operate from the UCC. Each vehicle has the CITYPORTO livery. It is anticipated that 17 vehicles will be used when the UCC reaches full-capacity. The UCC is managed and operated by the Logistic Division of Interporto di Padova (a company that specializes in intermodal transport and logistics).
Kms to Delivery Area	
Voluntary/Compulsory	Voluntary
Permanent/Temporary	Expected to become permanent
Start / Duration	2004
Involved Parties	Agreement to set up the UCC was signed by the Municipality, Province, Chamber of Commerce, Padua Interport Spa, APS Holding Spa.
Users/Clients	Fifteen transport operators are currently delivering goods to the UCC. In September 2005 approximately 4,800 deliveries were being handled per month, compared with 1,300 in September 2004.
Measured outcomes	Simulation work indicates that only one-fifth of the vehicle trips previously required will need to be made by vehicles at the UCC to deliver the same quantity of goods.
Other outcomes / lessons	
Observations	The Business Plan includes a forecast that the UCC will breakeven financially in its 4th year of operation.
Research File #	124, 125

Location	**ITALY - Siena**
Study/Trial/Operational	Operational
Justification	To improve the efficiency and reduce the number of trips and environmental impacts of urban goods transport in the historic city centre.
Description	Siena is a historical town with a population of approximately 60,000 inhabitants, and large annual tourist flows. The city centre comprises a network of narrow, steep streets and many shops. It is a Pedestrian Area and a Limited Traffic Zone (LTZ) and goods vehicle access is only allowed at specific times in the morning and afternoon. Electric vehicles are exempt from these time restrictions. Work has been carried out in recent years to establish new urban distribution arrangements in Siena. This has included time restrictions on vehicle access to restricted areas, reconsideration of loading and parking facilities, automated access control gates, etc. As part of the ALIFE project, an "urban logistics company" was established to co-ordinate and control all these changes to urban distribution. As part of this, two UCC were established outside the city walls (one for food and one for non-food) in 1999. These are used to consolidate goods destined for addresses inside the LTZ. The Urban Logistics Company operates twelve 3.5 tonnes gas powered vehicles and six 3.5 tonnes electric vehicles to make deliveries from the consolidation centres. These vehicles make an average of 4 trips per day into the city centre. As part of the eDRUL project (2002-2005), work is continuing to improve IT services at the UCCs and to develop a home delivery service from city shops.
Kms to Delivery Area	Just outside the city walls
Voluntary/Compulsory	Voluntary
Permanent/Temporary	Permanent
Start / Duration	The UCCs were established during the ALIFE project in 1999. The eDrul project which is enhancing IT services at the UCCs will run from 2002 to 2005.
Involved Parties	Local Administration, public private partnerships, transport operators and Ministry of Transport.
Users/Clients	Transport operators that choose not to enter the Limited Traffic Zone.
Measured outcomes	37% reduction in the freight vehicles travelling in the historic centre (from 450 to 280) with the objective of reaching 60% of goods carried.
Other outcomes / lessons	
Observations	The entire ALIFE project cost 1,330,000 Euro in the first year and 484,000 Euro in the second year. It has had annual costs since then of approximately 145,000 Euro.
Research File #	124, 126, 127, 135, 136

Location	**ITALY - Vicenza**
Study/Trial/Operational	Trial
Justification	Part of a project to rationalise urban goods distribution through innovation to maximise the usage of the vehicles in circulation and reduce their number. Consolidation is considered to be the goal.
Description	The city centre is only open to goods vehicles between 07:00 – 09:00 and 14:00 – 16:00 and vehicles >2.5 m. or with a capacity >7.5t need a permit within these times. Smaller vehicles do not. Permits also required to transit pedestrianised areas. Most logistics companies ignore the regulations. An "eco-logistic hub" was built in 2002 outside the city to serve not only Vicenza but also the bordering municipalities. The estimated potential customer base is 5,238 outlets – mainly clothing, shops, bars and food services. The hub is c6-7000 sq. m. of which 2,000 m. is covered.There is be a supporting IT system. Vicenza UCC began operating in January 2005. Five electric vehicles are operated from the UCC and are exempt from the access time restrictions in the Limited Traffic Zone in the centre of the urban area (normally vehicles up to 7.5 tonnes can only enter between 07:00-09:30 and 14:30-16:00) and can use the bus lanes. Fourteen operators are currently using the UCC. In May 2005, 2500 consignments were handled and the UCC was experiencing good growth in consignments per month between January and May.
Kms to Delivery Area	
Voluntary/Compulsory	Voluntary
Permanent/Temporary	
Start / Duration	2002
Involved Parties	Management is a mixed public-private company with participation from industry / trade associations.
Users/Clients	Premises in the delivery area
Measured outcomes	
Other outcomes / lessons	Industry associations are supportive on the condition that individual roles and operating methods are well defined.
Observations	
Research File #	79, 125, 136

Location	**JAPAN – Marunouchi, Tokyo**
Study/Trial/Operational	Trial
Justification	To investigate CDS (Co-operative Distribution System) in order to decrease distribution (especially delivery) costs.
Description	2 types of cooperative delivery system employed: "the horizontal" between the UCC and delivery points, and "the vertical" within the building where the delivery is made. A single Stock Point (SP) where the stock is consolidated; consolidated deliveries made on natural gas trucks to the underground entrances of the building; 2 staff at each building to unload the deliveries and then deliver within the building. 5 major and 13 smaller logistics companies took part in the trial and delivered all the goods to the SP. All product types except chilled and frozen handled. A fee of Yen 50 per freight (not clear what a "freight" is) was charged between the SP and delivery point. During the period of the trial illegal parking was banned (sic), no deliveries through a building's front door was permitted, 30 minutes free parking was available for deliveries
Kms to Delivery Area	
Voluntary/Compulsory	Voluntary
Permanent/Temporary	Temporary
Start / Duration	2002 – 19 weekdays trial
Involved Parties	Building owners, tenants, carriers, metropolitan police, Ministry of Land and Transportation. Representatives of all these formed an Executive Committee.
Users/Clients	Premises in the delivery area
Measured outcomes	186 trucks delivered into the SP and 125 trucks made deliveries from the SP – a reduction of 33%. Only 30% of the freight carried by the participants went via the SP, the remainder was delivered direct to each building. The traffic control measures that were tested resulted in a50% reduction in on-road parking and a 35% increase in the use of underground parking thus improving traffic flows. Claimed 90% reduction in Nox – presumably only from the vehicles used.
Other outcomes / lessons	Demonstrated that a cooperative approach to a problem produced far better outcomes that a non-cooperative approach which was the pre-trial approach. 18 (7.8%) carriers out of 232 serving the area participated and accounted for 7.2% of the trucks in the area and 22.2% of the "freights"
Observations	As much a "social experiment" as a trial of consolidation.
Research File #	59,

Location	**JAPAN - Osaka**
Study/Trial/Operational	Trial
Justification	Improvements in delivery efficiency and cost reduction
Description	2 department stores having depots adjacent to each other exchange goods for delivery in their respective depot territories. 11 department stores are covered by the operation. This is a very basic form of consolidation (2 organisations working together to optimise deliveries) derived from cooperation in their freight operations. The suggestion is that arriving goods are only delivered to one depot and then sorted between the 2 and their branches but there is no documentary evidence to this effect.
Kms to Delivery Area	
Voluntary/Compulsory	Compulsory – only 2 organisations involved
Permanent/Temporary	Permanent
Start / Duration	Not specified
Involved Parties	
Users/Clients	Branches of the Department Stores
Measured outcomes	
Other outcomes / lessons	Reduction in travel time for trucks, work hours and total costs.
Observations	Not known if the project proceeded
Research File #	51,

Location	**JAPAN – Tenjin (Fukuoka City)**
Study/Trial/Operational	Operational
Justification	Elimination of traffic congestion through the integration of services through establishing a consolidation centre (AIC).
Description	29 trucking companies providing a collective delivery and pick-up service for the cbd. Each contributes $1.6 / parcel to the operating costs of the AIC. 3,500 parcels per day delivered into city centre (3 waves: 08:00, 10:00 & 14:00), and outbound collections (c700 parcels / day) are made after 16:00 on 2t trucks.
Kms to Delivery Area	Round trip is 15 km.
Voluntary/Compulsory	Voluntary
Permanent/Temporary	Permanent
Start / Duration	1978 and still in operation
Involved Parties	
Users/Clients	Business units in the cbd.
Measured outcomes	61% decrease in number of trucks compared with those previously doing the same work. 6.8% decrease in total delivery vehicle parking time in service roads in city centre after introduction of CC. The overall savings from reduced road congestion, pollution and energy were small (less than 1%) as the number of vehicles and movements saved was small within the total freight movements in the cbd.
Other outcomes / lessons	Carriers: reduction in vehicles & drivers; improved load efficiency; reduced shipping costs. But the added complexity of sortation. Consignors / ees: greater efficiency & lower freight charges, but suffer when service not regular / predictable. Road users: less congestion, but partly offset by longer parking to unload Community: less traffic pollution and energy consumption
Observations	The traffic involved only represented 5.6% of the freight traffic in the cbd. To be successful a larger proportion of the market needs to be won to achieve a critical mass.
Research File #	75, 82, 118,

Location	**MONACO**
Study/Trial/Operational	Operational
Justification	Reduce traffic congestion in the city and improving the distribution of goods.
Description	The platform (UCC) is provided and owned by the government and operated by a private carrier (Monaco Logistique) delivering goods to the city areas. All vehicles with a weight >8.5t must transfer their loads at the UCC from where they are delivered on 6.5t capacity vehicles or collected by the customer. The delivery charge [1995 data] is Euro 1.52/100 kilos There is a government subsidy to provide a service with cheaper prices than normal. Vehicles with a weight >8.5t are banned from the Principality with some specific exemptions. Lower weight vehicles may circulate between 07:45-08:15, 11:30-12:30 and 13:45-14:45 and may deliver between 08:30-11:30,12:30-13:45 and 14:15-16:30. Loading / unloading is allowed when circulation is prohibited It is the government's intention to progressively lower the weight limit for vehicles entering the city and thereby "force" logistics companies to route their deliveries via the UCC.
Kms to Delivery Area	
Voluntary/Compulsory	Compulsory for vehicles >8.5t
Permanent/Temporary	Permanent
Start / Duration	1989 and still operating
Involved Parties	Monaco Logistique who have the concession to operate the service.
Users/Clients	Premises in the Principality
Measured outcomes	
Other outcomes / lessons	
Observations	The sole example of where regulation is, and will continue, to "force" logistics companies to use the UCC. The unique position of the Principality makes this possible.
Research File #	51, 124, 137

Location	**NETHERLANDS - Amsterdam**
Study/Trial/Operational	Operational
Justification	Political and public pressure to reduce commercial vehicle movements in city centre represented by a private initiative of logistics companies in partnership with the Chamber of Commerce and municipality.
Description	Initial research indicated 20-30% of shipments were suitable for routing via a UCC. Incremental approach through negotiations with 5 largest operators. Since 1996 freight vehicles may only enter the city centre if: total capacity is <7.5t; length is < 9m.; vehicle is at least 80% loaded for delivery or collection in the city centre; Euro 2 emission standards are complied with. Vehicles not meeting these standards are directed to one of nine logistics centres located on the periphery where the goods are unloaded for delivery by one of the participating logistics companies. The scheme is delivering 20% of the city centre traffic – the low end of the original estimate.
Kms to Delivery Area	Various
Voluntary/Compulsory	Voluntary
Permanent/Temporary	Permanent
Start / Duration	1996 and still in operation
Involved Parties	Logistics companies, Chamber of Commerce, the Municipality
Users/Clients	Premises in the delivery area
Measured outcomes	
Other outcomes / lessons	
Observations	
Research File #	17, 18, 124,

Location	**NETHERLANDS - Arnhem**
Study/Trial/Operational	Study
Justification	Government initiative to overhaul urban freight delivery resulted in a main proposal to develop "urban distribution centres". Support for pilot projects in Groningen, Arnhem, Leiden and Maastricht.
Description	The pre-conditions for establishing a UCC were: scheme had to be commercially viable, usage had to be voluntary, there had to be good road access, delivery from the UCC had to be on environmentally friendly vehicles, development had to be linked to tighter access restrictions. A typical UCC would 8,000 sq. m., with a fleet of 40 vehicles handling 1500 shipments a day. They would only serve the inner city and be primarily retail. Patterns of freight flows analysed by Coopers & Lybrand.
Kms to Delivery Area	
Voluntary/Compulsory	
Permanent/Temporary	
Start / Duration	1989
Involved Parties	Coopers & Lybrand
Users/Clients	
Measured outcomes	Estimated that a UCC would handle 10% of all freight tonnage delivered in the town centre after allowing for exempted items (fresh produce, waste etc), consignments >1 cu. m. In cost terms it was estimated that the annual costs for a UCC (in million Dfl/annum) would be 20.4 without a UCC (transport only) and 15.5 with a UCC (transport 5.0, transhipment 10.5)
Other outcomes / lessons	Strong opposition from the business community – present facilities & arrangements adequate, the UCCs would monopolise inner city transhipment services, conflict of interest in local government (both traffic regulator and involved in running UCC), major retailers envisaged a lost competitive edge in terms of their own logistics arrangements. The project was reduced to a single trial in Maastricht in 1991
Observations	In the 1970's there had been a 92 haulier co-operative in the city that provided an urban break-bulk transhipment function + groupage & resorting of inter-urban and intra-urban freight. There is no evidence that the project proceeded
Research File #	14, 18, 137

Location	**NETHERLANDS - Groningen**
Study/Trial/Operational	Operational
Justification	Government initiative to overhaul urban freight delivery resulted in a main proposal to develop "urban distribution centres". Support for pilot projects in Groningen, Arnhem, Leiden and Maastricht.
Description	Groningen has a historic city centre with small and narrow streets that cannot easily provide access to goods vehicles and vans. The city's policy is to minimise motorised traffic in the city centre. Research into the potential for UCCs in Groningen started in 1989 with a Coopers and Lybrand study. This work found that the pre-conditions for establishing a UCC were: scheme had to be commercially viable, usage had to be voluntary, there had to be good road access, delivery from the UCC had to be on environmentally friendly vehicles, development had to be linked to tighter access restrictions. A typical UCC would be 8,000 sq. m., with a fleet of 40 vehicles handling 1500 shipments a day. They would only serve the inner city and be primarily retail. Patterns of freight flows were analysed by Coopers & Lybrand. Since 1995, Groningen has operated a UCC scheme that is very similar to one in Utrecht. The following operating criteria required in order for companies to be given a UCC permit: prepared to receive goods from any other operator at the UCC, at least 100 deliveries per day from the UCC to at least 20 delivery addresses per journey, and operate small environmentally friendly vehicles. Permits are issued to any companies wanting one that meet these criteria. Distributors that are given these permits carry the 'Sustainable Distribution' logo. One company currently has a UCC permit to deliver in Groningen. It operates this UCC service from its existing depot. Its UCC vehicles are exempt from the time restrictions imposed on other goods vehicles. Other transport companies can therefore decide whether to make deliveries in the historic centre at permitted times, or pass the goods to the UCC operator for them to deliver the goods on their behalf.
Kms to Delivery Area	
Voluntary/Compulsory	Voluntary
Permanent/Temporary	Permanent
Start / Duration	1995 (for current UCC scheme)
Involved Parties	Coopers & Lybrand in 1989 study. Current UCC scheme has been in operation since 1995.
Users/Clients	
Measured outcomes	The 1989 study provided the following findings: Estimated that a UCC would handle 10% of all freight tonnage delivered in the town centre after allowing for exempted items (fresh produce, waste etc), consignments >1 cu. m. In cost terms it was estimated that the annual costs for a UCC (in million Dfl/annum) would be 20.4 without a UCC (transport only) and 15.5 with a UCC (transport 5.0, transhipment 10.5).
Other outcomes / lessons	Strong opposition from the business community to the 1989 study – they felt that existing facilities & arrangements adequate, the UCCs would monopolise inner city transhipment services, conflict of interest in local government (both traffic regulator and involved in running UCC), major retailers envisaged a lost competitive edge in terms of their own logistics arrangements. The project was reduced to a single trial in Maastricht in 1991. UCC scheme since 1995 has proved more popular as it is voluntary.
Observations	In the 1970's there had been a 92 haulier co-operative in the city that provided an urban break-bulk transhipment function + groupage & resorting of inter-urban and intra-urban freight.
Research File #	14, 17, 18, 133, 137

Location	**NETHERLANDS - Hague**
Study/Trial/Operational	Study
Justification	Upgrade the economic image and economic vitality of the shopping centre by reducing the hindrance caused by urban distribution vehicles and waste collection. The waste collection element is not reported here.
Description	This is essentially a transport scheme but is reported as consideration might be given to issuing a tender for a "consolidated delivery" operator. The aim is to reduce the number of deliveries per week to an outlet by recognising that the average lead-time is 4-5 days. The intention would be for outlet owners in a given area or street to determine the delivery arrangements for their area, for both large and small deliveries, and impose them on the carriers so as to achieve fewer deliveries with greater punctuality and efficiency. It is a "bottom-up" approach and is described as "Demand Side Consolidation". In itself it does not require a consolidation centre. This element was planned for introduction in 2004/5. Another scheme involved a "local service point" where goods would be delivered and then collected by the outlet owner when convenient / appropriate. The service point was also value-added activities and reverse logistics. It is a variant on a PUDO and was scheduled for 2006/7.
Kms to Delivery Area	
Voluntary/Compulsory	Voluntary
Permanent/Temporary	
Start / Duration	2002, seen as a mid - long term project.
Involved Parties	Buck Consultants International
Users/Clients	Outlet owners in the area serviced.
Measured outcomes	
Other outcomes / lessons	
Observations	There is no evidence that the scheme proceeded
Research File #	66, 94, 100,

Location	**NETHERLANDS - Leiden**
Study/Trial/Operational	Study and Operational
Justification	1989: Government initiative to overhaul urban freight delivery resulted in a main proposal to develop "urban distribution centres". Support for pilot projects in Groningen, Arnhem, Leiden and Maastricht 1997: To decrease congestion and decrease distribution costs.
Description	1989:The pre-conditions for establishing a UCC were: scheme had to be commercially viable, usage had to be voluntary, there had to be good road access, delivery from the UCC had to be on environmentally friendly vehicles, development had to be linked to tighter access restrictions. A typical UCC would 8,000 sq. m., with a fleet of 40 vehicles handling 1500 shipments a day. They would only serve the inner city and be primarily retail. Patterns of freight flows analysed by Coopers & Lybrand. 1994: New UCC set up with some consolidation (particularly parcels), distribution and other logistics services. 1997: Unclear if this is a continuation of the 1994 development. UCC on periphery of city centre. 5 EU funded electric vehicles.
Kms to Delivery Area	
Voluntary/Compulsory	Voluntary
Permanent/Temporary	Permanent
Start / Duration	1989, 1994 and 1997. All operations suspended in 2000.
Involved Parties	Coopers & Lybrand
Users/Clients	Premises in the delivery area
Measured outcomes	Estimated that a UCC would handle 10% of all freight tonnage delivered in the town centre after allowing for exempted items (fresh produce, waste etc), consignments >1 cu. m. Breakeven considered to be 600 shipments per day, while at best only achieved 394 a week.. Without subsidised labour the b/even was 2000/day. In cost terms it was estimated that the annual costs for a UCC (in million Dfl/annum) would be 20.4 without a UCC (transport only) and 15.5 with a UCC (transport 5.0, transhipment 10.5)
Other outcomes / lessons	Strong opposition from the business community – present facilities & arrangements adequate, the UCCs would monopolise inner city transhipment services, conflict of interest in local government (both traffic regulator and involved in running UCC), major retailers envisaged a lost competitive edge in terms of their own logistics arrangements. Contributory factors to its failure other than haulier opposition were: too far from motorway; poor image; development of competing sites.
Observations	In the 1970's there had been a 92 haulier co-operative in the city that provided an urban break-bulk transhipment function + groupage & resorting of inter-urban and intra-urban freight. The operation closed in 2000 through lack of support from the forwarders.
Research File #	14, 18, 73, 82, 124, 137

Location	**NETHERLANDS - Maastricht**
Study/Trial/Operational	Study and Trial
Justification	Government initiative to overhaul urban freight delivery resulted in a main proposal to develop "urban distribution centres". Support for pilot projects in Groningen, Arnhem, Leiden and Maastricht.
Description	1989:The pre-conditions for establishing a UCC were: scheme had to be commercially viable, usage had to be voluntary, there had to be good road access, delivery from the UCC had to be on environmentally friendly vehicles, development had to be linked to tighter access restrictions. A typical UCC would 8,000 sq. m., with a fleet of 40 vehicles handling 1500 shipments a day. They would only serve the inner city and be primarily retail. Patterns of freight flows analysed by Coopers & Lybrand. 1991: Initial pilot. Only a small number of "approved operators" in central restricted zone, all other operators had to route via a UCC (and approved carriers) or deliver on foot. One private company licensed to operate a 2-year trial, but reluctance to use and very low volumes (c 50 shipments per day). Particular concern over inability to trace goods once with the approved operator and fear of monopoly.
Kms to Delivery Area	
Voluntary/Compulsory	
Permanent/Temporary	
Start / Duration	1989 & 1991
Involved Parties	Coopers & Lybrand
Users/Clients	
Measured outcomes	Estimated that a UCC would handle 10% of all freight tonnage delivered in the town centre after allowing for exempted items (fresh produce, waste etc), consignments >1 cu. m. In cost terms it was estimated that the annual costs for a UCC (in million Dfl/annum) would be 20.4 without a UCC (transport only) and 15.5 with a UCC (transport 5.0, transhipment 10.5)
Other outcomes / lessons	Strong opposition from the business community – present facilities & arrangements adequate, the UCCs would monopolise inner city transhipment services, conflict of interest in local government (both traffic regulator and involved in running UCC), major retailers envisaged a lost competitive edge in terms of their own logistics arrangements. The project was reduced to a single trial in Maastricht in 1991
Observations	In the 1970's there had been a 92 haulier co-operative in the city that provided an urban break-bulk transhipment function + groupage & resorting of inter-urban and intra-urban freight. There is no evidence that the scheme is continuing
Research File #	14, 17, 18, 137

Location	**NETHERLANDS - Utrecht**
Study/Trial/Operational	Operational
Justification	To improve amenity and accessibility of city centre and to protect the city's arched basements from heavy vehicle damage.
Description	Objectives: reduce number of vehicle movements and kilometres, enforce weight and dimension restrictions in city centre, increase efficiency of distribution. The target was to reduce the number of trucks entering the city centre from 1500 to 400 a day. A number of UCCs was envisaged with the following operating criteria required in order for companies to be given a UCC permit: prepared to receive goods from any other operator at the UCC, , at least 100 deliveries per day from the UCC, a minimum of 25 deliveries per journey, and use of vehicles with a weight of less than 2 tonnes per axle. The requirement concerning 25 deliveries per journey was subsequently dropped as practice showed that this was not possible on UCC journeys involving large consignments. Permits are issued to any companies wanting one that meet these criteria. Two companies currently have UCC permits (DHL and GLS). They operate the UCC service from their existing depots. Their vehicles are exempt from the time restrictions imposed on other goods vehicles (which can only enter between 06:00-11:00 and 18:00-19:00). The UCC vehicles are allowed to enter the urban area for a 16-hour daily time window. These UCC vehicles are also allowed to use bus lanes. There are no special requirements for UCC vehicles regarding fuel consumption and emissions. Other transport companies can therefore decide whether to make deliveries in the historic centre at permitted times, or pass the goods to the UCC operator for them to deliver the goods on their behalf. It was originally estimated that 80% of conforming shipments would be handled through the UCCs. In practice, far less produce than this passes through the UCCs. The two companies have estimated that the UCC operation only accounts for approximately 2% of the total goods throughput in the depot.
Kms to Delivery Area	
Voluntary/Compulsory	Voluntary
Permanent/Temporary	Permanent
Start / Duration	First investigated in 1991. Operational since 1994.
Involved Parties	DHL and GLS
Users/Clients	Premises in the urban area
Measured outcomes	
Other outcomes / lessons	
Observations	Private sector run UCC with some support in terms of operating exemptions from municipal authority. Makes use of existing freight transport and logistics infrastructure and operations. Does not receive any public subsidy.
Research File #	30, 124, 132, 137

<table>
<tr><td>Location</td><td>PORTUGAL – Evora</td></tr>
<tr><td>Study/Trial/Operational</td><td>Trial</td></tr>
<tr><td>Justification</td><td>The “huge problem” of delivering goods in Evora that has a negative impact on the preservation of monuments and the quality of life. The project is called ECOLOGUS.</td></tr>
<tr><td>Description</td><td>Objectives of the proposed sustainable distribution system are: guarantee economic distribution of goods / reduce environmental impact (especially on buildings) / improve flow of traffic / improve image of transport sector.
The new distribution system will incorporate: biodiesel vehicles adapted for use in narrow streets / a consolidation warehouse outside the city centre / the creation of a legal autonomous entity involving the participants / a defined area of delivery within the city.
Anticipated that the delivery cost will be kept to a “reasonable” Euro 30 per tonne and that the participants will see their turnover increase.
New regulations controlling the size of vehicles entering the city centre (maximum size 3.5t gvw) has necessitated many of the changes. Without the consolidation warehouse the current 14 vehicles delivering in the centre would increase to 25, whereas will only now need 10.</td></tr>
<tr><td>Kms to Delivery Area</td><td></td></tr>
<tr><td>Voluntary/Compulsory</td><td>Voluntary</td></tr>
<tr><td>Permanent/Temporary</td><td></td></tr>
<tr><td>Start / Duration</td><td>2000. Currently being implemented.</td></tr>
<tr><td>Involved Parties</td><td>9 transport companies supported by ANTRAM</td></tr>
<tr><td>Users/Clients</td><td>All premises in the delivery area</td></tr>
<tr><td>Measured outcomes</td><td>Anticipated benefits: 35% reduction in trips / day – from 32 trips with 14 vehicles to 21 with 10; 100% reduction in CO2 emissions if use bio-diesel (re-absorbed) or by 35% if only reduce number of conventional vehicles.

<table>
<tr><th>Changing Distribution Costs</th><th>Current</th><th>New Regs</th><th>Ecologus</th></tr>
<tr><td>Cost / day</td><td>E 1096</td><td>E 1958</td><td>E 1377</td></tr>
<tr><td>Cost / tonne</td><td>E 23.84</td><td>E 42.56</td><td>E 29.83</td></tr>
</table>
</td></tr>
<tr><td>Other outcomes / lessons</td><td></td></tr>
<tr><td>Observations</td><td>No recent updates on project status and progress.</td></tr>
<tr><td>Research File #</td><td>84,</td></tr>
</table>

Location	**SPAIN – Malaga**
Study/Trial/Operational	Operational
Justification	Severe congestion in the public squares, many streets pedestrianised, pollution, inefficient use of energy, absence of special facilities for loading / unloading.
Description	In 2002 the operation was in the process of being established when it was estimated that there was a daily demand for 6,000 parcels which were being delivered on c 1000 trips. Proposal for 16t vehicles to deliver to a UCC [CUDE](3,000 sq. m.) on the first floor of a multi-storey car park with onward (post consolidation) deliveries on electric vehicles between 09:30 – 14:00 and 17:00 – 20:00. A second DC would be established outside the city to consolidate loads bound for the city arriving on vehicles >16t onto the 16t vehicles for transfer to the UCC. Value-added services – reverse logistics, short term storage, bundling and item picking for retailers, packaging disposal, stock management and integrated information systems – are also envisaged. There will be a price for delivery (not given) with daily invoicing. The UCC will make deliveries to addresses in the historic centre of Malaga using electric vehicles (an electric buggy/tractor unit with trailers). These vehicles are capable of carrying 700 kg and have a battery life of 4.5 hours. The UCC scheme is intended to be a self-financing, not for profit business. The Malaga Town Council provided the car park space at no cost. As an accompanying measure, the access of freight vehicles to the historical centre has been banned. Only the designated electric vehicles may make deliveries to the final destinations.
Kms to Delivery Area	
Voluntary/Compulsory	Compulsory
Permanent/Temporary	Permanent
Start / Duration	2002, with an operational start date of February 2004
Involved Parties	Local municipality, chamber of commerce, city preservation society, local distribution companies and the residents. The scheme was initiated by the local municipality, but the UCC is operated by an independent company.
Users/Clients	Food & restaurants 18%; clothing & textiles 28%; financial services 15%; public services 9%; others 30%.
Measured outcomes	In August 2004, after four months of operation, the Malaga UCC was achieving throughput of approximately one-third of its capacity. Fetrama (the Malaga Transport Federation) believes that this relatively low degree of use is possibly due to the goods vehicles continuing to make deliveries in the historic centre of Malaga by double-parking and parking illegally.
Other outcomes / lessons	The Mobility Strategy of the city authority is expected to result in the installation of automatic bollards in order to regulate the movement of vehicles in the historic centre.
Observations	Status of Malaga UCC currently unclear due to apparent low usage of the scheme.
Research File #	43, 66, 106, 134

Location	**SWEDEN - Gothenburg**
Study/Trial/Operational	Study and Trial
Justification	To reduce goods vehicle traffic and its related environmental impacts in an inner city area.
Description	Several empirical studies were carried out in the inner city area of Gothenburg between 1991-1998 in order to better understand urban freight operations and consider possible changes to existing distribution practices. These projects focused on food and grocery deliveries. The initial 1991 study focused on wholesalers but it was soon discovered that this was not the correct sector to study. Attention was switched in a 1995 project to food deliveries that had not been consolidated by a wholesaler. Carriers and retailers in these distribution operations were studied. A simulation exercise based on empirical data showed that deliveries in these uncoordinated food systems could be potentially reduced by approximately 40%. Attempts to establish a co-ordinated distribution system for these food deliveries that were not well consolidated began in 1996 in the Linnestaden district of Gothenburg, which is in the inner area of the city. The project was supported by the local government, the Communication Research Board and Volvo. The trial involved getting companies to work together on a voluntary basis to consolidate their food deliveries using existing vehicles and distribution centre infrastructure.
Kms to Delivery Area	
Voluntary/Compulsory	Voluntary
Permanent/Temporary	
Start / Duration	Study: 1991. Experiment: 1996
Involved Parties	Receivers, suppliers and transporters of food, local government, trade bodies, Volvo.
Users/Clients	Receivers, suppliers and transporters of food.
Measured outcomes	Few suppliers participated in the coordinated distribution experiment and it ended in 1998. The suppliers did not perceive sufficient benefits from the co-ordinated distribution scheme.
Other outcomes / lessons	The study and experiment indicated that it required initial actions from a third party not involved in the distribution system to initiate the process. It also indicated that vehicle restrictions might be necessary to make companies take part in such a scheme. To implement a co-ordinated distribution scheme that is based only on cooperation among competing companies proved to be difficult.
Observations	
Research File #	30, 138

Location	**SWEDEN – Hammarby (Stockholm)**
Study/Trial/Operational	Operational
Justification	Minimising the impact of the largest ongoing urban development in Sweden on the early residents (8,000 apartments being built in total). To be achieved largely by eliminating unco-ordinated delivery vehicles "touring" the site in search of their delivery point. Deliveries to the building site are difficult due to the location.
Description	Deliveries of construction materials are routed via the consolidation centre where they are labelled and stored on a short-term basis prior to delivery on a JIT basis. Ideal maximum storage period is 5 days. Deliveries made on a consolidated basis in "work packs" as requested by the Trade Contractors. Some bulk items such as concrete and steel are not routed via the consolidation centre, but their delivery is co-ordinated via an internet based scheduling system to avoid delivery clashes. The UCC is located at the entrance of the construction-site. It consists of: - 10 people working at the UCC (office and storage area of 8,000 m^2) - 8 goods vehicles (Euro IV standard) are used for deliveries within the construction-site - Web site and a supervision system The UCC is run by a subcontractor who is responsible for the operation of the centre, which includes fleet purchase and operation, employment of drivers and other staff, warehouse and office management, and web supervision system.
Kms to Delivery Area	On site
Voluntary/Compulsory	Compulsory except for exempted materials.
Permanent/Temporary	Permanent – see below
Start / Duration	Spring 2001 and to remain until the building project is complete (2010).
Involved Parties	All the contractors on the site (10), Investors (in the development), City of Stockholm
Users/Clients	All contractors working on the site
Measured outcomes	Estimated that for every one truck delivering under this system there would have been 4-5 without the use of the centre. 700t delivered per day / average of 1.5t per final delivery / one delivery every 30 seconds. Reductions in energy use and emissions will be calculated as part of the evaluation work.
Other outcomes / lessons	Significant reduction in the theft of materials. Demonstrable reduction in damage through the reduction in the number of material movements -not quantified. Less pollution – not quantified. Improved site safety and labour productivity through reduced congestion. Expected to result in fewer instances of traffic congestion at the construction site and improved living conditions for new inhabitants as building work continues.
Observations	The operation is part funded by the EU and there are said to be highly developed methods of recovering costs – no further details. Also the City initially paid 50% of the costs but with the intention of withdrawing that subsidy and letting the contractors pay. It was reported in June 2005 that the project is almost managing to break even.
Research File #	11, 43, 76, 82, 122, 124, 142

Location	**SWEDEN – Stockholm Old Town**
Study/Trial/Operational	Operational
Justification	Co-transportation of goods to reduce driving and emissions, queues and idling.
Description	The Logistics Centre co-ordinates and provides co-transport of goods within the Old Town leading to a reduction in direct deliveries and levels of congestion and also improving the environment through fewer emissions. To increase throughput the Logistics Centre now has cold food storage, is permanently manned from 06:00 to 15:00 hours and has a marketing campaign to attract more business. Delivery is made on a biogas delivery truck. The total number of deliveries in the Old Town area is estimated at 150,000 per annum of which 120,00 are for restaurants with some of them receiving 6 deliveries a day. The initial goal is to divert 20,000 deliveries to the Logistic Centre. It is reported that the majority of restaurants had joined the scheme by July 2005.
Kms to Delivery Area	
Voluntary/Compulsory	Voluntary
Permanent/Temporary	Permanent
Start / Duration	2000 and still operating
Involved Parties	City of Stockholm, Agenda 21 Society and Trendsetter. Operator = Home2You
Users/Clients	Shops and restaurants located in Old Town that have limited storage space thus requiring frequent deliveries.
Measured outcomes	An estimated 17% reduction in energy consumption and emissions (basis not known) has been advised and it is expected that transport mileage will decrease by 65%
Other outcomes / lessons	
Observations	
Research File #	76, 122

Location	**SWEDEN - Uppsala**
Study/Trial/Operational	Study
Justification	To map city centre goods distribution in order to investigate the potential for coordinated goods distribution to reduce cost, congestion and environmental impact.
Description	Study focused on 4 Galleria and identified that: deliveries were small and in large numbers – 23 vehicle runs per day delivered to 345 – 575 shops; grocery stores attracted more deliveries than other outlets; deliveries peaked in the morning; a high incidence of waiting and travel time; the impact of closely managed deliveries e.g.bread on all other deliveries.
Kms to Delivery Area	
Voluntary/Compulsory	
Permanent/Temporary	
Start / Duration	2001
Involved Parties	Swedish University of Agricultural Sciences
Users/Clients	
Measured outcomes	Improvements of a coordinated approach seen as: More effective deliveries for retailers & logistics companies through fewer deliveries, reduced delivery times and fixed times of delivery; Improved vehicle utilisation – improved loading, fewer vehicles, fewer stops per trip and reduction in total distance driven; Improved traffic and environmental conditions – lower emissions, congestion and noise plus improved security and accessibility.
Other outcomes / lessons	A coordinated approach to such schemes is important, as is the sharing of both the initial and the running costs. The study raised the interesting thought of retailer initiated coordination whereby the retailers would influence orders to have them routed via the common terminal – a bottom up approach.
Observations	There is no evidence of the scheme proceeding
Research File #	34,

Location	**SWITZERLAND - Basel**
Study/Trial/Operational	Trial
Justification	To solve the freight distribution problems in the city by reducing the number of commercial vehicle movements and the levels of pollutants, noise and energy consumption, but without reducing delivery services
Description	Carriers can join BCL if agree not to deliver into city centre themselves but to route loads via a UCC. In 1999 there were reported to be 12 participants. The UCCs (there are 5) only handle goods that are destined for small shops and do not require special handling. 3 vehicles used – 1 x eco-diesel; 1 x gas; 1 x electric. The cost of the study project, management and coordination + the gas & electric vehicles was funded by DIANE 6 at outset, but the intention is that the operation will be self-funding. In 1996 home deliveries were added to the service portfolio.
Kms to Delivery Area	2 km south of city centre
Voluntary/Compulsory	Voluntary
Permanent/Temporary	
Start / Duration	1993. Terminated when in a steady state.
Involved Parties	Shippers, carriers, retailers, DIANE 6 organisation, City of Basel, Chamber of Commerce & Industry, retailer organisations. All form the BCL (Basel City Logistik).
Users/Clients	Premises in the delivery areas of the UCCs
Measured outcomes	Load factor: raised from 28% to 47% Number of consignments / day / vehicle: from 8 to 15 Average tonnage / load: from 0.28 to 0.52 Fuel consumption: diesel from 17 litres / 100 km to 15 Petrol from 18.8 l / 100 km to 18.6
Other outcomes / lessons	By 1997 the project had failed to meet a number of core goals: expansion in number of participants, doubling of throughput, reduction in energy consumption and pollutant output was barely measurable. It was not certain if the trial was viable but at the stage the carriers believed that the project could be viable in the medium term even though it was considered a "necessary evil". The retailers saw and appreciated the benefits of having less goods vehicles in the city centre.
Observations	
Research File #	30, 75,124,

Location	**SWITZERLAND - Zurich**
Study/Trial/Operational	Trial
Justification	The aim of local government is to improve delivery density, reduce car usage and stimulate the use of electric vans for urban freight distribution.
Description	The UCC which was based at the Oerlikon Cargo site (north of the city) was only one of the measures to improve freight movements in the city and aimed to stimulate cooperation and deliberation between carriers shippers and consignees. At start focus on 7 retailers in Zurich whose goods were to be consolidated for delivery. Delivery by 1 carrier (Zingg Transporte AG) using a 3.5t vehicle and with ability to collect return loads to offset costs. Project part-funded by 2 major retailers (Migros & Co-op) who though having their own networks had an interest in the project. The distribution centre was located close to the national freeway and the Zurich western bypass. It was used for temporary storage and was $100m^2$. It received deliveries between 07:00-11:30 and 13:00-17:00. Deliveries were made from the UCC during the morning. The trial ran for 8 months. The investment in setting up the trial was approximately 190,000 Swiss Francs (including advertising costs of 30,000 Francs). The operating costs of the trial were 40,000 Francs (this including rent paid for the UCC, and the handling and delivery costs).
Kms to Delivery Area	
Voluntary/Compulsory	Voluntary
Permanent/Temporary	Permanent
Start / Duration	1994
Involved Parties	
Users/Clients	
Measured outcomes	
Other outcomes / lessons	Project not very successful – too few retailers participated resulting in low volumes which made prices uncompetitive. Vehicle movement reductions and energy savings were minimal. In total, only 74 delivery rounds took place during the trial. The operation was stopped with the following reasons given: unable to attract new participants / cost of transportation and transhipment too high – participants unwilling to pay the full costs once financial support withdrawn / subsidies not forthcoming and would have been objected to by competitors.
Observations	A “post mortem” identified possible corrective action: raise awareness of city problems among logistics companies / minimise costs / introduce value-added services / apply “push” to the carriers / widen participation as a means of increasing volumes.
Research File #	30, 137

Location	**U.K. - Aberdeen**
Study/Trial/Operational	Study
Justification	To reduce / eliminate large vehicles making small deliveries to create environmental benefits in city's prime shopping area.
Description	Early recognition that the text book definition of transhipment where large loads were decanted into smaller vehicles for final delivery was no longer tenable on cost and environmental grounds. The study set out to determine: the extent to which large lorries (particularly articulated) are used for deliveries and to test the reaction of suppliers / contractors using large vehicles to the idea of an edge of town UCC where consignments would be consolidated for final delivery. A one day traffic study was used to measure the traffic levels and a postal survey to gain the views of possible users. The key conclusions were: Large vehicle deliveries form a small proportion of the total; pre-consolidation has eliminated much of the need; the real opportunity was seen to be consolidating small deliveries (see below).
Kms to Delivery Area	
Voluntary/Compulsory	
Permanent/Temporary	
Start / Duration	1997
Involved Parties	
Users/Clients	
Measured outcomes	The report quoted Huddersfield University: "Any urban transhipment that does develop is likely to be based on a rather different model – one of private enterprise logistics services, where urban or sub-regional facilities are established by operators on a commercial basis to provide a wide variety of value added logistics services for a range of different users ….Logistics operators which are basically in competition with each other may see some benefit in cooperating in the provision and use of such facilities"
Other outcomes / lessons	The postal survey produced an overwhelmingly negative response including: loss of competitive edge, driver as an "ambassador", ability to handle multi-temperature bands, incompatible IT systems, additional handling, security and insurance issues, lack of delivery driver expertise, pre-consolidation already takes place. Maintenance of customer service levels was a key concern throughout.
Observations	Both the traffic survey and postal survey were very limited and in the absence of any attempt to "sell-in" the UCC concept to a survey group that represented a vested interest the results should not have been a surprise. The scheme did not proceed
Research File #	63,

Location	**U.K. - Barnsley**
Study/Trial/Operational	Study
Justification	To examine the feasibility of peripheral transhipment in an urban area with a view to enhancing the urban environment Seeking to understand the impact of transhipment, and by implication, consolidation on traffic levels and the cost of urban delivery.
Description	Assumed transhipment centre would be on margin of the area under study. Multi-user facility owned and managed by the local authority or a private contractor. Usage would be voluntary, but it was anticipated that the imposition of weight and size restrictions within the area covered would channel traffic into the centre.
Kms to Delivery Area	
Voluntary/Compulsory	
Permanent/Temporary	
Start / Duration	1976. The study was not converted into a trial.
Involved Parties	Urquhart (PhD thesis)
Users/Clients	
Measured outcomes	It was concluded that a peripheral transhipment point would increase delivery costs and that the economics of transhipment were dependent on the level of usage of the transhipment centre and the level of traffic restrictions imposed in the area served.
Other outcomes / lessons	The study confirmed that transhipment was unpopular with potential users (principally retailers) with only c15% prepared to consider using it. The main objections were: an extra stage in the supply chain, increased costs, delays / longer lead times, loss of control, risk of loss / damage, additional packaging to protect goods, unable to provide specialist handling when required, a monopoly / local authority control.
Observations	
Research File #	14,

Location	**U.K. – Bluewater, Kent**
Study/Trial/Operational	Operational
Justification	A commercial venture principally aimed at enabling retailers to minimise their in-store stock holding and stock handling operations thereby enabling them to maximise sales space and minimise non-retailing activities by their staff.
Description	6,500 sq. m. area within an existing offsite warehouse. Stock received from suppliers / RDCs or via Bluewater retailers. In addition to basic warehousing operations a range of value-added pre-retailing services are available – packaging removal & recycling / garment conversion from flat to hanging / product segregation / ticketing / tagging / storage / replenishment of non-sales materials. Customers have full stock visibility and call-off facility. Deliveries are consolidated and made to times agreed with the retailer. Minimum response time is 3 hours.
Kms to Delivery Area	<20 kms
Voluntary/Compulsory	Voluntary
Permanent/Temporary	Permanent
Start / Duration	November 2002 - ongoing
Involved Parties	Tibbett & Britten plc (now part of Exel plc). A commercial venture using capacity elsewhere in the immediate locality.
Users/Clients	Retailers on the Bluewater site. Names not known.
Measured outcomes	
Other outcomes / lessons	
Observations	The concept is the same as that at Meadowhall. The success or otherwise of the operation is not known.
Research File #	10,

Location	**U.K. - Bradford**
Study/Trial/Operational	Study
Justification	To examine the feasibility of peripheral transhipment in an urban area with a view to enhancing the urban environment Seeking to understand the impact of transhipment, and by implication, consolidation on traffic levels and the cost of urban delivery.
Description	Assumed transhipment centre would be on margin of the area under study. Multi-user facility owned and managed by the local authority or a private contractor. Usage would be voluntary, but it was anticipated that the imposition of weight and size restrictions within the area covered would channel traffic into the centre.
Kms to Delivery Area	
Voluntary/Compulsory	
Permanent/Temporary	
Start / Duration	1975. The study was not converted into a trial.
Involved Parties	WYTCONSULT
Users/Clients	
Measured outcomes	It was concluded that a peripheral transhipment point would increase delivery costs and that the economics of transhipment were dependent on the level of usage of the transhipment centre and the level of traffic restrictions imposed in the area served.
Other outcomes / lessons	The study confirmed that transhipment was unpopular with potential users (principally retailers) with only c15% prepared to consider using it. The main objections were: an extra stage in the supply chain, increased costs, delays / longer leadtimes, loss of control, risk of loss / damage, additional packaging to protect goods, unable to provide specialist handling when required, a monopoly / local authority control.
Observations	
Research File #	15,

Location	**U.K. – Bristol (Broadmead)**
Study/Trial/Operational	Trial
Justification	Benefits of consolidation to suppliers / benefits to retailers (improved supply chain & potential added value services) / benefits for community (reduced congestion, improved air quality & improved waste recycling).
Description	Suitable customers for the trial identified as "medium size, non-perishable goods, not high value goods". Warehouse close to strategic road network (M4 & M32); 5,000 sq. ft. of space; 25 minutes journey time to Broadmead; delivery by 1 x 7.5t and 1 x 17t Euro III standard engine vehicles (originally only 1 vehicle). Currently serves 51 retailers (October 2005). Value-added services being offered.
Kms to Delivery Area	11-12 km.
Voluntary/Compulsory	Voluntary
Permanent/Temporary	
Start / Duration	6 month trial commenced May 2004 – since extended to March 2006
Involved Parties	Bristol City Council, The Broadmead Board, The Galleries Shopping Centre, Business West (formerly Chamber of Commerce), Exel. EU funding through the Vivaldi project.
Users/Clients	Currently 51 retailers in the Broadmead Shopping Centre from major high street stores to small independents with the clothing and fashion sectors particularly well represented.
Measured outcomes	The number of roll cages which passed through the centre rose from 101 in May 2004 to 401 in December 2004. 68% reduction in vehicle trips into Bristol centre for retailers in scheme. To October 2005 - 42,772 total vehicle km; 5.29t of CO_2 emissions; 840 gms of NOx and 11,374 gms of PM10 emissions had been saved.
Other outcomes / lessons	Trial was initially free to participating retailers, although since summer 2005 financial contributions have been sought. 75% of all retailers interviewed chose the consolidation scheme because of improved service and cost reduction opportunities. 94% would recommend the service to another retailer. More than half of retailers are saving over 20 minutes per delivery. No loss or damage claims.
Observations	The extension of the initial trial period suggests that it is going well, but the financial viability of the operation and the ability of the operation to continue once the current funding expires is not known.
Research File #	7, 8, 99, 117, 119, 122, 144, 153

Location	**U.K. - Camberley**
Study/Trial/Operational	Study
Justification	To examine the feasibility of peripheral transhipment in an urban area with a view to enhancing the urban environment Seeking to understand the impact of transhipment, and by implication, consolidation on traffic levels and the cost of urban delivery.
Description	Assumed transhipment centre would be on margin of the area under study. Multi-user facility owned and managed by the local authority or a private contractor. Usage would be voluntary, but it was anticipated that the imposition of weight and size restrictions within the area covered would channel traffic into the centre.
Kms to Delivery Area	
Voluntary/Compulsory	
Permanent/Temporary	
Start / Duration	1975. The study was not converted into a trial.
Involved Parties	CIDP Ltd
Users/Clients	
Measured outcomes	It was concluded that a peripheral transhipment point would increase delivery costs and that the economics of transhipment were dependent on the level of usage of the transhipment centre and the level of traffic restrictions imposed in the area served. A cost penalty of £7.20 per tonne handled was estimated which was equated to 2.0% of retail prices.
Other outcomes / lessons	The study confirmed that transhipment was unpopular with potential users (principally retailers) with only c15% prepared to consider using it. The main objections were: an extra stage in the supply chain, increased costs, delays / longer leadtimes, loss of control, risk of loss / damage, additional packaging to protect goods, unable to provide specialist handling when required, a monopoly / local authority control.
Observations	
Research File #	15,

Location	**U.K. - Chester**
Study/Trial/Operational	Study
Justification	Concern about the environmental impact, the visual intrusion and the constraints upon small scale retail developments which large delivery vehicles impose.
Description	Early recognition that the text book definition of transhipment where large loads were decanted into smaller vehicles for final delivery was no longer tenable on cost and environmental grounds. The study set out to determine: the extent to which large lorries (particularly articulated) are used for deliveries and to test the reaction of suppliers / contractors using large vehicles to the idea of an edge of town UCC where consignments would be consolidated for final delivery. A one day traffic study was used to measure the traffic levels and a postal survey to gain the views of possible users. The key conclusions were: Large vehicle deliveries form a small proportion of the total; pre-consolidation has eliminated much of the need; the real opportunity was seen to be consolidating small deliveries (see below).
Kms to Delivery Area	
Voluntary/Compulsory	
Permanent/Temporary	
Start / Duration	1997
Involved Parties	
Users/Clients	
Measured outcomes	The report quoted Huddersfield University: "Any urban transhipment that does develop is likely to be based on a rather different model – one of private enterprise logistics services, where urban or sub-regional facilities are established by operators on a commercial basis to provide a wide variety of value added logistics services for a range of different users ….Logistics operators which are basically in competition with each other may see some benefit in cooperating in the provision and use of such facilities"
Other outcomes / lessons	The postal survey produced an overwhelmingly negative response including: loss of competitive edge, driver as an "ambassador", ability to handle multi-temperature bands, incompatible IT systems, additional handling, security and insurance issues, lack of delivery driver expertise, pre-consolidation already takes place. Maintenance of customer service levels was a key concern throughout.
Observations	Both the traffic survey and postal survey were very limited and in the absence of any attempt to "sell-in" the UCC concept to a survey group that represented a vested interest the results should not have been a surprise. The scheme did not proceed to a trial
Research File #	63,

Location	**U.K. – Chichester**
Study/Trial/Operational	Study
Justification	To examine the feasibility of peripheral transhipment in an urban area with a view to enhancing the urban environment Seeking to understand the impact of transhipment, and by implication, consolidation on traffic levels and the cost of urban delivery.
Description	Assumed transhipment centre would be on margin of the area under study. Multi-user facility owned and managed by the local authority or a private contractor. Usage would be voluntary, but it was anticipated that the imposition of weight and size restrictions within the area covered would channel traffic into the centre. 2 options considered from a financial rather than environmental perspective – all traffic through the centre or only those products most suited to depot handling. The County Planner recommended the "all traffic" option to avoid any hgv's entering the city centre. This was the more expensive option but also offered the greatest environmental benefit. 4 options were cost modelled: 1. All throughput, low delivery frequency, 3t vehicles - indexed cost 259.9 2. Ltd throughput, low delivery frequency, 1.5t vehicles - indexed cost 306.8 3. Ltd throughput, high delivery frequency, 3t vehicles - indexed cost 103.8 4. Ltd throughput, low delivery frequency, 3t vehicles - indexed cost 100.0
Kms to Delivery Area	
Voluntary/Compulsory	
Permanent/Temporary	
Start / Duration	1975. The study was not converted into a trial.
Involved Parties	Lichfield and associates / County Planning Officer
Users/Clients	
Measured outcomes	It was concluded that a peripheral transhipment point would increase delivery costs and that the economics of transhipment were dependent on the level of usage of the transhipment centre and the level of traffic restrictions imposed in the area served. A cost penalty of £6.00 per tonne handled was estimated. But a local logistics company (SPD) felt that this was conservative and claimed £16.00
Other outcomes / lessons	The study confirmed that transhipment was unpopular with potential users (principally retailers) with only c15% prepared to consider using it. The main objections were: an extra stage in the supply chain, increased costs, delays / longer leadtimes, loss of control, risk of loss / damage, additional packaging to protect goods, unable to provide specialist handling when required, a monopoly / local authority control. The consultants suggested that " a group of small towns might be a more feasible and economic solution".
Observations	As with other studies there was the assumption that there are benefits to be had from decanting fully loaded large vehicles into smaller vehicles.
Research File #	15, 65,

Location	**U.K. - City of London**
Study/Trial/Operational	Study
Justification	A study to consider freight and its impact on the challenge " to create a working and leisure environment which will secure the City's future . . . "
Description	The key messages from the report are set out below: The need for improved loading and unloading facilities was recognised and single receiving points were to be encouraged and made mandatory for new buildings. "Transhipment centres with loads being transferred to smaller vehicles would add to pollution, congestion and costs". Preferential treatment would be given to electric and low emission vehicles and consideration would be given to setting up a City Logistics Company. The idea of consolidation centres was considered attractive but the report found "little evidence of sufficient opportunity within the City for consolidation of compatible products to make an economic case for such a facility. Too many products require special handling, timed delivery, temperature control, food hygiene regulations compliance etc which cannot easily be delegated to a third party carrier". Consideration to be given to a commercially led experiment that would: cover an area larger than the City; involve securing a site on the edge of the City in another local authority; the production of a "model operation and Best Practice"; the identification and development of a number of common protocols and the means to measure the environmental impact.
Kms to Delivery Area	
Voluntary/Compulsory	
Permanent/Temporary	
Start / Duration	1997
Involved Parties	
Users/Clients	
Measured outcomes	
Other outcomes / lessons	If an experiment were to be conducted the City would be looking for pump priming finance from the DETR (now DfT) to ensure commitment and to help offset start-up costs.
Observations	No scheme has been proceeded with to date.
Research File #	61,

Location	**U.K. – Hammersmith (London)**
Study/Trial/Operational	Study
Justification	To examine the feasibility of peripheral transhipment in an urban area with a view to enhancing the urban environment Seeking to understand the impact of transhipment, and by implication, consolidation on traffic levels and the cost of urban delivery.
Description	Assumed transhipment centre would be on margin of the area under study. Multi-user facility owned and managed by the local authority or a private contractor. Usage would be voluntary, but it was anticipated that the imposition of weight and size restrictions within the area covered would channel traffic into the centre.
Kms to Delivery Area	
Voluntary/Compulsory	
Permanent/Temporary	
Start / Duration	1974. The study was not converted into a trial.
Involved Parties	Metra Ltd
Users/Clients	
Measured outcomes	It was concluded that a peripheral transhipment point would not necessarily increase delivery costs in that the cost of the transhipment centre would be largely offset by the logistics companies not having to make inefficient deliveries. However, it was recognised that this finding was "tentative".
Other outcomes / lessons	The study confirmed that transhipment was unpopular with potential users (principally retailers) with only c15% prepared to consider using it. The main objections were: an extra stage in the supply chain, increased costs, delays / longer leadtimes, loss of control, risk of loss / damage, additional packaging to protect goods, unable to provide specialist handling when required, a monopoly / local authority control.
Observations	With hindsight the conclusion made in Hammersmith as to the balance of costs between operating the centre and transport savings would now be considered "optimistic".
Research File #	15,

Location	**U.K. - Hull**
Study/Trial/Operational	Study
Justification	To examine the feasibility of peripheral transhipment in an urban area with a view to enhancing the urban environment Seeking to understand the impact of transhipment, and by implication, consolidation on traffic levels and the cost of urban delivery.
Description	Assumed transhipment centre would be on margin of the area under study. Multi-user facility owned and managed by the local authority or a private contractor. Usage would be voluntary, but it was anticipated that the imposition of weight and size restrictions within the area covered would channel traffic into the centre.
Kms to Delivery Area	
Voluntary/Compulsory	
Permanent/Temporary	
Start / Duration	1976. The study was not converted into a trial.
Involved Parties	Lorries and the Environment Committee / TRRL
Users/Clients	
Measured outcomes	It was concluded that a peripheral transhipment point would increase delivery costs and that the economics of transhipment were dependent on the level of usage of the transhipment centre and the level of traffic restrictions imposed in the area served. A cost penalty of £4 - 6.00 per tonne handled was estimated which was equated to 1.4% of retail prices.
Other outcomes / lessons	The study confirmed that transhipment was unpopular with potential users (principally retailers) with only c15% prepared to consider using it. The main objections were: an extra stage in the supply chain, increased costs, delays / longer leadtimes, loss of control, risk of loss / damage, additional packaging to protect goods, unable to provide specialist handling when required, a monopoly / local authority control.
Observations	
Research File #	15,

Location	**U.K. – London Heathrow - Construction**
Study/Trial/Operational	Operational
Justification	"To deliver our extensive capital programme on-time, on-budget, with minimum impact on our customers"
Description	20,000 sq.ft. building (a former aircraft hangar) at Hatton Cross. Goods for use on projects at Terminals 1-4 are delivered to the centre checked for quantity and quality, and held ideally for a maximum of 7 days. Bulk items such as concrete and steel frames are not routed via the centre. Contractors call off materials in "work packs" for JIT delivery to the "workface". Deliveries often made at night, but intake only during the day.
Kms to Delivery Area	2.5 km from Terminal 4. 16 km round trip to all terminals.
Voluntary/Compulsory	Compulsory except for exempted items.
Permanent/Temporary	Permanent
Start / Duration	2001 – still operating
Involved Parties	Wilson James Ltd., Mace Ltd., British Airports Authority (BAA)
Users/Clients	All building and specialist contractors working in the terminal (85 in total)
Measured outcomes	Strict KPIs & performance targets kept from the outset which relate to the quality of the service provided to the contractors e.g. right goods, right quantity, right condition, right place, right time.
Other outcomes / lessons	Greatest benefits seen as predictability and certainty. Improvements in productivity (+5% claimed through having materials on time), safety and environmental matters. Reduction in waste. Reduction in number of deliveries "airside" – not quantified – with attendant reductions in congestion, pollution and carbon dioxide emissions. The centre provides a "buffer stock" for materials with long or complex supply chains.
Observations	Almost a mirror of the Hammerby scheme in Stockholm.
Research File #	12, 13, 83, 96

Location	**U.K. – London Heathrow - Retail**
Study/Trial/Operational	Operational
Justification	To alleviate congestion within airport / reduction in vehicle movements / security / environmental improvement / reduction in handling costs/improve delivery to retail units/improve waste management.
Description	A retail operation supplying all shops at Terminals 1, 2, 3 & 4. All deliveries (except newspapers and high value / high insurance items) are made to a consolidation centre outside the airport perimeter where inbound deliveries are security checked (scanned) and sorted by delivery address into sealed roll cages and then delivered to a regular schedule. Some low value items e.g. soft drinks are delivered on pallets. The service includes: delivering to individual premises by a dedicated "delivery team" located within each terminal and the return of packaging / waste to the depot. 2003: 25k sq.ft. warehouse = 3,500 sq.ft. chilled, 1500 roll cages, 5 vehicles, 38 operational & clerical staff, 6 management. 24 hour / 7 day operation 2005: 3 rear-steer urban artics and 3 rigids. Operational staff 40
Km to Delivery Point	2.5 kilometres from Terminal 4. 16km round trip to service all 4 terminals.
Voluntary/Compulsory	Initially voluntary. Compulsory for all retailers in the terminals since 2004.
Permanent/Temporary	Permanent
Start / Duration	Commenced 2000 as a trial, 5 year contract awarded 2001 - ongoing
Involved Parties	A partnership between British Airports Authority (landlord) and a logistics provider (Exel)
Users/Clients	All retailers with premises within the 4 terminals. In 11/01 chilled & frozen facilities added so as to cover all temperature bands thereby adding catering outlets to customer base.
Measured outcomes	66% reduction in deliveries measured at trial stage (2001/2) plus: reduction in vehicles travelling to terminals and driving airside (reduction of 35 vehicle deliveries into the airport per week in last week of Jan 2002), faster deliveries for distribution companies (at consolidation centre compared with shops) (calculated to be 234 hours per week saved in making deliveries), more frequent and reliable deliveries at shops, potential cost savings (time savings for delivery companies were estimated to be worth £4715 – assuming £20 per hour, which is equivalent to an annual saving of £245,000 based on the activity levels. Fuel savings were calculated to be worth £100 per week), vehicle kilometres reduction (approximately 560 fewer vehicle kilometres travelled per week), reductions in CO_2, carbon monoxide, nitrogen oxide and particulate emissions (weekly reductions of 426 kg of CO_2, 1.06 kg non-methane volatile organic compounds, 3.79kg nitrogen oxide, and 0.28 kg of particulates). More recent results show that in 2004 the centre received 20,000 vehicle deliveries; this resulted in 45,000 store deliveries being made from the centre on 5,000 vehicle trips. 190 out of 240 of the retail outlets are using the centre. Vehicle trip reduction of approximately 70% is being achieved for those goods that flow through the centre. This was estimated to result in 87,000 vehicle kilometres saved in 2003, and 144,000 vehicle kilometres saved in 2004. Vehicle emissions reductions have also increased as goods throughput has grown, with CO2 savings of 1,200 kg per week in 2003 and 3,100 kg per week in 2004.
Other outcomes / lessons / information	A showcase for the principles of consolidation in a "controlled" setting. Charging is by the roll cage and intended to be cost neutral for the retailer. Additional services are charged separately. Exel have an "open book + fee" agreement with BAA. The prime benefit has been reduced congestion within the airport and the far more efficient supply of goods for both retailers and their suppliers.
Observations	A successful example of a consolidation centre. Considered essential by BAA who claim that the concept means that the new Terminal 5 will need far fewer than the originally planned 64 delivery bays. Charges to retailers are not fully transparent as an element of the rent is likely to be assigned to the operation by BAA as their contribution to operating costs.
Research File #	4, 6, 7, 82, 96, 117,

Location	**U.K. – Meadowhall, Yorkshire**
Study/Trial/Operational	Operational
Justification	To minimise the impact of an average of 350 deliveries a day to the centre and to enhance the profitability of the retailers and the landlord.
Description	An on-site consolidation centre serving retailers on the Meadowhall site. Also known as an Accelerated Response Centre (ARC). Central stock receiving point / stock handling to suit retailers needs e.g. receipt and inspection of stock / pre-retailing / multiple deliveries to stores with minimum response time / collection of surplus stock / assistance with start-ups & re-fits / stock management / full stock visibility to retailers at the single item level. 6 days (Monday – Saturday). 8 staff and 1 x 7.5t delivery vehicle. There are standing charges for the services offered by ARC and the more specialist tasks are negotiated separately as and when required. The expectation is that these costs will be offset by savings within the retailer's own operation.
Kms to Delivery Area	On site
Voluntary/Compulsory	Voluntary
Permanent/Temporary	Permanent
Start / Duration	2002
Involved Parties	British Land (landlord), Exel (service provider)
Users/Clients	At 01/04 – 28 customers out of 270 retailers on the site used the service.
Measured outcomes	
Other outcomes / lessons	Reduction in total goods vehicle journeys and an increase in delivery time flexibility minimising total mileage and allowing goods vehicle deliveries at off-peak times.
Observations	
Research File #	7, 123,

Location	**U.K. - Swindon**
Study/Trial/Operational	Study
Justification	To examine the feasibility of peripheral transhipment in an urban area with a view to enhancing the urban environment Seeking to understand the impact of transhipment, and by implication, consolidation on traffic levels and the cost of urban delivery.
Description	Assumed transhipment centre would be on margin of the area under study. Multi-user facility owned and managed by the local authority or a private contractor. Usage would be voluntary, but it was anticipated that the imposition of weight and size restrictions within the area covered would channel traffic into the centre. All vehicles >3t unladen would be required to tranship at the centre for onward delivery. Some consignments would be exempted – bulk materials, hazardous materials and items requiring high security – but all temperature bands would be handled. The average daily throughput would 180 t comprising 425 consignments. Delivery would be 24 hours later (next day) but 36 hours for furniture. It was estimated that the 24 hour delay would enable a 25% reduction in delivery trips to be achieved.
Kms to Delivery Area	<5 km
Voluntary/Compulsory	Compulsory
Permanent/Temporary	
Start / Duration	1976 based on 1973 data. The study was not converted into a trial.
Involved Parties	Transport and Road Research Laboratory (TRRL)
Users/Clients	
Measured outcomes	It was concluded that a peripheral transhipment point would increase delivery costs and that the economics of transhipment were dependent on the level of usage of the transhipment centre and the level of traffic restrictions imposed in the area served. A cost penalty of £9.10 per tonne handled was estimated of which more than 50% was labour plus an additional £2.00 per tonne for loss and damage. There appears to have been a 20% profit margin in the figures.
Other outcomes / lessons	The study confirmed that transhipment was unpopular with potential users (principally retailers) with only c15% prepared to consider using it. The main objections were: an extra stage in the supply chain, increased costs, delays / longer leadtimes, loss of control, risk of loss / damage, additional packaging to protect goods, unable to provide specialist handling when required, a monopoly / local authority control. It was concluded that it would have been cheaper for most logistics companies to acquire lighter vehicles for deliveries in Swindon rather than use the centre.
Observations	The idea of decanting full loads in large vehicles into smaller deliveries is now considered untenable, but what is also questionable is the large amount of labour employed, the decision to delay all deliveries by 24 hours, the high loss / damage allowance and the 20% profit margin. With hindsight the scheme seems over-costed..
Research File #	15, 64,

Location	**U.K. - Winchester**
Study/Trial/Operational	Study
Justification	To restrict the weight and size of lorries allowed into the town.
Description	The approach used was the classic 1970's model of achieving the objective by decanting a large load into a number of smaller vehicles but with the added feature of load consolidation, possibly in conjunction with other modes of transport (rail).
Kms to Delivery Area	
Voluntary/Compulsory	
Permanent/Temporary	
Start / Duration	1994. The scheme was not converted into a trial
Involved Parties	Oscar Faber TPA Consultancy for Hampshire County Council.
Users/Clients	
Measured outcomes	No measured outcomes but section 3.5.2 in document 18 details the findings of the study.
Other outcomes / lessons	The environmental benefits were agreed, but it was considered that "the magnitude of these benefits is relatively small compared with the cost of setting up and operation of a transhipment centre". The conclusion was reached that "comprehensive transhipment in the form of a transhipment depot is only likely to be worth considering in very exceptional circumstances".
Observations	The large vehicles into small approach is now largely discounted as a means of reducing the effect of freight vehicles in town centres except where the large vehicles only has a small load or is making a large number of deliveries.
Research File #	15, 18

Location	**U.K. - Worcester**
Study/Trial/Operational	Study
Justification	To permit retailers to receive deliveries in pedestrianised zones in the city centre during the periods when vehicles were banned and seen as an alternative to out-of-hours servicing.
Description	A very small transhipment depot with 2 loading bays located just outside the city centre (next to the ring road). Delivery on pedestrian controlled electric vehicles with a capacity of 2 cubic metres / 1 ton. Deliveries would have been allowed between 10:30 and 16:30 when other vehicles were prohibited.
Kms to Delivery Area	<2 km
Voluntary/Compulsory	Voluntary
Permanent/Temporary	
Start / Duration	1980's Finally abandoned in 1990
Involved Parties	
Users/Clients	
Measured outcomes	
Other outcomes / lessons	The Council rejected the scheme on basis of operating and capital costs. 45% of retailers consulted supported the scheme, but only 10% said they would use it for all deliveries and 33% for some deliveries.
Observations	
Research File #	15, 62,

Location	**U.S.A. – Columbus, Ohio**
Study/Trial/Operational	Study
Justification	To measure the impact of a consolidation centre on urban freight traffic.
Description	All consignments of <5000 pounds to be consolidated at an "urban consolidation terminal" for delivery on 28 ft articulated vehicles with a carrying capacity of 7.5 tons.
Kms to Delivery Area	
Voluntary/Compulsory	
Permanent/Temporary	
Start / Duration	1972-74 Scheme not implemented
Involved Parties	
Users/Clients	
Measured outcomes	The study identified potential benefits of the following reductions: 90% in number of vehicles; 91% in distance travelled, 91% in transit time, 53% in unloading time, 37% in loading time, 100% in queuing time, 76% in annual cost, vehicle emissions and traffic congestion.
Other outcomes / lessons	It was stated that after allowing for the cost of the terminal the scheme offered financial benefits
Observations	A similar scheme in Chicago with a lower weight limit for consolidation as concluded that the approach was commercially viable.
Research File #	15, 15

APPENDIX 3: Interview Topic Guide

The topic guide used in the interviews is shown below. However it should be noted that the not all the topics contained in the guide were relevant to all interviewees, and therefore topics were selected for discussion as appropriate.

Urban consolidation centre project: Draft list of topics for the interviews

Interview technique: semi-structured interviews, to allow us to get some standardised responses from across the sample but also to follow the discussion in whatever direction the specific interviewee sees as important (i.e. not to pre-empt the importance of particular topics).

All interviews will be preceded by a short explanation of what is meant by an Urban Consolidation Centre

- Product types suited to the consolidation centre concept
- Supply chains suited to the consolidation centre concept
- Type of receiver suited to the consolidation centre concept
- Ownership and operation of consolidation centre(s) – e.g. public or private; single operator or joint venture
- Responsibility for transport operations (same provider as operator of centre or another; monopolistic or competitive operation)
- Range of logistics and distribution services provided by the centre
- Flexibility of delivery operations – e.g. fixed delivery schedules or on demand
- Localities suitable for the siting of consolidation centres (e.g. edge-of-centre or edge-of-city) and their characteristics and size
- Number of centres to serve an urban area (or other defined location)
- Financial issues (including capital, land and operating costs), particularly the nature of any financial support and revenue raising
- Appropriate traffic regulations / restrictions to use in conjunction with consolidation centres (and whether or not use of centre should be voluntary or compulsory)
- Suitable types of transport modes for consolidation centres
- Suitable types road vehicles for consolidation centres (inbound and outbound)
- The likely effects of consolidation schemes on:
    - Supply chain operations
    - Supply chain costs
    - Transport intensity
    - Environmental impacts
- Barriers to the development and use of consolidation centres
- Do you envisage that at some date in the future there will be a role for Consolidation Centres, and if so by what date?
- *If the answer to the previous question is "yes" ask the next 3 questions using the date given + (say) 5 years as the reference date*
- What type of consolidation centre do you expect to be most prevalent by 2010 and 2015?

- How many and what type of consolidation centres do you expect to be operational in the UK by 2010 and 2015?
- How many and what type of consolidation centres do you think should ideally be operational in the UK by 2010 and 2015?

APPENDIX 4: UCC Classifications Proposed by Other Authors

Köhler, U. (2001)

Köhler (2001) describes 6 fundamental co-operation forms for city logistics in Germany:

1. The forwarding agents involved as partners of the city logistics scheme, deliver the goods to a city-terminal, from where a neutral carrier with its own lorries takes over the goods and delivers them to recipients (e.g. Freiburg – see Figure A4.1a)

2. The total city delivery area is split into several geographical areas. One forwarding agent who is a partner in the city logistics scheme is given responsibility for one of these areas. This company collects all deliveries destined for that area from the other participating companies' depots (e.g. Munich – see Figure A4.1b).

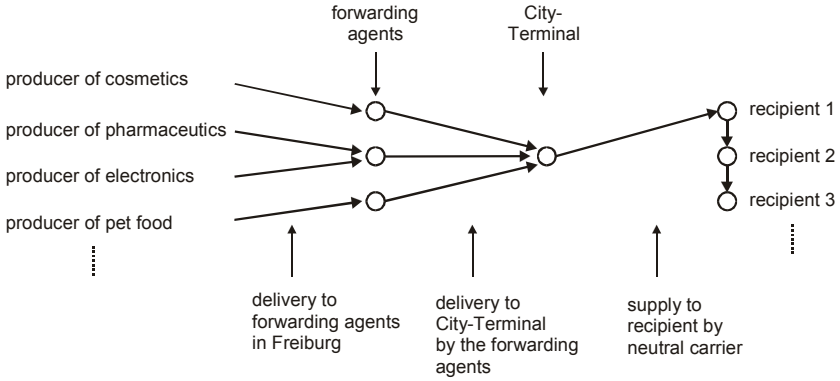
3. The forwarding agents select one of their own agents to make deliveries on behalf of all agents for a fixed period of time. The chosen agent makes all the deliveries in the city area with their own vehicles, collecting goods from the other agents (.e.g. Hamburg)

4. The forwarding agents working together in the city logistics scheme select a neutral freight carrier to make deliveries on their behalf in the city area. This neutral company is responsible for collecting goods destined for delivery from the partners' depots, taking them to a city terminal for sorting and then delivering them in the city area (e.g. Kassel - see Figure A4.1c).

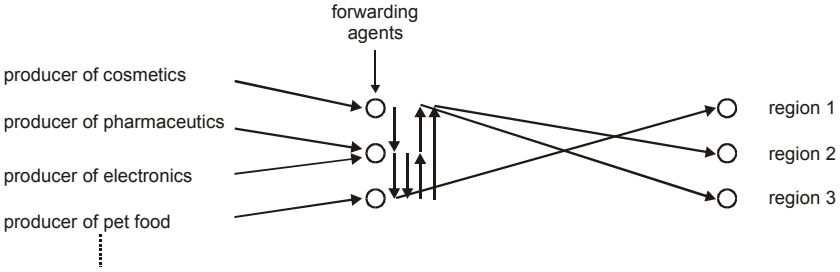
5. The forwarding agents working together in the city logistics scheme form a joint venture. This neutral joint venture company has its own vehicles to collect goods from the partners' depots and delivers them in the city area (e.g. Bremen).

6. Several forwarding agents deliver to a city terminal that is located close to the city. The goods are sorted at the terminal and then delivered in the city area. The delivery is made with electric vehicles using route optimisation software. Delivery times are agreed with receivers. Packaging materials are also collected and returned to the city terminal. The terminal also offers storage space to the receivers. Goods purchased by customers from shops in the city area can be collected from the shop and delivered to home by the city terminal operator (e.g. Nurnberg).

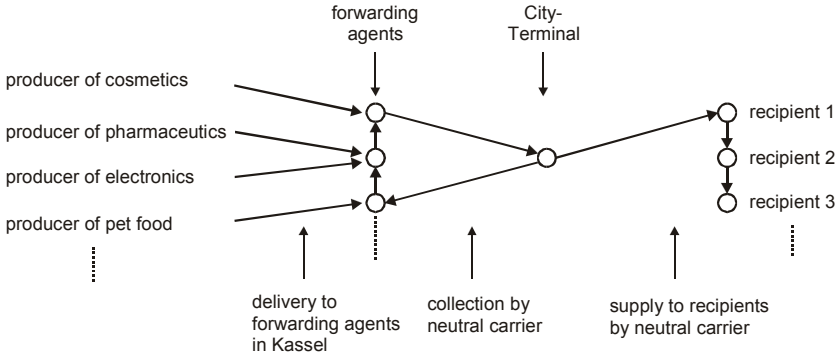
Figure A4.1: Cooperation Models in Germany



a: Freiburg model



b: Munich model



c: Kassel model

Source: Köhler, 2001.

Ministère de l'Equipement (2002) Programme national de recherche TMV

"A few, mostly north European cities are designing innovative ways of managing urban freight activities, by means of "Urban Distribution Centres" (UDC). By doing so, they are inventing the provision of a freight transport urban service. Of the two dozens or so cities which have been studied three "models" can be defined."

1. The "Monaco model". In Monaco, the UDC is owned and operated by the government. In 1989, the government contracted out the operation of freight distribution to a single carrier (a regional

transport company). This sub-contractor was given a monopoly over the municipal depot. Added to this was a partial monopoly on the delivery of goods. All trucks over a GVWR of 8 tons (this limit should be lowered to 3.5) are banned from the city of Monte Carlo. If they are to deliver goods to clients there, they have first to go to the local freight platform and unload. The municipal service then takes the final distribution in charge, with specific vehicles. The costs of the service are shared between the municipality, which gives financial aid and free warehouse space to the carrier ; the carrier which provides driving and handling staff as well as the vehicles ; and finally the retailers who supposedly pay for the amount of goods they receive through the service.

2. The "Dutch model". Following a national program of energy reduction in cities, many Dutch cities have set up systems of urban freight distribution licenses. Strict operating regulations are imposed on the licensees in exchange for an extended usage of street space and longer delivery hours. For example in Leiden, a license system has been functioning since March 1997. Applicant carriers must respect a list of criteria such as good level of truck loading, minimum number of shipments and the use of electric vehicles. This kind of municipal organization can lead to a quasi monopoly of distribution where a very limited number of registered carriers dominate the market of urban distribution, as it was the case in Utrecht.

3. The "German model". In that case, at carriers' own initiative, a private service of goods distribution is set up with the help of the city. Different carriers join together to consolidate freight and distribute it cooperatively. These experiences have been developed in some German cities such as Freiburg. In Nuremberg for example, electric vehicles are used for the city delivery service. The system provides other kinds of services, such as home deliveries, collect and recycle service, or short time storage. Government support can take the form of the distribution of an official "City Logistik label" on trucks and warehouses. Governments can also participate in the financing of the system. In Nuremberg, the experimental phase for the City consolidated Delivery Service was paid in half by the Land administration."

Klaus, P. (2005)

Klaus (2005) has defined three types of "inner city" Cargo Logistics initiatives tested in Germany in the 1990s:

- Type I: Logistics for "difficult" receivers of cargo – a milk round operation for a single retailer with a vehicle collecting goods in peripheral locations and delivering them to a site in the city, not many of these schemes were ever established.

- Type II: Consolidation concepts for city cargo in which goods are received at a consolidation centre and then delivered on to the receiver's premises in the city on a single vehicle– these are the typical German City Logistics schemes

- Type III: Applying telematics and alternative transport technologies (such as use of containerised systems and on-foot deliverers making the deliveries in the city).

Type II was by far the most common type of experiment in Germany during the 1990s. However, more than 100 type II projects have been aborted in Germany since their inception.

BESTUFS (2002)

This work considered freight platforms that operate at the urban level (i.e. UCCs) right through to national and international freight platforms.

Several classification criteria for freight platforms were identified:

- **Company structure**: does the platform process goods from only one or several transport operators.
- **Spatial orientation**: urban, regional, national, international
- **Transport modes and intermodal access**: Road, rail, barge, sea, air, pipeline
- **Institutional solution**: private or public-private partnership
- **Main aims**: optimisation of logistics operations, urban traffic reduction, modal shift, regional economic growth.

The classification of freight platforms devised is shown in Table A4.1. The columns in grey show freight platforms that could potentially operate at the urban scale (namely UCCs (referred to as Urban Distribution Centres" and freight villages).

Table A4.1: Classification of freight platforms [based on REFORM 1999 and Visser et al. 1999]

	Terminal development		*Area development*			
	Intra-company synergies	*Inter-company synergies*	*Transport oriented*	*Transport + other*	*Industrial + some transport*	*Port related*
	Single-company Urban Distribution Centre	**Multi-company Urban Distribution Centre**	**Freight village**	**Industrial and logistic park**	**Business Grouping Developments**	**Special logistic area**
Transport modes	road-road road-rail	road-road road-rail	road-road road-rail-(barge)	roads-road road-rail	road-road	road-sea/air road-rail-sea/air
Main aims	optimisation logistic operations	optimisation logistic operations, urban traffic reduction	modal shift, urban traffic reduction	regional economic growth, modal shift	revitalising small and medium sized firms	regional economic growth
Company structure	one single huge forwarder, retailer or transport company	co-operating transport companies	mostly small companies	large industrial companies and transport companies	wholesalers and transport companies	international oriented companies
Land use	small areas in urban areas or in the outskirts	small areas in urban areas or in the outskirts	large areas in the outskirts	large areas in the outskirts or at old industrial areas	large areas in the outskirts	near airports and harbours
Spatial orientation	**urban**	**urban**	**urban** / regional	regional and international	urban and regional	international

Source: BESTUFS, 2002