



Evaluating the potential for urban consolidation centres

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Abstract

This paper focuses upon the potential for Urban Consolidation Centres (UCCs) to alleviate local environmental and traffic problems within urban areas. An international literature review was undertaken, interviews were held with a range of relevant parties, and an evaluation framework was developed. In previous work a narrow focus has typically been adopted and no examples of thorough scheme evaluation were found. A particular concern discussed in the paper is the identification and subsequent allocation of the costs and benefits of implementing and operating a UCC. Lessons learned from existing and attempted UCCs are then presented, and a number of themes and location types that point to successful implementation are identified. The likelihood of a UCC being successful depends considerably upon the legal and planning frameworks in the locality or country involved.

Keywords: Freight consolidation; Urban transport; Transport policy; Freight scheme evaluation.

Introduction

This paper summarises key elements of the findings of a research project on Urban Consolidation Centres (UCCs) funded by the Department for Transport (DfT) and carried out by the University of Westminster (2005). The project essentially consisted of a scoping study that aimed to identify the potential for the development of UCCs that have as their principal objective the alleviation of local environmental and traffic concerns in urban areas. It was also concerned with the wider business and supply chain issues associated with the use of such centres.

Broadly speaking the key purpose of UCCs is the avoidance of the need for goods vehicles to deliver part loads into urban areas (be that a city centre, an entire town or a specific site such as a shopping centre). This objective can be achieved by providing facilities in or close to the urban area whereby deliveries (retail, office, residential or construction) can be consolidated for subsequent delivery into the target area in an appropriate vehicle with a high level of load utilisation. A range of other value-added

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logistics and retail services can also be provided at the UCC. Much of the older literature on transshipment centres (and similar public sector driven initiatives) can be said to focus on “the traditional break-bulk form of transshipment 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 (see for example McKinnon, 1998a and 1998b; Battilana and Hawthorne, 1976; GLC London Freight Conference, 1975; Lorries and the Environment Committee, 1976; Nathaniel Litchfield and Partners, 1976). 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, transshipment and groupage, often with a focus on maximising vehicle loads, thereby avoiding the need for vehicles to deliver part loads into urban centres, and with a far greater role for the private sector (see for example Department for Transport, 2002; Dunning, 1997; Exel, 2004; Hesse, 2004; Institut für Seeverkehrswirtschaft und Logistik, 2005; Köhler. and Groke, 2003).

This paper addresses two key questions:

- How should the impacts of UCCs be evaluated?
- In what circumstances are UCCs likely to succeed and what are the main barriers to successful implementation?

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. A review of the literature found that no clear and detailed methodology has been developed for, or applied to, the evaluation of UCCs: a number of schemes have been evaluated to some extent, but these evaluations have tended to be fairly ad hoc and generally have been limited in scope. This paper presents 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 UCCs are taken into account. The paper concludes with an analysis of the lessons learned from existing and attempted UCC schemes.

Study approach

The study consisted of three main elements. First, a comprehensive literature review was conducted. This covered academic journals, public sector documents and industry publications from the United Kingdom and elsewhere. Specific consolidation centre research, trials and schemes that have been referred to in the literature were also identified and an attempt made to record consistent data relating to each of them. The review provided an important input to the evaluation task. The majority of the literature came from France, Germany, Netherlands, Sweden, the United Kingdom and Japan, and a more detailed discussion can be found in the full project report (University of Westminster, 2005). It was clear from the literature review that evaluating UCCs is far from straightforward, though a number of important measures were identified. In

previous work, in each of the countries where UCC evaluation has taken place, a narrow focus has typically been adopted and no examples of thorough scheme evaluation were found.

Second, interviews were held with a range of relevant parties, 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.

Finally, an evaluation framework was developed. This 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. This element forms the focus of this paper, and pulls together the key findings from the first two elements.

Key elements of the evaluation framework

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 paper 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.

It was evident from the review of the literature that the evaluation of a UCC is far from straightforward. In this section, the most important aspects that should be part of any such evaluation are set out. Ten different measures were identified that have typically been used in previous evaluations:

- 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 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 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 (see Table 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 from a data collection perspective 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 final delivery point(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 (i.e. prior to the introduction of the UCC) 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.

Table 1: Variables and Indicators to be Included in a Comprehensive UCC Evaluation.

<i>Broad Indicators</i>	<i>Narrow Indicators</i>
<p>1) Logistics and supply chain changes</p> <p>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</p> <p>2) Social/environmental impact of UCC vehicle activity</p> <p><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)</p> <p><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)</p> <p><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</p>	<p>3) Goods vehicle activity</p> <p><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)</p> <p><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)</p> <p><u>Vehicle load factor</u> Vehicle weight and volume utilisation for deliveries from UCC Vehicle weight and volume utilisation for supplies into UCC</p> <p>4) Loading/unloading activity</p> <p><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</p> <p><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</p>

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) has been 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 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 2) demonstrates a fairly typical transshipment-type of operation, where large goods vehicles making direct deliveries to customers are replaced by smaller vehicles operating out of a UCC.

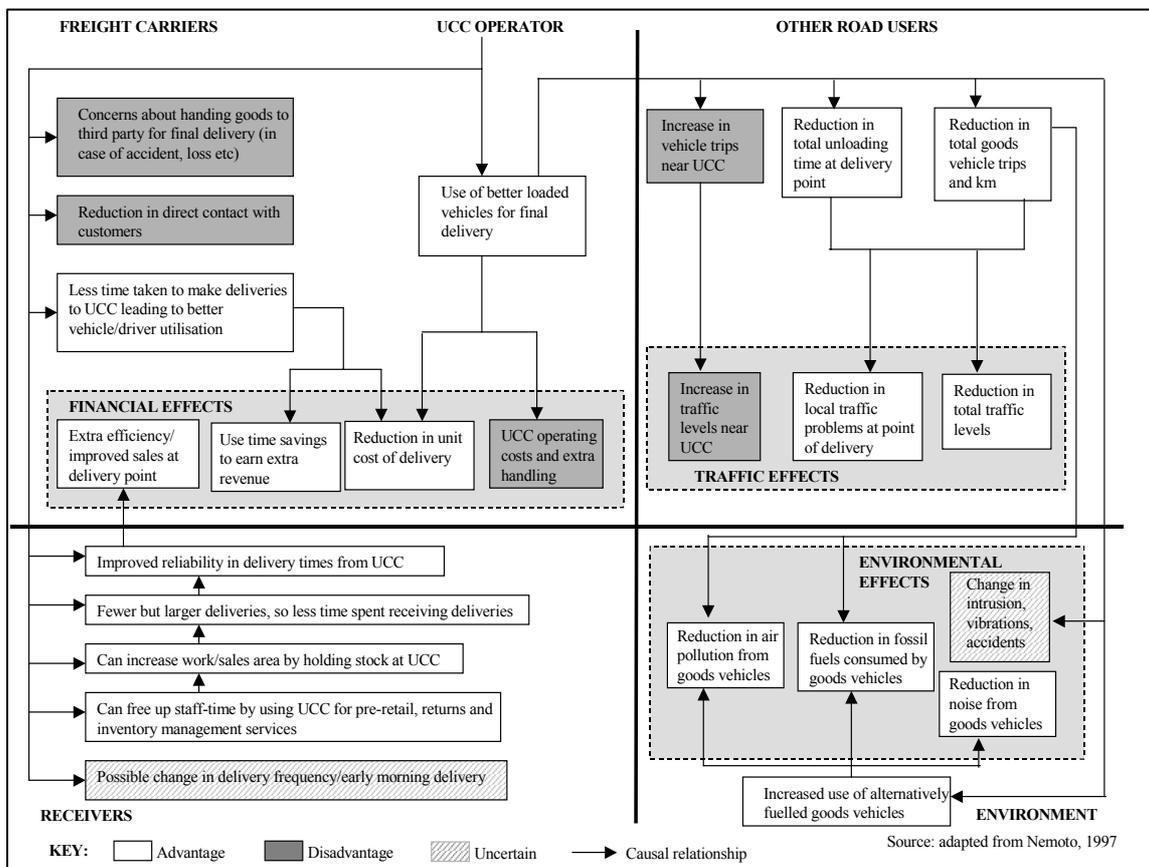


Figure 1: Model 1 - Poorly Loaded Vehicles on Direct Deliveries Replaced by Better Loaded Vehicles from UCC.

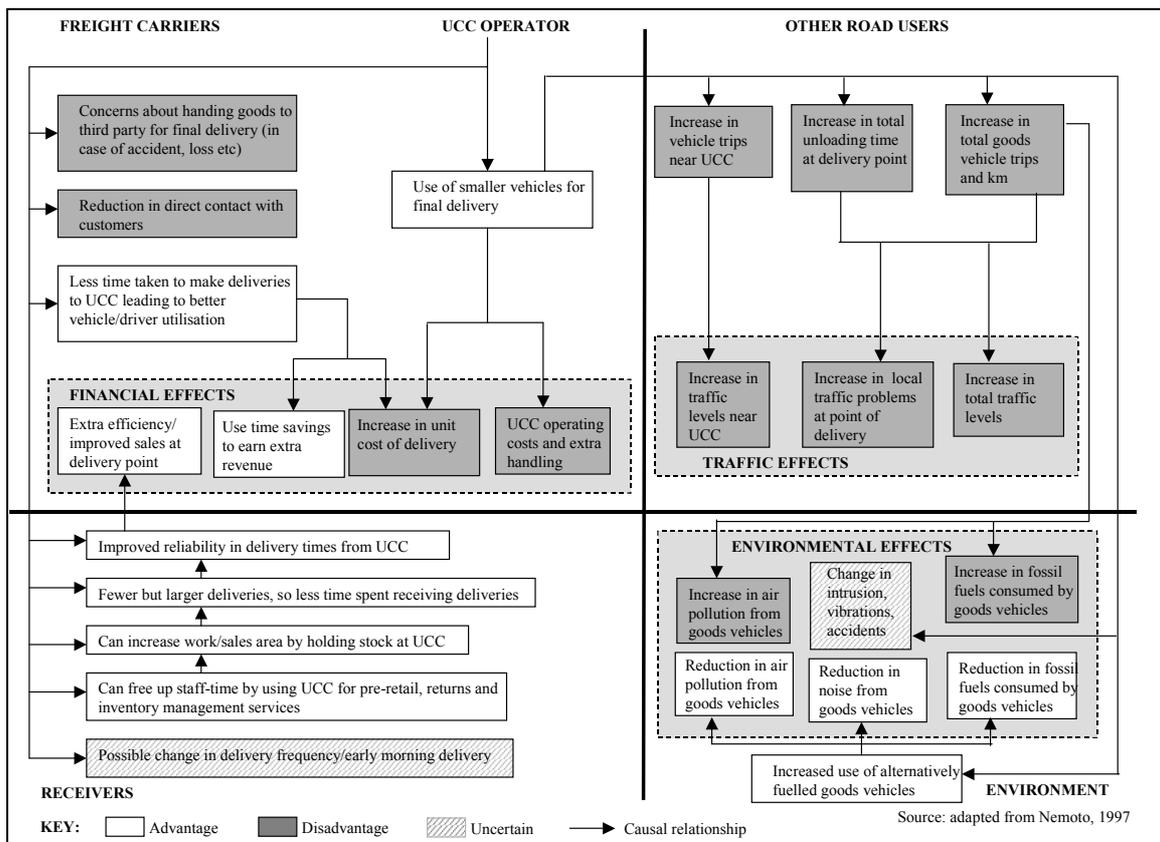


Figure 2: Model 2 - Large Goods Vehicles on Direct Deliveries Replaced by Smaller Vehicles from UCC.

Figures 1 and 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 the two diagrams reveals 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 1 performs better in terms of the balance of advantages and disadvantages than does the transshipment of goods into smaller vehicles as shown in Figure 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. However, the comparison does lend weight to the more recent developments in UCCs, where the emphasis has shifted away from the traditional transshipment 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. Further developmental work is required to enhance these models and to identify which is better or, indeed, whether a different variant would yield better results.

Previous UCC scheme evaluation

One of the best existing examples of UCC evaluation is that for Tenjin in Japan (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. 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 NO_x 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 this discussion 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.

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 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”.

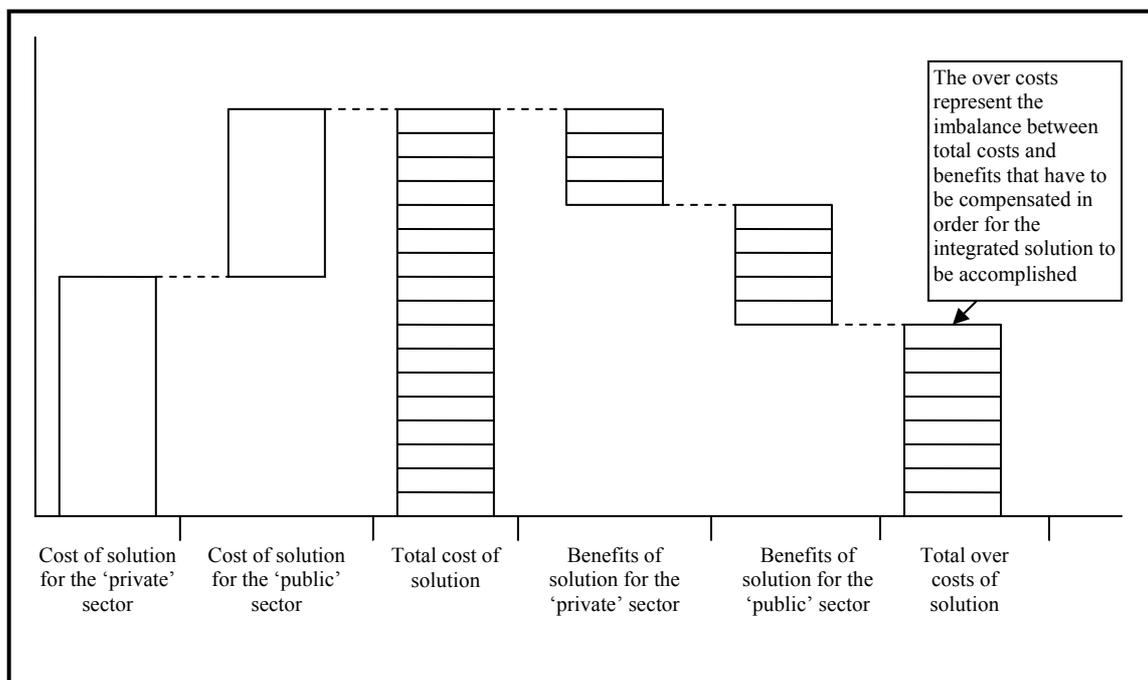


Figure 3: Example of cost-benefit analysis for a UCC scheme.
Source: City Ports (2005).

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 themselves. 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 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 and shows the wider range and complexity of “costs” and benefits that may apply to the different parties involved.

Table 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).

	<i>COSTS</i>	<i>BENEFITS</i>
Supplier	<ul style="list-style-type: none"> • Not a single “door-to-door” operation 	<ul style="list-style-type: none"> • Less time spent making deliveries in cities, leading to reduced operating costs • Potential to use time savings to generate additional revenue
Transport provider	<ul style="list-style-type: none"> • 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” 	<ul style="list-style-type: none"> • 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
Receivers	<ul style="list-style-type: none"> • Additional stage when chasing missing/late deliveries 	<ul style="list-style-type: none"> • 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
Local Authority	<ul style="list-style-type: none"> • Cost of policing freight movements 	<ul style="list-style-type: none"> • 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
UCC operator	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Profit-making business
Developer (new retail sites only)	<ul style="list-style-type: none"> • Cost of establishing UCC if condition of planning consent 	<ul style="list-style-type: none"> • 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

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 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 CO₂ emissions. Hypothecated revenue from transport schemes (e.g. congestion charging) could be used to fund these benefits on a transparent basis, 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.

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).

Lessons learned from existing and attempted urban consolidation centres

Despite the limited evaluation of UCCs in the literature to date, it has been possible to draw out some key lessons from the combination of the desk research and interviews undertaken in the course of the research project being reported on. A number of key themes have emerged:

- Organisational considerations
- Scheme funding
- UCC operations issues
- Awareness and understanding of the UCC concept

Organisational considerations

It appears that imposed UCC solutions are successful only if the imposing organisation is able to control or strongly influence all the players. Thus, at London Heathrow, for example, British Airports Authority (BAA) 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. As landlord, BAA is clearly in control. A similar approach could be applicable with new major retail developments. By contrast, voluntary schemes seem often to be loosely constituted and are 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.

From this it is possible to infer, though there is not sufficient evidence to support it, that the most likely successful alternative to an imposed UCC will be the bottom up approach. In this scenario the initiative would come from, for example, a street association or the traders in a location who wish to improve their local retailing environment. 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 freight operators to devise a traffic minimisation scheme that by definition would entail a scheme of consolidation. In the United Kingdom, Freight Quality Partnerships (FQPs) provide a possible structure within which UCC schemes can be developed.

The process leading to the establishment of a UCC will require the involvement of many parties from both the private and public sectors (e.g. local government, potential UCC operators, trade associations, local logistics companies, police authorities) and it is essential that everyone who is likely to have any involvement is part of the discussion and planning process. Without such comprehensive 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 adapting 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. Experience in mainland Europe suggests a preference for legally constituted bodies involving all the main players to establish and operate UCCs, whereas in the UK the approach has been for a commercial organisation to take the 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. Certainly, the evidence from the UK suggests that success is more likely where the involvement of private companies in using a UCC is voluntary, rather than imposed by public bodies on to private companies who tend not to have a sound understanding of the commercial considerations of the private companies. The role of local authorities, therefore, is likely to focus on promoting UCC-friendly urban policies, bringing together those with an interest in UCCs and their potential benefits, and scheme funding (see below). It is important not to underestimate the task involved in developing a scheme that addresses the requirements and views of the disparate parties likely to be involved.

Scheme funding

The general consensus is that UCCs must be financially viable in their own right in the medium- to long-term and that subsidies are not a desirable solution. As part of wider financial considerations, however, 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. It is apparent 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 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. Physical expansion, more elaborate handling systems, or additional capabilities such as chilled and frozen produce storage, could be developed over time.

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 potential customers, and to demonstrate that by using such centres costs in other parts of their operation could be reduced. Such reductions may be achieved through, for example, less time being spent on deliveries in difficult and/or congested areas, shorter journey times and increased vehicle utilisation, and the possibility of night-time deliveries into the UCC. 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 the allocation of costs and benefits needs to be the subject of a more comprehensive and detailed pilot study. Such a study would encompass both the financial costs and benefits along the whole supply chain and the wider issue of how to handle the environmental costs and benefits.

UCC operations issues

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 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 trial 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 heavy goods vehicles (HGVs). It is now recognised that there is no benefit, and indeed there are often environmental and cost penalties, in decanting the contents of a well laden HGV into a greater number of light goods vehicles (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 vehicles returning to the UCC are as highly utilised as possible. To achieve this, inter-site transfers, unsold stock, waste and damaged material for recycling and orders placed by customers may all be 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 outer packaging; the assembly of promotional offers; waste recycling; providing a post-sale collection service for the retailers' customers; and field stores for service engineers are typical examples. Given that one of the non-financial objections to UCCs is typically the loss of control and 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.

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 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 kilometres 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. While a single UCC may be beneficial to a specific location, it is not yet clear what the impacts would be, particularly on the haulage industry, if a given region were to establish a number of UCCs, perhaps even one in each town. In such circumstances the benefits to the haulage industry could potentially be significant.

Awareness and understanding of the UCC Concept

It seems there is a fairly widespread lack of awareness both within the public and private sectors as to the opportunities that UCCs might provide if they were to be

established in appropriate situations. In the public sector in Britain, references to UCCs are frequently found in Freight Strategies and proposals for Freight Quality Partnerships (FQPs). However, it is rare for there to be 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. From discussions with representatives of local government there is a desire 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 mean 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 earlier, there may be considerable merit in undertaking an extended pilot project 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. However, 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.

In the private sector, those who are most likely to instigate the development of a UCC are the “customers” (e.g. retailers) and freight carriers. The latter 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. To succeed, it must be demonstrated that the additional costs associated with a UCC operation may not have to be borne by the freight carrier or retailer, or if they do have to be that there may be significant benefits elsewhere in the operation that can reduce if not eliminate them. For example, in the case of a freight carrier, 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. 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 freight carriers of any concerns they may have in that respect.

As indicated above, by undertaking a carefully measured trial it should be possible to provide the data that are needed to enable freight carriers 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 freight carriers aware of the problems that congested areas face and thereby engage them in helping to solve those problems. 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/social factors – is seldom considered and any potential overall benefits are dismissed. However, 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.

Conclusions

Given the relatively low success rate of UCCs to date, 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 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 both to financially support the operation and to enhance the service offering to attract greater throughput. 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 interests and intuition, and in the absence of hard facts are not easily refuted. While it is perhaps inevitable that politicians and civil servants do not wish to be seen to spend unnecessarily on schemes such as UCCs, it is vital that sufficient consideration is given to the evaluation of schemes that are implemented so that good practice can be identified and lessons for the future can be learned. Also, it is important that there is policy consistency; there is a tendency for different types of transport initiatives to be in favour at different times, and for certain initiatives to fall down the political agenda before their worth has been fully evaluated.

Many UCCs focus on retail operations. They appear to offer greatest scope for those retailers, predominantly smaller stores and independent retailers, who are not part of supply chains in which deliveries are already highly consolidated at distribution centres into full vehicle loads, since vehicles already carrying full-loads for a single retail outlet will not benefit. It is also important to be aware of the potential role of UCCs in other sectors including construction, offices, service organisations such as maintenance engineers, hotels and other tourist services and residential homes. Where final deliveries are multi-drop in nature, and geographically spread across an urban area, transport operators tend to suffer major inefficiencies in the “last mile” delivery operation. In a general sense, therefore, the concept should benefit those transport operators making small, multi-drop deliveries where the location, parking and unloading time are disproportionate to the size of the delivery, and where vehicle utilisation could be increased through consolidation. It is important, though, to realise that UCCs are likely to be better suited to some types of goods than others. In particular, the concept is

unlikely to be suited to perishable and highly time-sensitive products and goods with specific distribution and handling requirements.

In terms of specific location types, UCCs are most likely to succeed in the following places:

- Specific and clearly defined geographical areas such as historic town centres with a high incidence of small traders/outlets who are not 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 Problems (e.g. poor vehicle access, significant traffic congestion, constrained loading/unloading facilities) 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, particularly if there is a single manager or landlord to coordinate and/or enforce UCC usage. 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.

Finally, it is important to reinforce the need for the availability of funding, since there is no strong evidence that any truly self-financing schemes yet exist, and strong public sector involvement in encouraging (or forcing) their use through the regulatory framework.

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