

Distributional Impacts of Sector Strategies and Schemes

Development of a Spreadsheet Tool to Assist in Identifying Cross-Sector Impacts

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1. Background

DISTILLATE is a four-year programme of research, funded by the Engineering and Physical Sciences Research Council (EPSRC) and carried out by four universities and the Transport Research Laboratory (TRL), in conjunction with local authority partners. The broad aim of DISTILLATE is to develop new products (processes and techniques) that will assist local authorities in developing and implementing sustainable transport strategies and schemes. The research programme consists of seven streams of work, one of which (Project G) deals with improved techniques for option appraisal.

Part of the Project G work stream is concerned with exploring the distributional impacts of strategies and schemes. Guidance from HM Treasury (2003) and from the Department for Transport (2004, 2006) has recommended that more attention be paid to distributional impacts – which is something that is normally ignored or netted out in conventional cost benefit analyses. A review of previous work on distributional impacts (Upton and Jones, 2007), found that there was a large body of literature (particularly associated with environmental justice issues) which dealt with the impacts of policies on different population and geographical groupings at a strategic level.

The review identified two major gaps in coverage: at scheme level, and - less recognised - in terms of cross-sector impacts. The first of these gaps has been addressed in another DISTILLATE report, which describes a spreadsheet tool that explores the effects of different streetspace allocation design options on different population groups (Jones and Paskins, 2008). The second gap is addressed by the spreadsheet tool described in this report. Here, rather than looking at distributions of social or spatial impacts, we add a third dimension to the analysis, by investigating the distributions of impacts across sectors of the decisions taken by particular agencies.

2. Cross-sector Impacts

NERA (2004) produced an extensive report for the Department of Transport looking at the impacts of integrated transport and the cross-sector benefits of improved accessibility. However, much of the report deals with process issues (e.g. barriers to partnership working) and most of the extensive series of case studies deal with forms of demand responsive services. Relatively few look at impacts outside the transport sector, and those that do focus on the impacts of improvements and not reductions in service levels.

Examples where cross-sector impacts were identified included:

- Reducing levels of no-shows and cancelled appointments in the health sector; faster turnover of patients and a reduction in bed blocking.
- Providing access to better quality health care, by providing GP mobile services, or reducing the need for home visits.
- Staggering opening times of day centres and schools, to achieve greater vehicle utilisation.
- The Merseytravel Joblink service evaluation suggest that there have been non – transport benefits in terms of “health, social services costs, crime levels and, of

course, the self esteem and confidence of people who are becoming regular public transport users” (NERA, 2004, page 22).

The NERA report finds that little systematic attention has been paid to cross-sector impacts. In relation to schools policy, for example, it notes (page 127) that: “the national policy of encouraging wider school choice has transport cost implications, which will reduce other services or increase local taxation. Local authorities see little evidence that this impact is recognised in central government.” More generally, it concludes (page 143) that: “There appears, for example, to be no data to help put monetary values on the improved accessibility that such services provide, nor of any consequential impacts on, for example, employment, crime, or health status.”

In the wider literature, there appears to have been little discussion of the impacts of actions taken by one agency on others, or the benefits of inter-agency collaboration. Again, the emphasis seems to have mainly been on process issues relating to inter-agency collaboration (e.g. Hudson *et al.* 1999), although Huxham and MacDonald (1992) note that one of the pitfalls of organisational individualism is ‘counter production’ explained as “organisations working in isolation may take actions which conflict with those taken by others”.

The groups which appear to have been most sensitive to cross sector issues can be found within the health sector, but again much of the emphasis is on policy and process, rather than outcomes (e.g. see Powell and Exworthy, 2001). One exception is the report by Hamer (2004), from the Health Development Agency, which discusses the advantages and possibilities for pooling resources across sectors, in the context of the introduction of the Local Strategic Partnerships.

Within the DISTILLATE project, the problems associated with the lack of inter-agency working became apparent during work carried out in the Dearne Valley in South Yorkshire, as part of Project B on problem identification and option generation, in the context of an assessment of accessibility needs of disadvantaged populations. Here a number of issues were identified.

From discussions with local residents (Snell and Jones, 2007), it became apparent that:

- There are gaps between the responsibilities of different agency service providers that made it difficult for people to access services (e.g. between employers’ decisions about shift working hours and the timing of public transport services).
- When ‘things went wrong’, agencies took no collective responsibility to ensure that users are able to complete a sequence of tasks needed to undertake an activity. For example:
 - Older teenagers would lose their EMA educational allowance if they arrived late at college, due to a bus cancellation or severe delay;
 - Bus passengers would be left ‘stranded’ in inhospitable situations, if the bus company had to divert a service, due to vandalism or flooding.

During discussions with a wide range of sector practitioners (Jones and Thoreau, 2008), two other problems emerged:

- The strong focus on government-set targets, which tended to concentrate on certain aspects of a sector's traditional service provision. This left little management or financial resource to consider the wider aspects of their provision, and indeed encouraged the externalisation of some aspects of their service provision that was no longer considered 'core'. For example, a tendency for schools to concentrate on the core curriculum and reduce resources devoted to sport or leisure activities.
- A recognition among the agencies that took part in the professional workshops that decisions taken by one agency in their own institutional/commercial interests could create problems, both for their customers and others, which would end up being picked up as costs by other agencies. For example, hospital relocation decisions that do not take into account transport difficulties for those without access to a car.

3. Objectives of the Cross-Sector Impacts Tool

In the light of the concerns expressed in the resident focus groups and the first professional workshop about the lack of co-ordination between agencies, it was decided to develop a simple spreadsheet tool to begin to explore the distributional effects of decisions taken by one agency on the areas of responsibility of others. The intention was to provide a tool to facilitate cross agency dialogue at a very early stage in an agency's project planning process.

Given the evidence in the NERA (2004) report of the lack of quantitative data on impacts, it seemed most practical and useful to develop a simple qualitative tool designed to help to trace through potential consequences, which might at a future date be developed into something more quantitative and comprehensive.

The more specific objectives of the cross-sector impacts tool were to:

1. Identify the potential wider consequences for other agencies of a decision taken by one agency; and
2. Indicate which other sectors might be impacted – beneficially or adversely – by each of the identified consequences.

The aim was to develop an exploratory tool that would enable agencies to explore potential impacts for themselves (using either a graphical 'mind mapping format' for tracing consequences, or a more structured tabular format), or to refer to examples that have been provided to illustrate the kinds of direct and indirect impacts on other agencies that might arise from a decision taken by one agency.

The remainder of this report describes the exploratory spreadsheet tool and illustrates its application in two example situations: school consolidation on fewer sites, and the relocation of a primary care centre.

4. Outline of the spreadsheet tool

The tool operates in two modes:

1. In visual form, as an 'Agency Impacts Kit', providing colours, shapes and symbols so that users can build up their own 'Consequences Tree'; and
2. In tabular form, with the policy change and the various consequences explored through drop-down menus.

Figure 1 shows the initial screen of the Cross-Sector Impacts spreadsheet. The *Aspect* sheet is automatically shown to the user when the spreadsheet is opened.

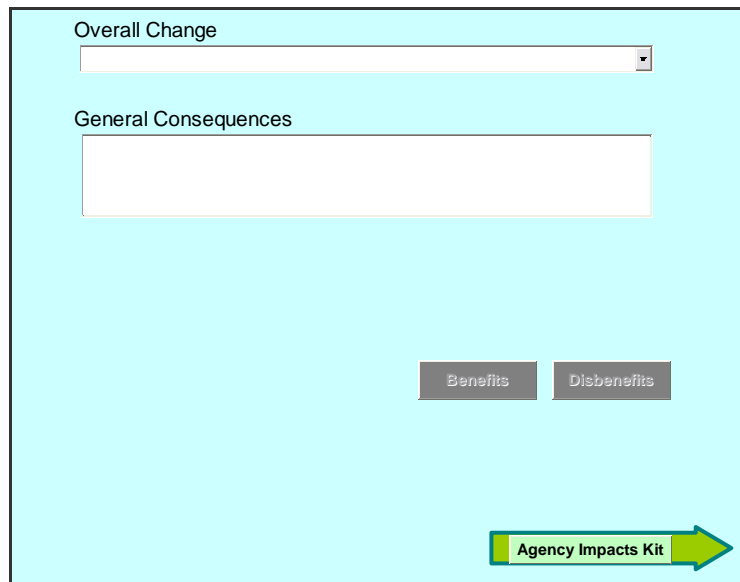


Figure 1: The *Aspect* sheet - the initial sheet seen by the spreadsheet user

From this initial screen, the spreadsheet user can either go to the *Agency Impacts Kit* and begin themselves to map out the relationships between changes and consequences (as described in Section 5); or start building up a list of benefits and disbenefits for a given change, from a list of pre-coded options. This tabular form is described in Section 6.

5. The Agency Impacts Visualisation Kit

Clicking the *Agency Impacts Kit* button (see Figure 1) will take the user to the *Impacts Kit* sheet, which has the basic components shown in Figure 2.

The right hand side of the figure provides a key to the various components available to build up a Consequences Tree, and the left hand side contains the actual components that can be edited and used to build up the tree. The blank area in the centre of the screen is used to build up the tree.

The *Impacts Kit* sheet allows the user to build up a tree diagram showing the relationships between policy changes, consequences and benefits and disbenefits. The

benefits and disbenefits can be allocated to a sector using an appropriate colour shading (extra sectors can be added to the *SectorList* sheet, as described in Appendix A).

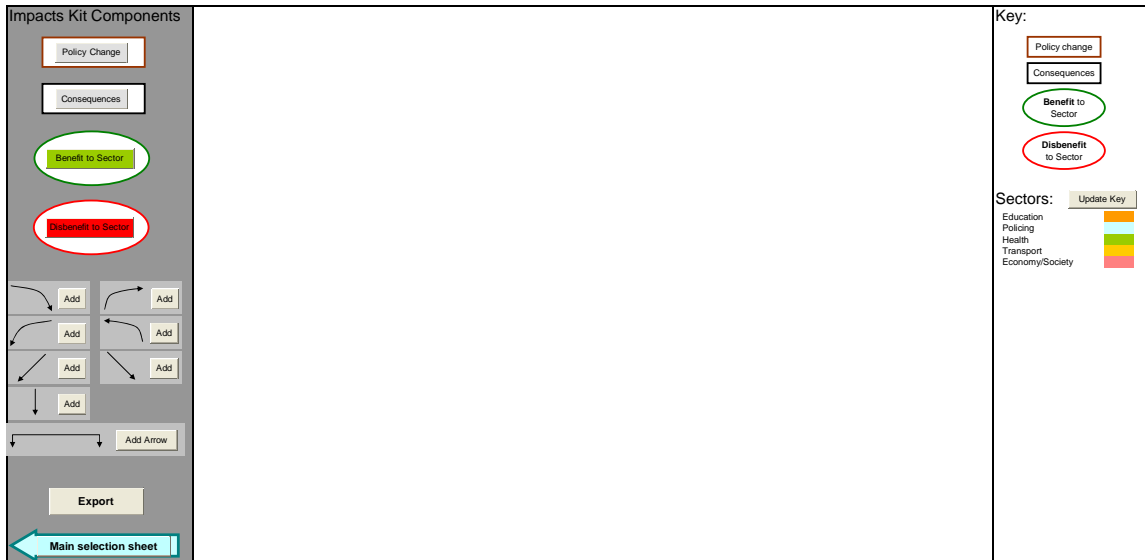


Figure 2: The main elements of the Basic *Impacts Kit* sheet

The diagrams are built up by adding diagram elements that represent the policy change, the consequences of that change and the benefits and/or disbenefits that are associated with the consequences. Arrows to connect the diagram elements can also be added.

When clicked on, the top four components buttons, *Policy Change*, *Consequences*, *Benefit* and *Disbenefit* all open the *Add detail to organisation chart* dialogue box, as shown in Figure 3.

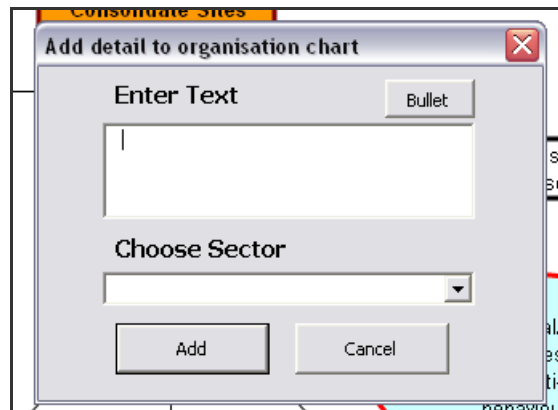


Figure 3: *Add detail to organisation chart* dialogue box

Using this dialogue box the user can add text, with bullet points if required (pressing the *Bullet* button adds a bullet at the cursor location) and choose a colour coded sector that will be particularly affected (e.g. orange for education, light blue for policing).

The four components represent the following features of the tree:

- *Policy change*: adds a box with a brown border representing the overall policy change that is being considered; the background colour shading is determined by the chosen sector.
- *Consequences*: adds a box with a black border and white background to represent a consequence or consequences of the policy change; consequences are not assigned to a sector.
- *Benefits*: adds an oval with a green border to represent a benefit associated with a consequence; the background colour is determined by the affected sector.
- *Disbenefits*: adds an oval with a red border to represent a benefit associated with a consequence, the background colour is determined by the affected sector.

After the elements have been added, any text they contain can be edited manually (to select the text simply click on it inside the box so that it is selected).

All the component types and sector colour shadings are shown in the key on the right hand side of the chart (see Figure 2). If the user has added or removed sectors, or altered their descriptions or associated colours (as described in Appendix B), then they should click the *Update Key* button above the sector list, so that these changes are added to the chart's key.

Connecting arrows are added by clicking the *Add* buttons next to the appropriate arrow picture (lower left in Figure 2).

Once added, the component shapes can be moved manually by the user, by clicking and dragging them. The component shapes can also be deleted manually, by selecting the element and then pressing the delete key.

In the current version of the spreadsheet, an example of a Consequences Tree is included as a default, as shown in Figure 4, rather than the blank area that was shown in Figure 2. This configuration both gives the spreadsheet user an indication of the general structure of a tree, and provides the possibility to edit this one, rather than start from scratch, if the user prefers to do that.

In this example, the proposal by the education sector to close a school and consolidate education at fewer sites has clear educational benefits, but has a wide range of potential disbenefits that impact on the transport, health and policing sectors – making it more difficult for these other sectors to provide their services cost-effectively and meet their own targets.

A second example of a Consequences Tree is shown in Figure 5. Here there are no direct implications for policing, but instead important implications for the continuing economic vitality of this small market town if GP services are relocated from the centre – as well as potential negative implications for other health sector targets (e.g. increased numbers of 'no shows' among non car owning households).

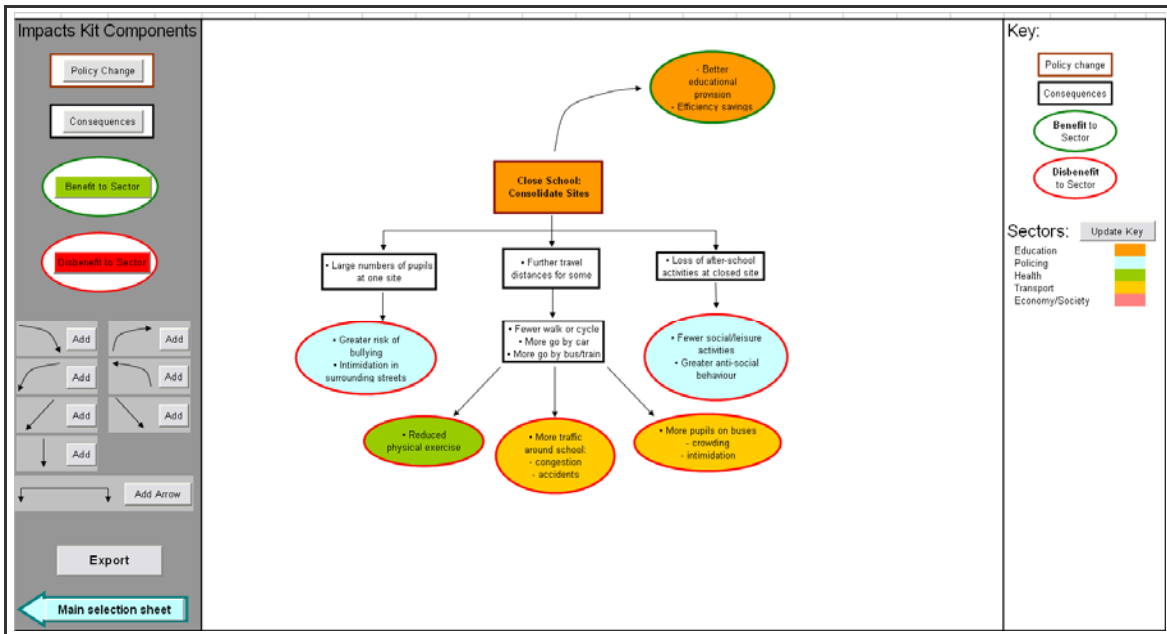


Figure 4: The full screen of the Basic *Impacts Kit* sheet

Health Centre Moves to Edge-of-Town Site

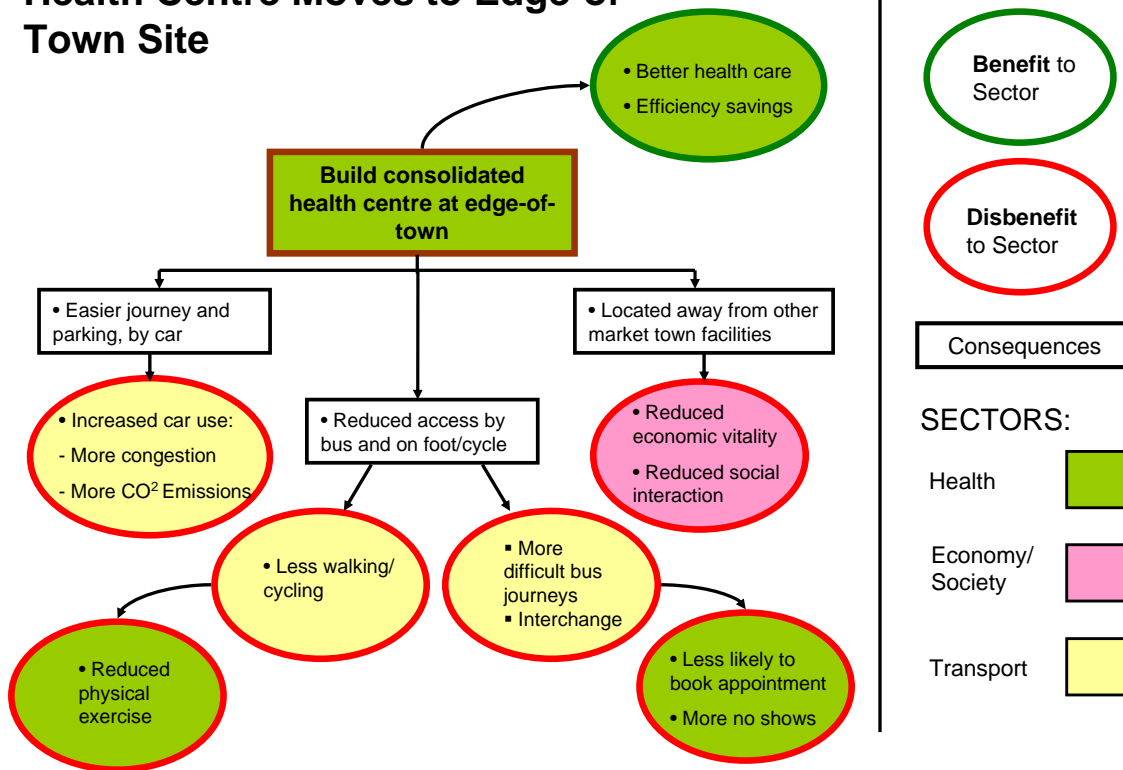
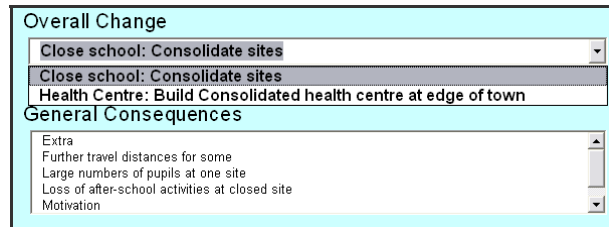


Figure 5: Example of a Consequences Tree linked to the consolidation of GP services in an edge-of-town health centre

6. Cross-Sector Impacts Spreadsheet: Tabular Form

The second way in which the spreadsheet can be used is in tabular form, where the user can either (i) build up a list of impacts by selecting from predefined lists of options, or (ii) create their own list of options, using the procedures described in Appendix B..

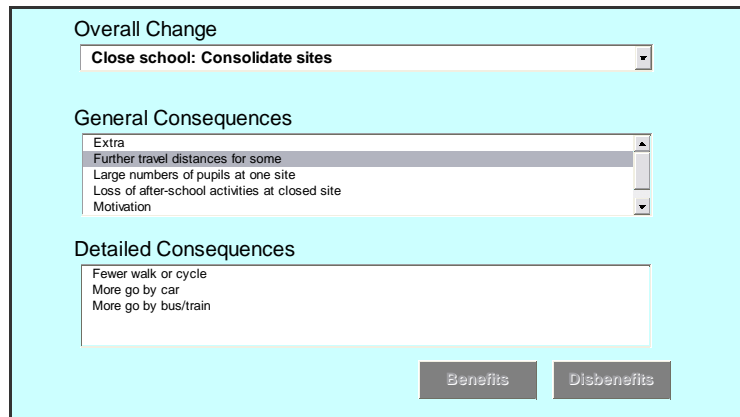
To build up a list of benefits and disbenefits for a proposed initiative to be taken by one agency from a list of predefined options [method (i) above], the spreadsheet user starts by selecting an ‘Overall Change’ from the drop down box that forms part of the initial sheet shown in Figure 1. Figure 6 shows the drop down box being used to select the overall change “Close school: Consolidate sites”, which is the tabular equivalent of the ‘consequences tree’ shown in Figure 4.



The screenshot shows a window titled 'Overall Change'. At the top, there is a dropdown menu with 'Close school: Consolidate sites' selected. Below the dropdown, the text 'Close school: Consolidate sites' is repeated. Underneath, the text 'Health Centre: Build Consolidated health centre at edge of town' is visible. A section titled 'General Consequences' contains a list of items: 'Extra', 'Further travel distances for some', 'Large numbers of pupils at one site', 'Loss of after-school activities at closed site', and 'Motivation'. A scrollbar is present on the right side of this list.

Figure 6: Selecting an ‘Overall Change’

Once an *Overall Change* has been selected, a list of *General Consequences* is displayed. Selecting an entry in the *General Consequences* list will either activate the *Benefit* and *Disbenefit* buttons at the bottom of the sheet or open up a list of further sub-consequences, the *Detailed Consequences* list, where these are hierarchical in nature. This hierarchy can be seen in Figure 4, where ‘further travel distances for some’ leads to a series of mode-specific consequences. This is shown in a drop down box format below in Figure 7.



The screenshot shows a window with three sections. The top section is 'Overall Change' with a dropdown menu showing 'Close school: Consolidate sites'. The middle section is 'General Consequences' with a list of items: 'Extra', 'Further travel distances for some', 'Large numbers of pupils at one site', 'Loss of after-school activities at closed site', and 'Motivation'. The bottom section is 'Detailed Consequences' with a list of items: 'Fewer walk or cycle', 'More go by car', and 'More go by bus/train'. At the bottom right of the window, there are two buttons: 'Benefits' and 'Disbenefits'.

Figure 7: Example of the *Detailed Consequences* list

If the *Detailed Consequences* list appears, then selecting an entry in this list will activate the *Benefits* and *Disbenefits* buttons, as shown in Figure 8.

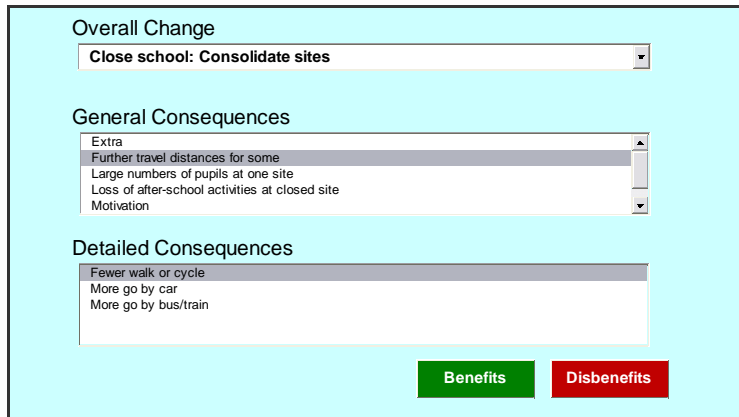


Figure 8: Initial sheet with the *Benefits* and *Disbenefits* buttons activated.

The Benefits and Disbenefits sheets

Clicking the *Benefits* button will take the spreadsheet user to a list of benefits associated with that specific consequence. Likewise, clicking the *Disbenefits* button will take the user to a list of disbenefits. If the *Benefits* button is pressed and there are no benefits the message box shown in Figure 9 is displayed. A similar message is displayed if there are no disbenefits for that particular consequence.



Figure 9: The *No Benefits* message box

Figure 10 shows the list of benefits that is displayed when the *Benefits* button is clicked, in the case of the policy change ‘school closure, consolidate sites’, after selecting “Motivation” in the *General Consequences* list.

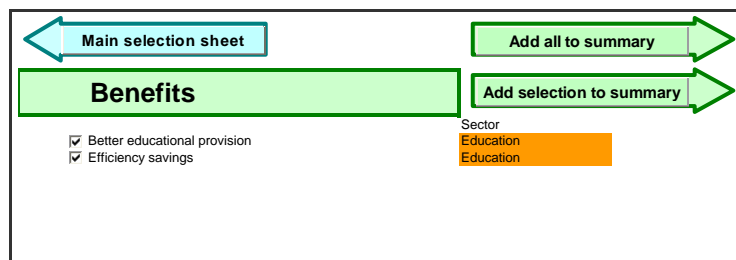


Figure 10: The *Benefits* sheet

All the potential benefits associated with the selected consequence are listed on the benefits sheet, along with the sector that will receive each benefit. The user can decide which benefits are likely to be applicable in their own situation, and then transfer them to

the summary sheet that builds up an overall list of benefits and disbenefits. The tick marks next to a benefit indicate that it has been selected and will be transferred when the *Add selection to summary button* is clicked. Initially all benefits are selected, and clicking on a tick box will then deselect that benefit.

Clicking the *Add all to summary* will add all the benefits to the summary sheet regardless of whether or not they are individually selected.

Figure 11 illustrates the *Disbenefits* sheet for the general consequence “Large numbers of pupils at one site”.

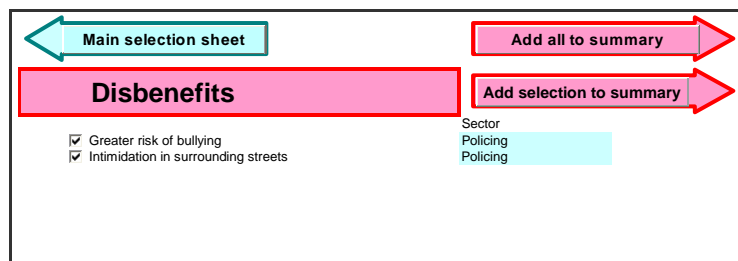


Figure 11: The *Disbenefits* sheet

Disbenefits are added to the summary sheet in the same way as benefits, as described above.

The Summary sheet

Figure 12 shows the *Summary* sheet. The sheet is displayed when any benefits or disbenefits are added, and builds up a record of the total picture as the exercise progresses.

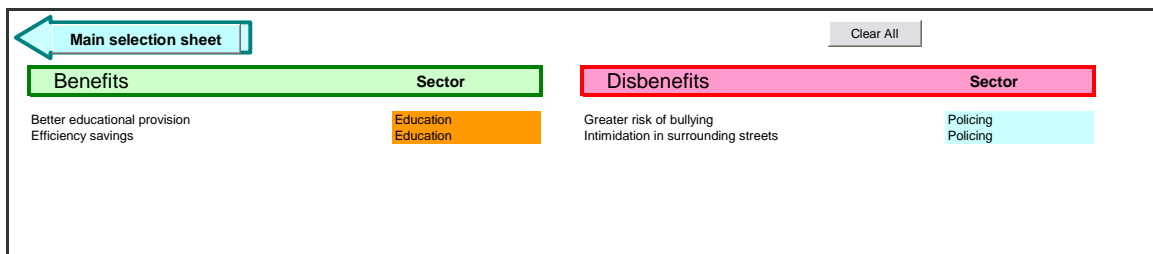


Figure 12: The *Summary* sheet

It can also be accessed directly by clicking its tab at the bottom of the main spreadsheet, as shown in Figure 13.

The Summary sheet can then be saved or printed, to provide a record of the full set of benefits and disbenefits that are expected to result, directly or indirectly, across all sectors from the service change planned by one sector.

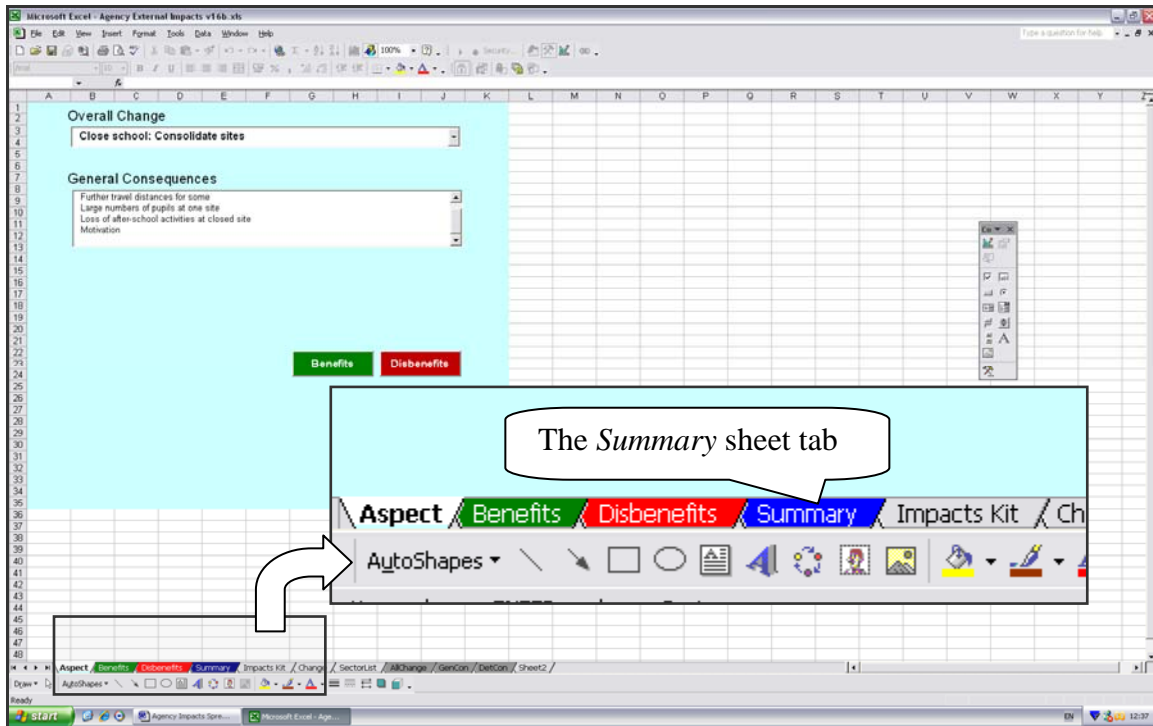


Figure 13: The location of the *Summary* sheet tab

7. Conclusion

This simple exploratory cross sector impacts spreadsheet tool has been developed in response to a need that was identified in the course of carrying out resident focus groups and a professional workshop in the Barnsley Dearne area of South Yorkshire. Here the lack of co-ordination and dialogue between different agencies was identified as resulting in serious problems for some groups of the population, either through agencies making incompatible demands on users (e.g. through the timing constraints of appointments), or cases where problems ‘fell in the cracks’ between responsibilities accepted by different agencies (e.g. late arrival at work or education).

It was recognised that a major opportunity to address cross agency problems particularly arose at times when an agency was planning to revise its patterns of service delivery. Were all relevant agencies to be involved at the earliest stages of project planning, then there were felt to be opportunities to modify proposals, at minimum cost, in order at worst to minimise external costs and, at best, to identify synergies that could result in ‘win-win’ outcomes for most or all of the affected agencies. It was felt that a simple tool would help those involved to think through potential impacts and possible amelioration measures.

A prototype version of the tool was presented to participants in a second professional workshop. They felt that it was a useful way of systematically exploring potential impacts, and a starting point for determining which stakeholder groups to involve in discussions at an early stage in the planning process.

References

- Department for Transport. (2004). *Transport Appraisal and the New Green Book*. TAG Unit 2.7.1.
- Department for Transport. (2006). *Measuring the Social and Distributional Impacts of Road Pricing Schemes*. TAG Unit 3.12.4.
- H M Treasury. (2003). *Appraisal and Evaluation in Central Government*. London: The Stationary Office.
- Hamer, L. (2004). "Pooling resources across sectors: a report for Local Strategic Partnerships". Health Development Agency, 2004.
- Hudson, B., Hardy, B., Henwood, M. and Wistow, G. (1999). "In pursuit of inter-agency collaboration in the public sector." *Public Management Review*, 1(2), 235-260.
- Huxham, C. and MacDonald, D. (1992). "Introducing collaborative advantage." *Management Decision*, 30(3), 50-56.
- Jones, P. and Paskins, J. (2008). "Distributional impacts of transport schemes: winners and losers of streetspace allocation exercises." DISTILLATE Report, CTS, UCL, March.
- Jones, P. and Thoreau, R. (2008). "Engaging with professional stakeholders in the Dearne Valley Area of South Yorkshire. Strategic problem identification and option generation: the case of Accessibility Planning." DISTILLATE Report, CTS, UCL, March.
- NERA (2004). "Evaluating the processes and impacts of integrated transport and the cross-sector benefits of improved accessibility, Phase 1." Final report to the Department for Transport, April 2004.
- Powell, M. and Exworthy, M. (2001). "Joined-up solutions to address health inequalities: analysing policy, process and resource streams." *Public Money and Management*, January – March 2001.
- Snell C. and Jones, P. (2007). "Accessibility problems in the Dearne: Experiences of some local residents and their suggestions for solutions. A case study for Developing Accessibility Planning Tools for Problem Identification and Option Generation." DISTILLATE Report, CTS, UCL, December.
- Upton, A. and Jones, P. (2007). "An overview of how the distributional impacts of transportation policy have been measured". DISTILLATE Report, CTS, UCL, February.

Appendix A: Editing the sector list

Open the *SectorList* sheet, see Figure A1, and add the sector name below the last current entry. To assign a colour to the sector, which will appear in the Benefits and Disbenefits sheets, and the *Impacts Kit* diagram, you must assign a number in the *ColourIndex* column. A full list of Colour index values and their associated colours is included on the sheet.


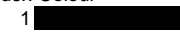








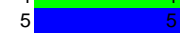



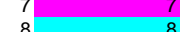





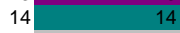





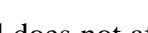
Sector Name	Colour	ColourIndex	Colour index	Colour	Unique colours
Education		45	1		
Policing		34	2		
Health		43	3		
Transport		44	4		
Economy/Society		22	5		
			6		
			7		
			8		
			9		
			10		
			11		
			12		
			13		
			14		
			15		

Figure A1: The *SectorList* sheet

The block of colour in the *Colour* column only acts as a reminder and does not affect the colour used for the sector elsewhere in the sheet. To change this colour elsewhere, use the 'paint tin' icon (Figure A2) or select *Cells* in the *Format* menu to open the *Format Cells* dialogue box and then click on the *Patterns* tab.



Figure A2: The 'paint tin' used to change the fill colour in a cell

Appendix B: Adding Policy Change information

All the information that is shown in the drop down menus on the Overall Change sheet (see Figure 6) sheet is taken from the *Change master* sheet, as shown in Figure B1.

Change	General Consequence	Detailed Consequence	Benefits	Benefit Agency	Disbenefits	Disbenefit Agency
Close school: Consolidate sites	Extra	Detailed 1	Benefit1	Extra Agency		
Close school: Consolidate sites	Extra	Detailed 2	Benefit2	Extra Agency		
Close school: Consolidate sites	Extra	Detailed 3	Benefit3	Extra Agency		
Close school: Consolidate sites	Extra	Detailed 4	Benefit4	Extra Agency		
Close school: Consolidate sites	Further travel distances for some	Fewer walk or cycle			Reduced physical exercise	Health
Close school: Consolidate sites	Further travel distances for some	More go by car			More traffic around school: congestion, accidents	Transport
Close school: Consolidate sites	Further travel distances for some	More go by bus/train			More pupils on buses: crowding, intimidation	Transport
Close school: Consolidate sites	Large numbers of pupils at one site				Greater risk of bullying	Policing
Close school: Consolidate sites	Large numbers of pupils at one site				Intimidation in surrounding streets	Policing
Close school: Consolidate sites	Loss of after-school activities at closed site				Fewer social/recreational activities	Policing
Close school: Consolidate sites	Loss of after-school activities at closed site				Greater anti-social behaviour	Policing
Close school: Consolidate sites	Motivation		Better educational provision	Education		
Close school: Consolidate sites	Motivation		Efficiency savings	Education		
Health Centre: Build Consolidated health centre at edge of town	Easier journey planning and parking by car				Increased car use	Transport
Health Centre: Build Consolidated health centre at edge of town	Easier journey planning and parking by car				More congestion	Transport
Health Centre: Build Consolidated health centre at edge of town	Easier journey planning and parking by car				More CO2 emissions	Transport
Health Centre: Build Consolidated health centre at edge of town	Located away from other market town facilities				Reduced economic vitality	Economy/Society
Health Centre: Build Consolidated health centre at edge of town	Located away from other market town facilities				Reduced social interaction	Economy/Society
Health Centre: Build Consolidated health centre at edge of town	Motivation		Better health care	Health		
Health Centre: Build Consolidated health centre at edge of town	Motivation		Efficiency savings	Health		
Health Centre: Build Consolidated health centre at edge of town	Reduced access by bus and on foot/cycle				Less walking/cycling	Transport
Health Centre: Build Consolidated health centre at edge of town	Reduced access by bus and on foot/cycle				More difficult bus journeys	Transport
Health Centre: Build Consolidated health centre at edge of town	Reduced access by bus and on foot/cycle				Interchange	Transport
Health Centre: Build Consolidated health centre at edge of town	Reduced access by bus and on foot/cycle				Reduced physical exercise	Health
Health Centre: Build Consolidated health centre at edge of town	Reduced access by bus and on foot/cycle				Less likely to book appointment	Health
Health Centre: Build Consolidated health centre at edge of town	Reduced access by bus and on foot/cycle				More 'no shows'	Health

Figure B1: The *Change* sheet

The *Change* sheet is accessed by clicking its tab at the bottom of the spreadsheet reproduced in Figure B2 (the location of the tabs is shown in Figure 13).

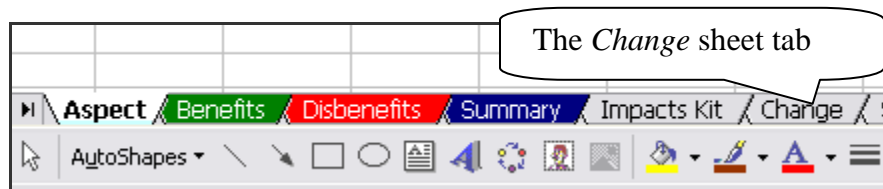


Figure B2: Location of the *Change* sheet

Entries are added manually. The ‘Change’ and ‘General Consequences’ columns must be filled in, along with either or both of the ‘Benefits’ and ‘Disbenefits’ columns. After making any changes the user must click the *Update List* button, to ensure that the changes are reflected in the drop down boxes on the first sheet.

Clicking the *Add new entry* button will open the *Change Details* dialogue box, shown in Figure B3. The *Change Details* dialogue box is used to add additional benefits or disbenefits. The user enters the specific policy change that the benefit or disbenefit relates to, along with the associated particular consequence, and detailed consequence if required – from the drop down menus.

The user can specify whether the consequence is the main motivation of the change by clicking the *Main Motivation* button. Each change should have at least one main motivation assigned to it. There is also a drop down box to choose the sector that the benefit or disbenefit relates to. Appendix A has described the process for editing the sector list.

The dialogue box uses a drop down box to simplify the process of adding information.

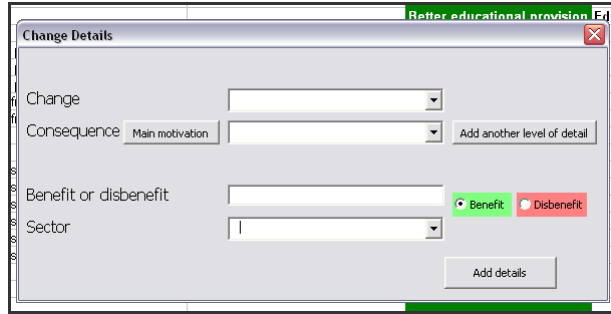


Figure B3: The *Change Details* dialogue box