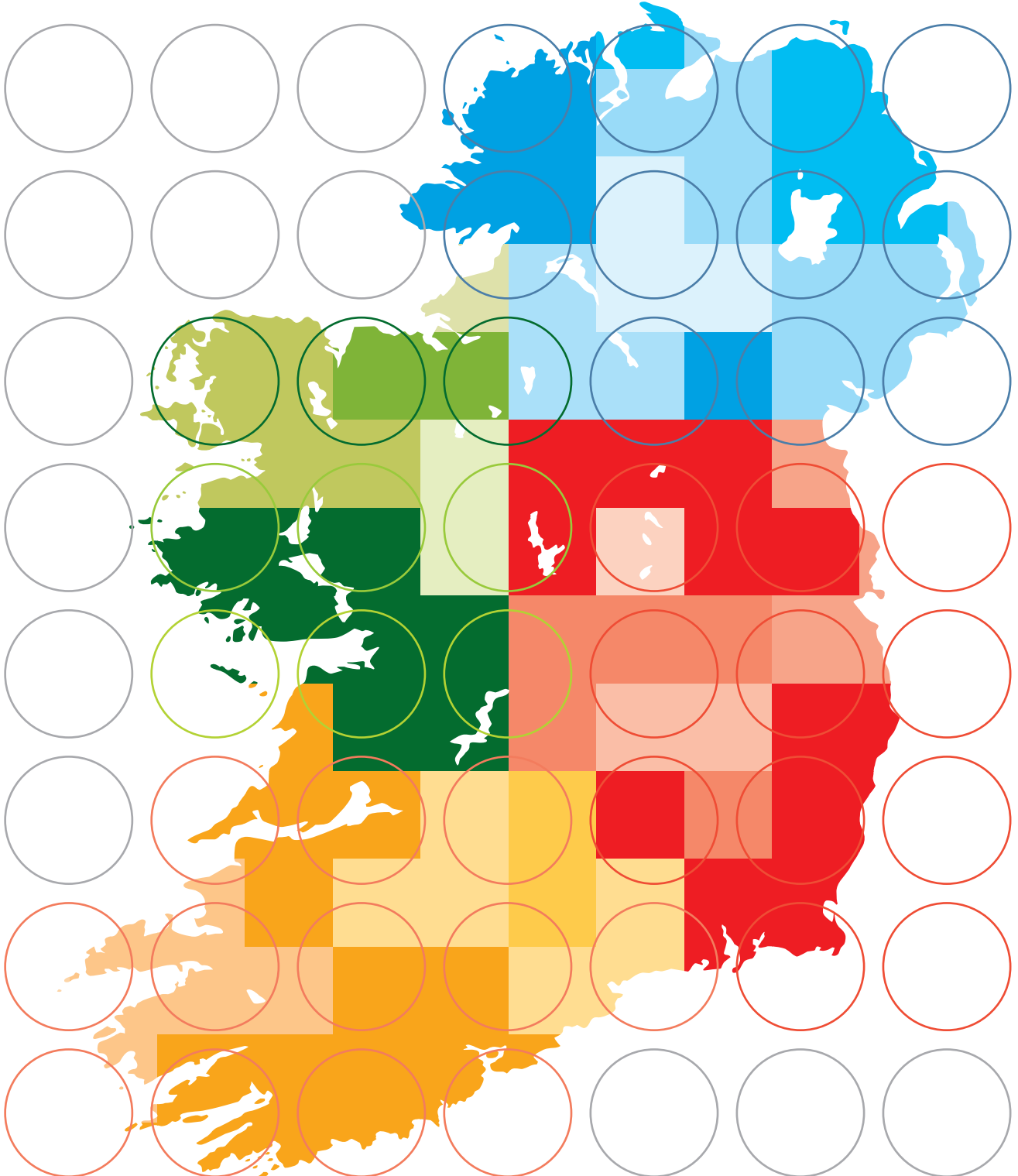


**Delineating Functional Territories across the Island of Ireland: An Initial Scoping**



Ireland's EU Structural Funds Programmes 2007 - 2013

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EUROPEAN REGIONAL DEVELOPMENT FUND



AN ROINN OIDEACHAIS AGUS EOLAIOCHTA | DEPARTMENT OF EDUCATION AND SCIENCE

**HEA**

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An tÚdarás um Ard-Oideachas

# Table of Contents

<b>Acknowledgements</b>	iii
<b>Authors &amp; Steering Committee</b>	iv
<b>Report Background</b>	1
<b>Introduction</b>	2
<b>Section 1</b>	
Phase I: Exploratory Functional Territory Research	6
<b>Section 2</b>	
Phase II: Proposed Next Steps	37
<b>References</b>	40
<b>Appendix I: The ICLRD</b>	42

This research on delineating functional territories has been undertaken as part of the International Centre for Local and Regional Development's (ICLRD) 2009/10 work programme. Funded by the Higher Education Authority (HEA), this scoping exercise explores the various options for mapping functional territories; for example, natural catchments, travel-to-work catchments, origin-destination, gravity models and urban functional specialisation. This study brings together a multi-disciplinary research team drawn from three academic and research organisations with an interest in spatial scale, data and regional development.

## **Acknowledgements**

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**Delineating Functional  
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Main Report

This report summarises the progress made by the International Centre for Local and Regional Development (ICLRD) research team on delineating functional territories in the Irish space economy during Phase I of this project; carried out between August 2009 and June 2010 (see Appendix I for further details on the ICLRD). The main focus of Phase I was to explore the various possibilities of mapping functional territories and to produce a set of outputs based on datasets that are available to the research team. Considerable progress has been made in many areas of the project and a completed set of outputs have been produced. There are, however, some areas of the project that require additional research and resources to further develop the progress that has been made to date.

Following the completion of an Interim Report and a presentation of initial maps produced to the ICLRD Steering Committee on 8 July 2009, the research team made significant progress on a number of areas of the project. This included producing, for the first time, a series of 'output maps' detailing functional territories both in the Republic of Ireland (RoI) and on an All-Island (A-I) basis; depending on the data source. Emphasis was also placed on developing an outline for Phase II of the project – this would outline the required next steps and enable the development of a more sophisticated, policy relevant and applied set of outputs.

This report will summarise the progress made in Phase I and also outline the proposed next steps for Phase II of the project.

The content of this Phase I report is as follows:

1. Introduction: Mapping the Irish Space Economy
2. Phase I: Exploratory functional territory research
3. Phase II: Proposed next steps

## Introduction: Mapping the Irish Space Economy

At the scale of individual states and regions, urban settlement patterns and economic structures are in large part a consequence of historical and economic development, and this is the case in Ireland, North and South, as much as anywhere else. However, as explained by Manuel Castells (1996) and others, the advent of the network society and economy, together with the evolving processes of globalisation and Europeanisation, has transformed the nature and roles of cities and towns in contemporary urban systems. The increasing connections and interactions between places, regardless of official borders, means that the traditional way of seeing cities and towns need to be augmented by a network approach, which assesses the functionality of individual urban centres within a network of cities. Thus, in place of a traditional geography of cities and their surrounding rural hinterlands, it is necessary to view both urban and rural regions in terms of a complex set of evolving relationships between rural areas, urban centres and the global economy. The concept of 'functional territories' can provide a useful tool to make sense of some of these relationships.

It has long been recognised at a European level, that territorial cooperation across political and administrative boundaries can help reduce social and economic disparities and improve cross-cultural dialogue and understanding. The *Europe 2000+* report published by the European Commission in the early 1990s explicitly adopted functional rather than administrative regions as the focus for analysis, in an effort to 'encourage new ways of thinking about spatial prospects which is not limited by national boundaries' (CEC, 1994: 169). The report, further stressed that the particular functional regions identified in the report were only one possible division of the European territory and were not intended to provide a basis for future policy action. The intention was not to create new territorial spaces or 'European super regions' but to identify functional linkages across territorial boundaries. Subsequent European spatial planning policy initiatives have maintained this focus on functional spaces. For example, the *European Spatial Development Perspective* (ESDP) makes strong reference to the concepts of urban-rural relations and polycentric urban regions, both of which, in turn, emphasise functional relationships across space rather than territorial divisions (CEC, 1999).

Indeed, the ESDP sought to introduce a spatial dimension to EU policy which may be viewed as part of a wider process of European integration or Europeanisation, centrally concerned with the dismantling or harmonisation of socio-cultural, as well as territorial, boundaries. The more recent *Territorial Agenda of the European Union* further emphasises the importance of 'connectivity' and urban-rural partnerships in overcoming the challenges associated with the concentration of economic development in the larger urban centres (Territorial Agenda 2007, see also ESPON<sup>1</sup> 2010). Perhaps more significantly, the Barca Report on the future of cohesion policy serves to position a 'place-based approach' at the forefront of the EU policy agenda (Barca, 2009). Reflecting the enhanced status of 'territorial cohesion' in the Lisbon Treaty, The Fifth Cohesion Report of the European Commission places renewed emphasis on the spatial dimensions of social and economic

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<sup>1</sup> European Observation Network for Territorial Development and Cohesion

disparities and highlights the contribution of territorial cooperation at sub-national, cross-border and transnational levels to reducing such disparities (CEC, 2010).

In the context of the island of Ireland, administrative boundaries do not always coincide with patterns of economic and social activity 'on the ground'; and as a result, administrative areas can become divorced from the functions of towns and cities. This, in turn, can lead to inefficient planning and the duplication of services, particularly on an inter-county (and inter-jurisdictional) basis. The notion of 'functional areas', as promoted by the EU, has formed part of the policy debate across the island of Ireland since the publication of the ESDP, and the subsequent emphasis placed by member states on producing their individual spatial strategies at a national and / or regional level.

In Northern Ireland, the *Regional Development Strategy (RDS)*, published in 2001, considers the role of multi-functional spaces such as hubs, corridors and gateways in achieving balanced development; for example in the areas of retail, service provision and leisure and cultural activities, and serving both rural and urban communities. In this way, the strategic vision for each area becomes an integral part of the wider region's development and growth. The current review of the RDS may, when completed, provide more clarity in relation to functional territories in Northern Ireland. Turning our attention towards the Republic of Ireland, the initial scoping documents for the *National Spatial Strategy (NSS)* referenced functional areas; suggesting that spatial trends and patterns of activity and development can be seen in terms of distinct areas that tend to share common characteristics and issues. This would include, for example, where people live, and their working, schooling, shopping and leisure lives – characteristics with which many can identify. In addition, with the cessation of violence in Northern Ireland, such identification has also begun (again) to span the border between the Republic of Ireland and Northern Ireland (DELG, 2001). The theme of 'functional areas' made up almost 46% of the submissions received during the consultation phase on the preparation of the NSS in 2001 (Department of An Taoiseach, 2002); some in support while others expressed reservations on the usefulness of the concept of 'functional areas'. It is no small surprise, therefore, that given the interest expressed in wanting to understand the relationships between places, the resulting national-level strategy contains a number of inter-related central concepts, namely: Potentiality, Critical Mass, and Gateways and Linkages.

The NSS itself, published in 2002, recognises strong functional interrelationships between places and sub-regions; and encourages the nurturing of these relations. It calls for targeted growth and investment along clear spatial lines; with the full potential of each region to be harnessed in meeting the objectives of balanced regional development. The Regional Planning Guidelines (RPGs), adopted in 2004 by each of the eight Regional Authorities, have been instrumental in applying the NSS vision at this sub-national scale. And interestingly, in some cases, the functional territories of the identified Gateways and Hubs can, and do, cross official regional boundaries.

The recently published *NSS Update and Outlook (2010)*, in recognising the sprawl and inappropriate location for quite significant amounts of development, both residential and commercial, calls for clear and coordinated investment in the already agreed-upon Gateways and Hubs and "greater operational integration in the implementation of the two spatial strategies...through better sharing



of data and consultation and co-operation in developing both statutory and non-statutory plans” (DoEHLG, 2010: 6). To this end, special emphasis is being placed on locations such as Letterkenny-(London)Derry and Dundalk-Newry as drivers for sub-regional development and cross-border collaboration.

In early 2010, the impact of Gateways in terms of their functional areas was further elaborated on by Forfás, the Irish national policy advisory body for enterprise and science. The report highlights the governance challenges associated with the Gateways and argues that although their functional areas often span a number of administrative boundaries it is necessary that one single body assumes a strategic leadership role in each case. The report notes that particular incentives for collaborative action or alternatively, boundary revisions, may be needed in order to ensure strategic leadership at the local level (Forfás, 2010).

It is evident that further research is required in order to delineate the functional areas of each of the Gateways and, in particular, to identify areas where the strategic potential and spatial reach of the Gateways may be enhanced through cooperation among neighbouring local and regional authorities. In the cross-border context, there may be significant areas where functional interactions across the border are currently poorly developed but could be enhanced through strategic policy initiatives.

While the various framework documents for both jurisdictions speak of functional areas / territories, they do not clearly specify their boundaries – so as with spatial planning approaches elsewhere in the U.K., for example (Haughton et al, 2009), functional territories across the island of Ireland tend to be characterised by ‘fuzzy boundaries’. Although it may be difficult and in some cases counterproductive to precisely define the outer limits of particular functional territories, it is necessary that our understanding of functional territories is informed by a substantive evidence base.

It is increasingly important to know how the island of Ireland fits into a transforming economic world context that is defined by rapid globalisation and the intensifying process of European integration. This project focuses on the nature and function of urban areas in the Irish and Northern Irish economic systems, with a view to situating the island of Ireland within the European urban economic system. To achieve this aim, it is necessary to go beyond the traditional approach of describing the urban systems which have tended simply to provide an account of the distribution and size of towns along with an inventory of their main functions. The requirements of the new comparative economics and geography of urban analysis entails a more detailed and in-depth account of the labour dynamics and economic performance of urban centres along with details of the processes (including trade and labour markets, together with commuting and other interactions) which connect them to their own regions and other city-regions. It is in this sense that the ‘functional urban areas’ (FUAs) approach is distinguished from the ‘morphological urban areas’ (MUAs) approach which is concerned predominantly with the physical footprint and design of urban areas. The FUA approach identifies distributions and densities of functions across space and scales regardless of administrative borders and highlights the degree of clustering or dispersal of urban activities across the landscape of mutating economic and urban networks. The FUA data is a core element of the scenario models being developed by ESPON to enable policy makers and

practitioners to assess the impacts of prospective actions on cohesion and competitiveness at the European scale. This macro-mapping, analysis and modelling by ESPON needs to be replicated across the island of Ireland at state and regional levels: (a) as a potential check on the top-down application of EU-scale results to the island; and (b) to provide an informed bottom-up means to represent Irish and Northern Irish interests and inputs when EU policy is being formulated. Detailed, locally informed comparative information is necessary both to check the validity and accuracy of the generalised European results as they apply to the island of Ireland and as a bottom-up means to inform both strategy and tactical interventions in contributions to EU policy and actions.

By (a) addressing the deficiencies of statistical tools in relation to the measurement of urban functionality across the island of Ireland, and (b) undertaking a preliminary FUA analysis of the Irish / Northern Irish urban systems, this study illustrates the contribution that dynamic spatial analysis of urban functions can make to describing the relational status, performance and potential of urban centres across the island. It highlights the utility and potential of the evidence that can be harnessed to support effective spatial and economic planning by:

1. Identifying urban areas as the basis for policy in relation to options for appropriate degrees of monocentric and polycentric urban development strategy, and
2. Demonstrating the scope for rigorous analysis of urban function and their impacts across official boundaries and different scales.

Finally, this basic account of the urban systems on the island of Ireland is the initial step required to provide the basis for a more detailed and integrated description of the urban economy of the island as a whole. It also provides a first step to exploring the degree to which urban and economic strategy aligns with the development aims of the EU in terms of competitiveness and cohesion. The disaggregated preliminary information produced for the island of Ireland in this report can be augmented and combined to provide (a) more sophisticated indicators of comparative performance with EU benchmarks, and (b) inputs to a scenario modelling for assessing the potential impacts of pursuing alternative policy options. If developed, a fuller FUA can provide an essential platform for informed policy formulation and decision-making for both spatial planning and infrastructure investment on the island of Ireland.

The following section on Phase I summarises the progress made to date by the ICLRD research team on delineating functional urban areas in the Irish space economy (and it is acknowledged that further research must be undertaken to consider the application of the functional territories concept to rural areas which do not fall within the catchments of the Gateways and Hubs). Section II will detail the proposed research agenda for Phase II of the project.

## Section 1

### Phase I: Exploratory functional territory research

The main focus of Phase I was to explore the various possibilities of mapping functional territories within the Irish space economy and to produce a set of outputs based on datasets that are available to the research team. The approach taken during this phase was primarily exploratory with an emphasis placed on developing a wide series of different types of functional territories and catchments, and also ensuring that maximum benefit was gained from interrogating and analysing the available data.

Much progress has been made during this phase and the research team has developed a number of completed and stand alone outputs that provide a better understanding of the basic functional territories in place across the island (travel to work, natural catchments, house-price, access to services etc). This exploratory research phase has also seen the initial steps taken on a number of more sophisticated mapping techniques aimed at delineating functional territories (Exploratory Spatial Data Analysis of Population Accessibility, A-I Gravity Models).

This section will outline the progress made to date on the following themes:

1. Natural Catchments (Gateways and Hubs)
2. Network Travel Catchments
3. Service Infrastructure Accessibility
4. Origin-Destination Employment Data
  - a. Urban Functional Specialisation
  - b. Delineation of Central Place Service Hinterlands
  - c. Developing All-Island Travel to Work Catchments
  - d. Cross Border Traffic Flows
5. Exploratory Spatial Data Analysis of Population Accessibility
6. 'Natural Catchment' Gravity Model Catchments
  - a. Republic of Ireland
  - b. All Island
7. House Price Mapping

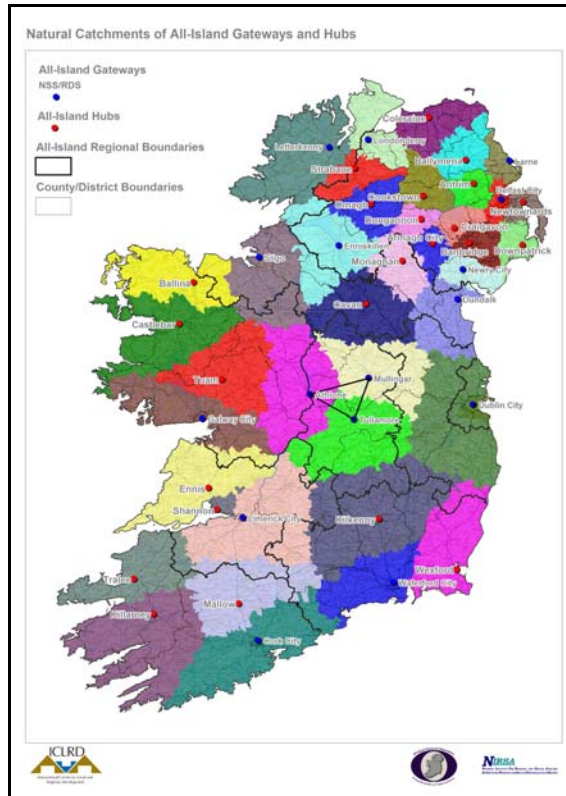
## 1. Natural Catchments (Gateways and Hubs)

A series of maps have been developed to show the natural catchment or 'potential catchment' of Gateways and Hubs in both the Republic of Ireland (RoI) and Northern Ireland (NI). Using a transport network dataset it was possible to allocate each origin geography, EDs (RoI) and Output Areas (NI), to their closest Gateway or Hub. This approach recognises that the natural catchment of places extend beyond political and local government boundaries and also highlights that some residents close to the Irish border may find Gateway/Hubs in the other jurisdiction more accessible than their nearest Gateway/Hub of comparable status.

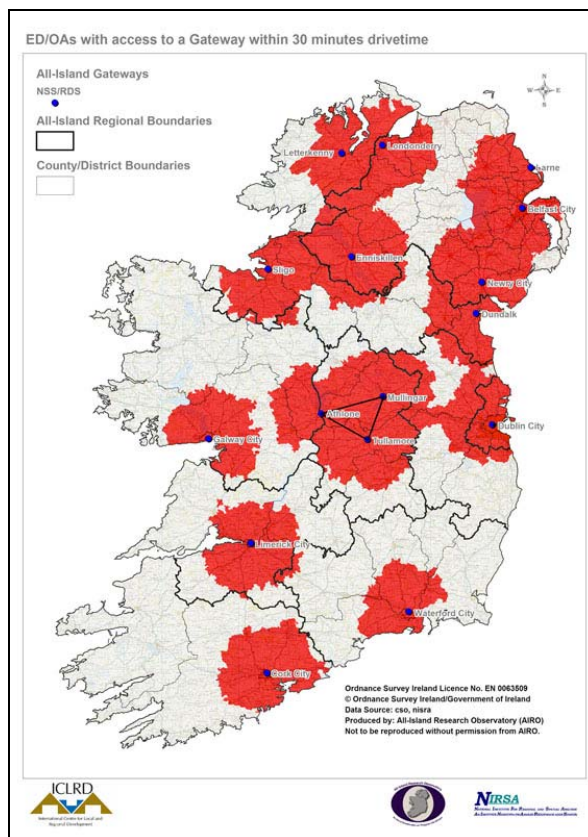
A number of maps have been created to show the relationship between the origin geographies (ED's, OA's) and the Gateways and Hubs across the island. Map 2.1, for example, details the natural catchments of Gateway towns on the Island while Map 2.2 details the catchments to a combined grouping of Gateways and Hubs. Map 2.3 details areas on the island that are within a 30 minute drive-time of a Gateway.



**Map 1.1: Natural Catchments of All-Island Gateways**



**Map 1.2: Natural Catchments of All-Island Gateways and Hubs**



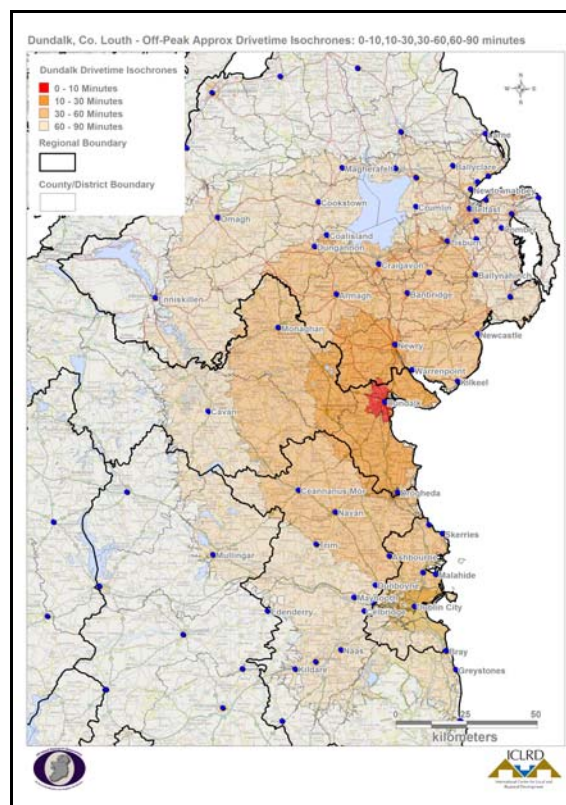
**Map 1.3: Access to a Gateway within 30 minute drive-time**

## 2. Network Travel Catchments

Following the initial analysis of 'natural catchments' to Gateways and Hubs, a series of drive-time catchments were then created for all towns, across the island of Ireland, with a population greater than 500 people. The catchments are based on an analysis of travel times across the road network. Catchments have been created for 585 towns (401 in the RoI and 184 in NI).

Using ARCGIS Network Analyst software a network dataset was developed based on a digital transport infrastructure across the Island. Each town was linked to an arc on the dataset. Once in place it was possible to generate drive-time catchments to each town. Each catchment is represented by a mapped image that depicts the drive-time catchment to a particular town in four different time bands; 0-10 minutes, 10-30 minutes, 30-60 minutes and 60-90 minutes. The mapped output is accompanied by a detailed census profile for each time band.

All of the results of this analysis are available on the All-Island Research Observatory website ([www.airo.ie](http://www.airo.ie)).



**Map 2.1: Network Travel Catchment to Dundalk, 10, 30, 60 and 90 minute bands**

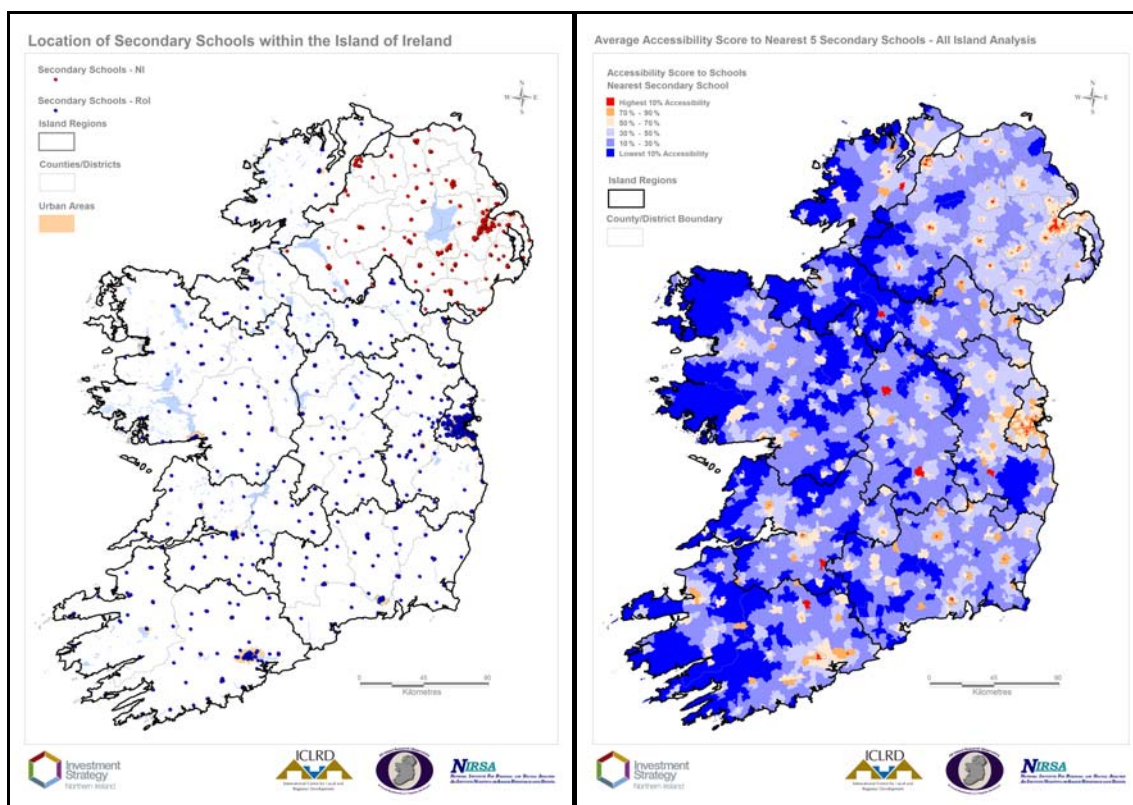
## 3. Service Infrastructure Accessibility

As part of a wider research project, ICLRD has been involved in conducting the first in-depth spatial analysis of community accessibility to public services in Northern Ireland. The datasets collated and methodologies developed for this exercise have also being applied by ICLRD to services in the South -

and useful evidence is beginning to emerge that should help the policy development community in both jurisdictions.

The sourcing and development of spatially encoded datasets of strategic public infrastructure for both Northern Ireland and the Republic of Ireland initially allowed for a basic mapping of the specific services. Although this procedure was not sophisticated it was still extremely useful to map the distribution of the infrastructure for Northern Ireland and on an A-I basis. It is believed that this is the first time the distribution of services such as medical GP's, schools, transport hubs have been mapped across the Island of Ireland.

To develop a measure of accessibility to the current service infrastructure ('supply') it was necessary to incorporate the underlying population base ('demand') into the analysis. This can be done using a number of sources depending on the scale of the analysis and also on the availability of existing and accurate 'demand' surfaces within the study area. This choice is linked to the accessibility methodology being undertaken, numerous different measurements of accessibility can be calculated such as Container, Coverage, Minimum Distance, Travel Cost and Gravity approaches. For the purposes of this initial research undertaken by ICLRD, it was decided to concentrate on the Minimum Distance and a Travel Cost methodology to a selected number of services.

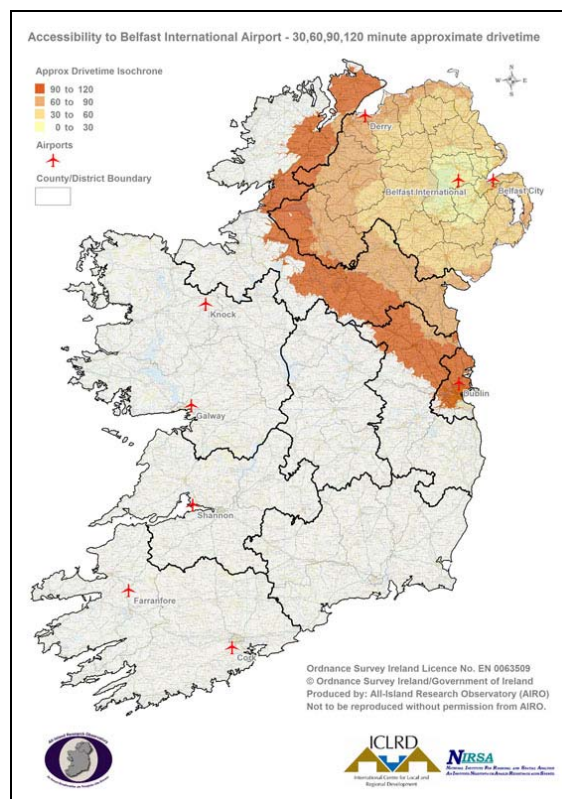


**Map 3.1: Location of Secondary Schools and Average Accessibility to Nearest 5 Secondary Schools**

The research project was conducted in two phases. The initial phase sourced and gathered the highlighted datasets for both Northern Ireland and the Republic of Ireland. The second phase

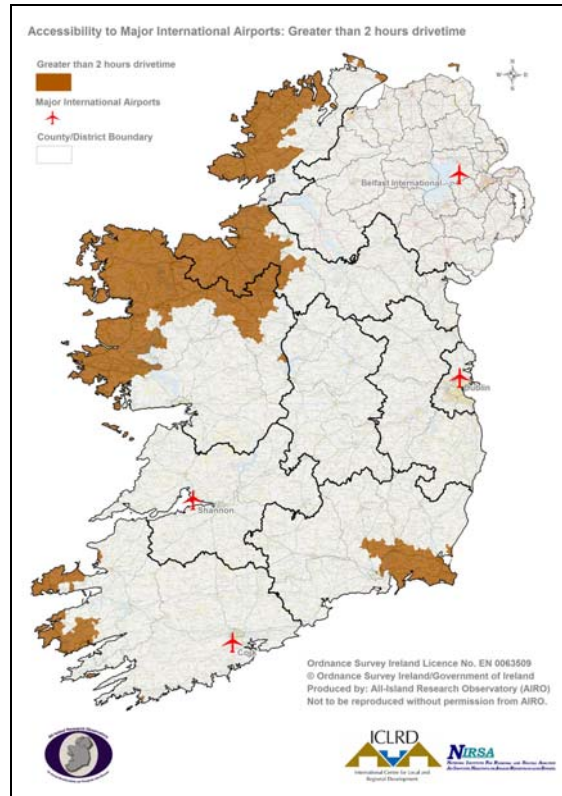
involved the use of a GIS to undertake a detailed spatial analysis of the collected data. The output of this stage was a series of maps representing both the spatial distribution of services and also mapped accessibility to services.

As a follow on to this piece of work the research team focussed on analysing access to key strategic transport infrastructure such as airports, train stations, bus stations and motorway junctions. Developing a baseline of current access to such services will prove to be useful in monitoring the development and improvement of access levels through the current and subsequent national development plans. To date an analysis has been undertaken on the nine principal airports across the island (Belfast International Airport, Belfast City Airport, Derry City Airport, Dublin Airport, Cork City Airport, Shannon Airport, Galway Airport, Knock Airport and Farranfore Airport). Map 3.2 details the patterns of accessibility to Belfast International Airport for a number of different drive-time bands (0-30 minutes, 30-60 minutes, 60-90 minutes and 90-120 minutes). An analysis has also been undertaken to delineate areas across the island that are not within a two hours drive-time of the principal international airports (Belfast International, Dublin, Shannon and Cork). Map 3.3 details that the majority of the island, with the exception of the north western seaboard and parts of Kerry and the south-east, is within a two hour drive of an international airport.



**Map 3.2: Accessibility to Belfast International Airport**





**Map 3.3: Accessibility to Major International Airports – greater than 2 hour drivetime**

#### 4. Origin-Destination Employment Data

Until now, research in area of origin-destination employment flows in the Republic of Ireland has been hindered by the lack of appropriate and reliable data on urban employment profiles. The Census of Industrial Production and Annual Services Enquiry are not sufficiently disaggregated geographically, while the Census of Population (CoP) - which has been the most widely used source - suffers from a lack of detail in the industrial classification. More significantly, the CoP classifies workers by place of residence rather than by place of work, a feature that became more problematical for urban economic base studies as commuting volumes and distances increased rapidly in recent years, resulting in a growing disjuncture between the geographies of jobs and of workers' residences. However, data availability has been transformed with the development of the Place of Work Census of Anonymised Records (POWCAR), based on origin and destination questions in the 2006 population census.

## POWCAR Inter-urban Commuting Matrix

Cities and Counties - Place of work (POWCAR)				1	2	3	4	5
	Index	Name of city / county	POWCARID	GDA	Cork City	Limerick City	Galway City	Waterford City
OUTERLAND ▼▼ (Persons living in (Non)Urban_Cluster {})	1	Greater Dublin Area	8299	350,519	130	80	13	46
	2	Cork City	3799	398	84,467	82	18	48
	3	Limerick City	2699	465	110	10,003	58	14
	4	Galway City	2699	107	15	24	21,828	2
	5	Waterford City	2499	135	21	4	2	14,163
Towns 10,000 and over	6	Drogheda	9307	2,544	4	3	1	3
	7	Durham	9308	703	1	3	2	3
	8	Drogheda	9414	7,328	4	1	2	4
	9	Clay	5505	4,362	2	1	0	1
	10	Fleming (An Uacht)	9116	2,254	5	5	1	3
	11	Ennis	9804	60	17	530	44	1
	12	Trillick	9925	30	28	22	1	3
	13	Kiloweney	8709	399	16	7	2	124
	14	Carlew	9903	447	2	5	2	18
	15	Fleas	8815	2,214	3	7	0	2
	16	Sligo	3704	41	2	3	7	1
	17	Drachead Naa	8819	1,428	4	3	1	2
	18	Mulling	3311	909	3	1	3	3
	19	Ward	9418	77	4	1	2	52
	20	Lifford	3317	35	0	2	4	3
	21	Athlone	5301	921	1	3	15	3
	22	Colbidge	9907	3,488	3	1	2	1

**Table 4.1: The POWCAR Matrix which is used to identify inter-urban commuting patterns as a base for delineating functional regions in the Republic of Ireland. A similar matrix is required for Northern Ireland to facilitate the production of all island functional territories maps.**

This new database facilitates new approaches to the classification and analysis of Irish towns in terms of their occupational and functional make-ups. The research in this report classifies Irish towns in terms of daily movements in and out of commuters, thus facilitating the identification of primarily dormitory and primarily “stand-alone” centres whose economic base is internal. It then analyses the latter towns in terms of their functional configurations (based on occupational data) and generates estimates of employment in a number of key sectors, such as local government, health, education, retailing, financial services, hotels & catering, personal services, and manufacturing. Employment in central place services is related to urban hinterland size, identified with the assistance of commuting data, and adjusted for spatial variations in average disposable income. Estimates are also made of the split between central place services and basic services (especially manufacturing). The findings of the analysis provide a range of new insights into the structure of the Irish urban system.

### 4(a) Urban Functional Specialisation

Past analyses of the Irish urban system have tended to use population size as a proxy measure of economic size, in terms of the range and depth of economic functions performed by towns. However, the growth of interurban commuting has created a growing disconnect between population size and the economic base of towns. For example, in 2006, Youghal had three times the population of Cashel, but the same level of local employment, while Nenagh and New Ross had almost the same populations, but there were almost twice as many people employed in Nenagh as

there were in new Ross (see Table 4.1). Our analysis therefore uses employment as the measure of town size, and focuses on those towns where at least 1500 people were employed in 2006 and which were not primarily dormitory towns. Excluding Dublin and the main regional centres, a total of 67 towns were included in our analysis.

**Table 4.1: Employment configuration of selected towns**

	Pop 2006	Employed in Town	% of residents in employment	Residents working in town	Residents working elsewhere	Incoming workers
Cashel	2,338	1,802	39.2	536 (58.5%)	380	1,266
Youghal	6,785	1,830	29.5	1,111 (55.4%)	893	719
Nenagh	7,751	4,732	35.6	1,701 (61.6%)	1,059	3,031
New Ross	7,709	2,543	31.0	1,000 (41.9%)	1,389	1,543

Table 4.2 shows a remarkable uniformity in the distribution of the urban workforce among broad economic sectors across different town size categories. While one might have expected the larger towns to have a higher concentration of employment in Professional & Business Services and Banking, Finance & Real Estate, there is no evidence of this here.

**Table 4.2: Urban Sectoral Profile**

Sector	Town Size (Employment)					All towns
	1500 <1999	2000 <2999	3000 <4999	5000 <9000	9000+	
Retailing/Wholesaling	20.8	22.2	20.7	20.6	19.4	20.5
Manufacturing	14.8	12.9	12.5	11.8	13.5	12.9
Hotels/Catering/Recreation	10.4	9.2	9.4	10.0	9.0	9.5
Medical Services/Social Wk	10.5	8.3	8.8	8.8	8.4	8.8
Education	8.9	11.0	7.3	7.5	8.1	8.3
Public Admin/Defense	4.6	5.4	9.8	9.0	7.8	7.8
Hospitals	5.4	2.8	8.2	8.3	9.9	7.7
Prof/Business Services	6.1	7.5	6.5	6.6	7.4	6.9
Banking/Finance/Real Estate	4.5	5.6	4.3	4.6	4.8	4.8
Transport/Communications	3.0	3.9	2.8	3.4	3.5	3.4
Other	10.9	11.2	9.6	9.4	8.1	9.4

In fact, the only sectors where a town size influence is apparent are Hospitals and Public Administration/Defence, which are disproportionately under-represented in the two smallest size

categories. Of course, there may be internal variations in the configuration of individual sectors across size categories; further research is required in this area.

The broad similarities across size categories in the sectoral distribution of employment mask significant differences between individual towns in their sectoral configurations. Although there has also been a tendency in past analyses to assume that towns with similar populations have a similar range of functions, in fact there is a high level of specialisation in evidence in the component of the Irish urban system under review here. Table 4.3 shows, for the different economic sectors, the number of towns whose share of a particular sector is either below 50%, or above 150%, of the overall average for that sector across the 67 towns included in this study. It is clear that the main differentiators between towns in terms of their economic configuration are Manufacturing, Public Administration/Defence and Hospitals. In these sectors, the location of factories, hospitals, local government offices, decentralised national government offices and army barracks are a matter of administrative fiat which may have little to do with the broader socio-economic characteristics of the selected locations, whereas, for the most part, the distribution of private services reflects the geography of demand. However, even here there is a growing incidence of exceptions, due to the increasing significance of private services in foreign investment inflows and the increasing tendency to locate projects in this sector in provincial urban locations.

In all, forty different towns possessed at least one sector whose share of the town's employment was more than 50% above the average share for all 67 towns. Many towns possessed a single stand-out sector, while some exceeded the 50% threshold for two and even three sectors simultaneously. Such specialisation may indicate a degree of complementarity between neighbouring towns, and indeed preliminary perusal of the data does point to this phenomenon. Thus, we find that Castlebar in County Mayo is strong in Manufacturing, Hospitals and Medical Services/Social Workers but relatively weak in Retailing, Financial and Professional/Business Services while its near neighbour Ballina is strong in Retailing and Financial and Business Services but weak in Hospitals, indicating a significant degree of complementarity between the two. The other major town in that part of Mayo, Westport, by contrast, is strong in manufacturing and tourism, but weak in terms of most central place functions. There would appear to be good reason, therefore, to treat the area embraced by these three towns as a single polycentric region for planning purposes, rather than as three separate urban hinterlands.

In a further exercise designed to detect spatial patterns in the incidence of specialisation, we have mapped the location quotients for the different economic sectors, and present the most interesting of these here. Thus, we tend to find the towns with the strongest specialisation in Education in the east and southeast (Map 4.1), those with a specialisation in Professional/Business Services are mainly found in the east (Map 4.2), we see the importance of Manufacturing to a number of the smallest towns (Map 4.3), what little specialisation there is in Retailing is found mostly in the southeast (Map 4.4), and we see the importance of Public Administration/Defence as an anchor sector for many towns in the midlands, which tend to be relatively weak in most of the other sectors (Map 4.5).

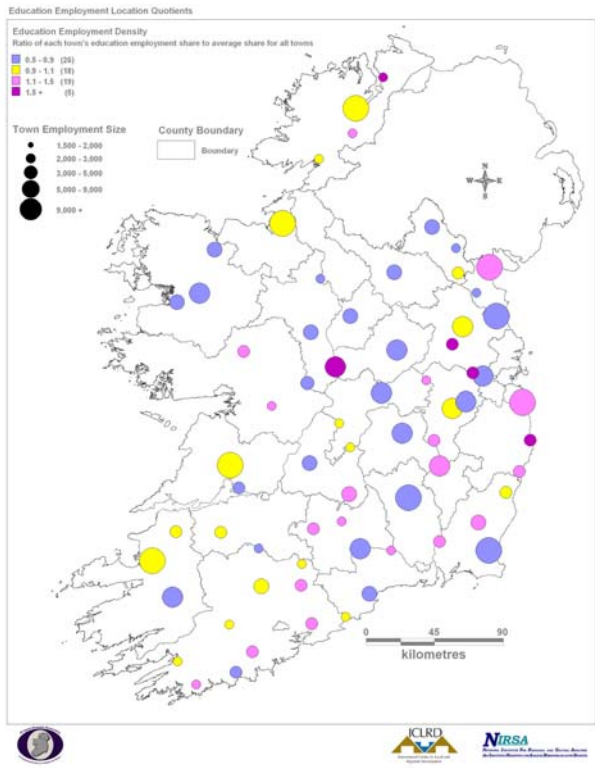
**Table 4.3: Level of Specialisation/non-specialisation in Irish towns (N=67)**

Sector	No. of towns below 50% of average share	No. of towns above 150% of average share
Retailing and Wholesaling	0	0
Manufacturing	12	11
Hotels, Catering, Recreation	0	4
Medical Services/Social Work	1	2
Education	0	4
Public Administration/Defense	16	8
Hospitals	31	13
Professional/Business Services	1	2
Banking, Finance, Real Estate	0	5
Transport/Communications	3	3

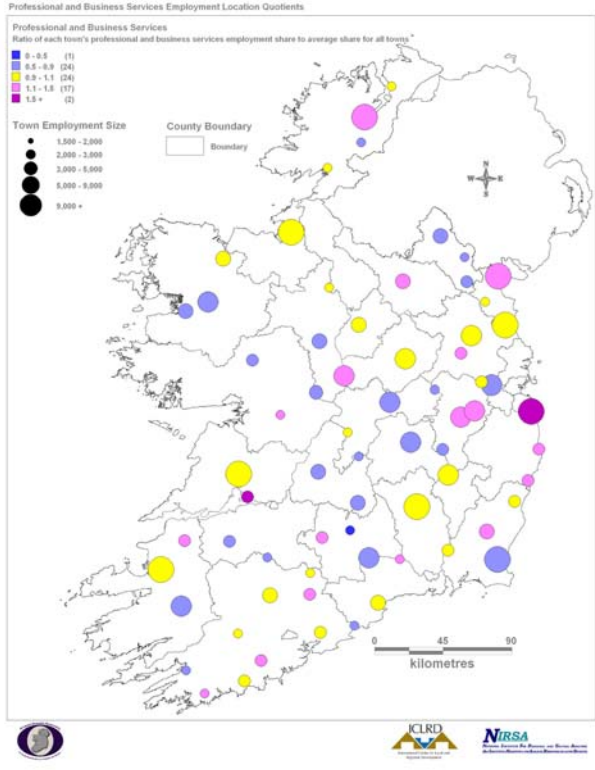
Specialisation, of course, indicates functions whose markets extend beyond the immediate service hinterlands of the towns in question, and may extend to the international level. The fact that the economies of Irish towns may include export activities in addition to central place functions has sometimes been overlooked by Irish urban analysts. This is apparent in a major study of the Irish urban system which was produced as a background document for the *National Spatial Strategy* (NSS). In this document, entitled *The Irish urban system and its dynamics*, prepared in 2000 by Brady Shipman Martin in association with Fitzpatrick Associates and personnel from NUI Maynooth, it is stated that

“A[n urban] function is defined as a specific activity or service provided in an urban centre, serving the resident population and the population of the centre’s hinterland” (2000: 29).

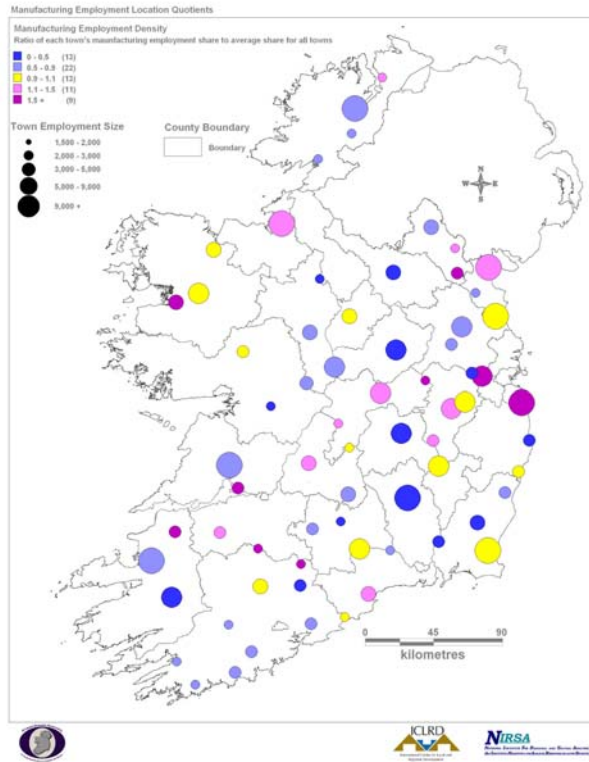
This ignores most manufacturing activity which, as we have seen, is the second most important economic activity in Irish towns and which, for the most part, sells its products outside the local hinterlands of these towns. It also ignores a growing range of service activities, embracing not only tourism but also decentralised government offices, back offices of private companies and other, mainly information-based, services provided from remote locations. Exploratory analysis using location quotients as a means of identifying export-oriented employment suggests that, on average, some 20% of employment in the study towns is engaged in export activities, with the proportion reaching 40% in the case of Shannon and Westport.



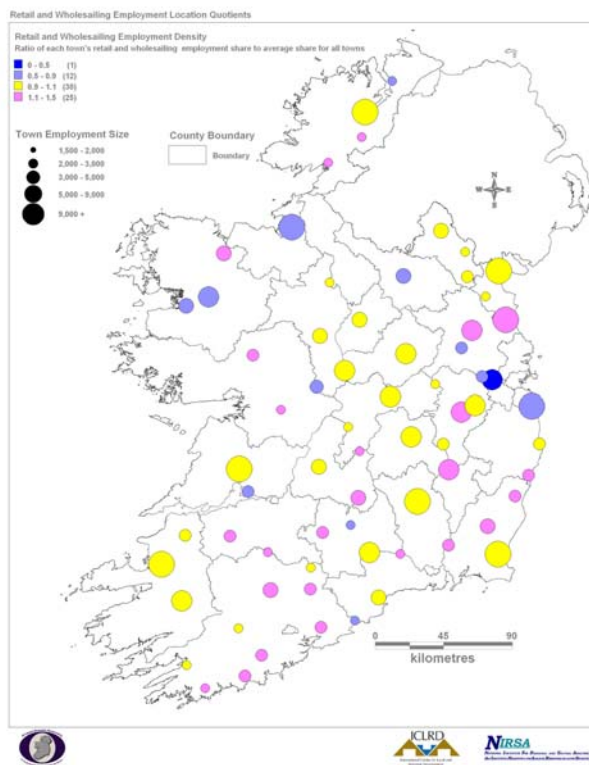
**Map 4.1: Education Employment Location Quotients**



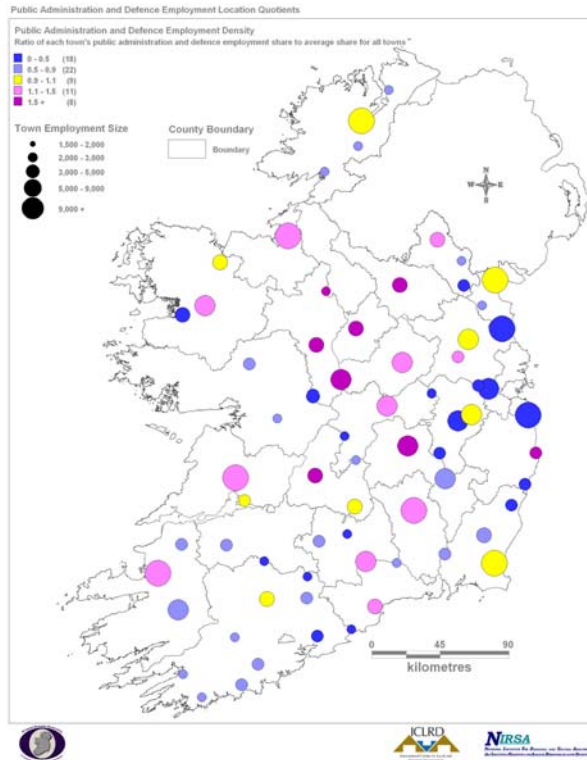
**Map 4.2: Professional and Business Services Employment Location Quotients**



**Map 4.3: Manufacturing Employment Location Quotients**



**Map 4.4: Retailing and Wholesaling Employment Location Quotients**



**Map 4.5: Public Administration and Defence Employment Location Quotients**

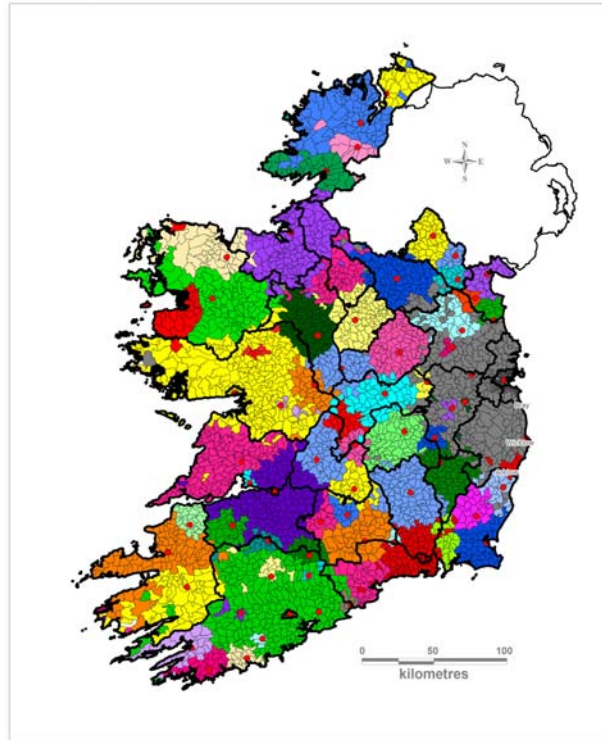
4(b) Delineation of Central Place Service Hinterlands

This section of Phase I seeks to delineate the hinterlands served by central place services located in towns within the Republic of Ireland. Using the POWCAR commuting data from the 2006 census as a basic indicator for identifying urban hinterlands, a large number of maps were generated based on different commuting measures and different sets of towns. Town sets were selected based on different population and employment thresholds, and for each town set, maps were generated based on different levels of commuter interaction. After much experimentation, it was found that maps involving towns with a minimum employment level of 1,500 (excluding dormitory towns), and including in these towns' hinterlands those EDs which sent more commuters to each town than to any other town, provided the most complete spatial coverage of the national territory.

A key problem arising from this methodology was that many towns with a substantial service base were shown to have minimal commuting hinterlands due to the "swamping" effect of the Dublin and the major provincial cities (See Map 4.6).



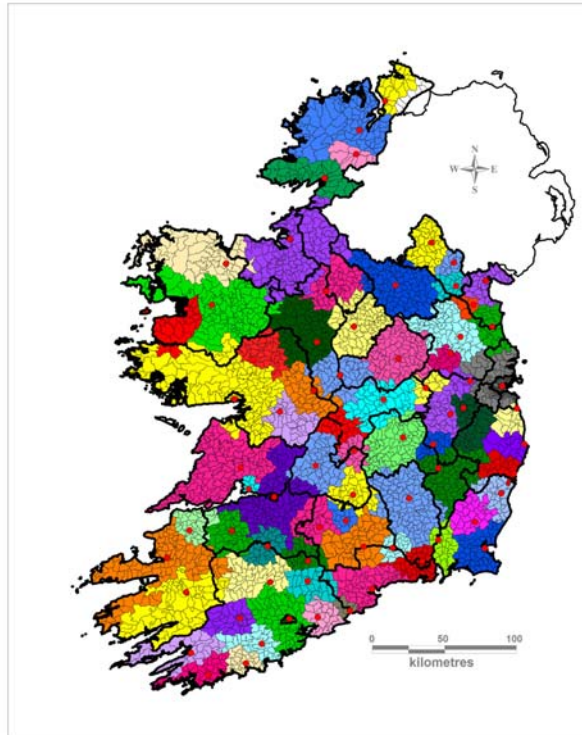
Map of Urban Function Catchments - 0% Minimum Interaction -  
Towns with 1,500+ Jobs Excluding Dormitory and Export Only Towns



**Map 4.6: Hinterlands including “swamping” effect of the Dublin and the major provincial cities**

A methodology for addressing this problem was devised by correlating the level of employment in a number of central place functions with the identified populations of the hinterlands of those towns not impacted by this swamping effect. The number of secondary school teachers was found to provide a particularly good fit with catchment population, and the regression equation for these two variables was used to estimate the appropriate hinterland populations of the swamped towns. Surrounding EDs were then allocated to these towns to make up the target catchment populations. The remaining EDs were then allocated to the provincial cities to indicate the hinterlands of these cities for the service in question (see Map 4.7). The mapping of urban hinterlands in Dublin’s “urban shadow” has not yet been completed and will be done in the next phase of the project work.

Map of Urban Function Catchments - 0% Minimum Interaction -  
Towns with 1,500+ Jobs Excluding Dormitory and Export Only Towns



***Map 4.7: Catchment areas excluding the “swamping” of larger urban centres. The mapping of urban hinterlands in Dublin’s “urban shadow” has not yet been completed and will be done in the next phase of the project work.***

#### 4(c) Developing All-Island Travel to Work Catchments

The development of catchments based on the travel to work trips of the working population is a useful way of understanding the employment strengths of urban centres in a local, regional and national context. There is much anecdotal evidence of workers undertaking long commuting journeys to work in both the Republic of Ireland and Northern Ireland. In recent years the availability of high levels of job opportunities in the Republic has resulted in an increased level of cross border commuting to employment destinations. As part of this study an attempt has been made at mapping the commuting patterns to urban centres in both jurisdictions. Further research is also underway to explore specific levels of cross both commuting from the Republic to the North and vice-versa.

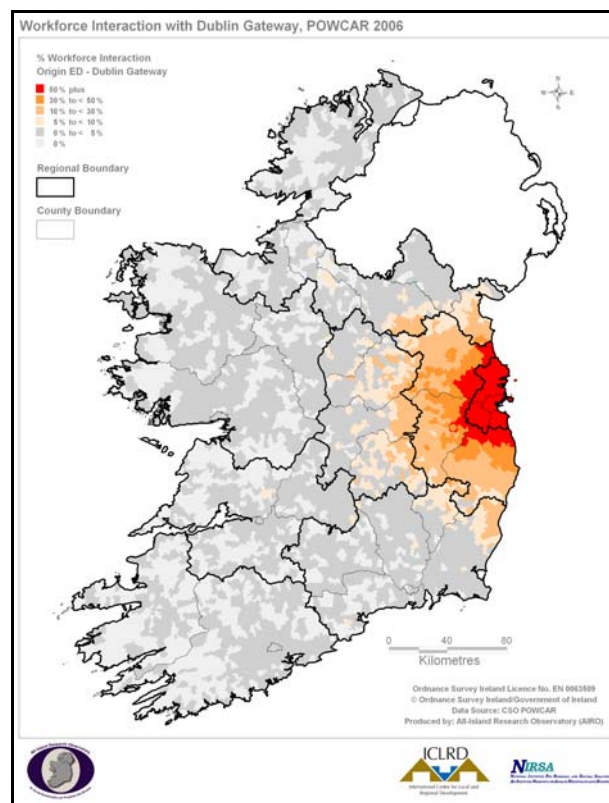
The primary sources of origin-destination (OD) employment data required to undertake this research are collected by the main national statistical agencies, the Central Statistics Office (CSO) in the Republic and the Northern Ireland Statistics and Research Agency (NISRA) in the North. OD data in both jurisdictions are collected almost entirely independently of each other and little or no data is recorded for destinations in either jurisdiction. OD data is available for the Republic of Ireland in 2002 (15% sample) and a complete coverage is available in 2006 through the POWCAR dataset. The Northern Ireland OD data is available through the 2001 Census outputs.

### *Republic of Ireland*

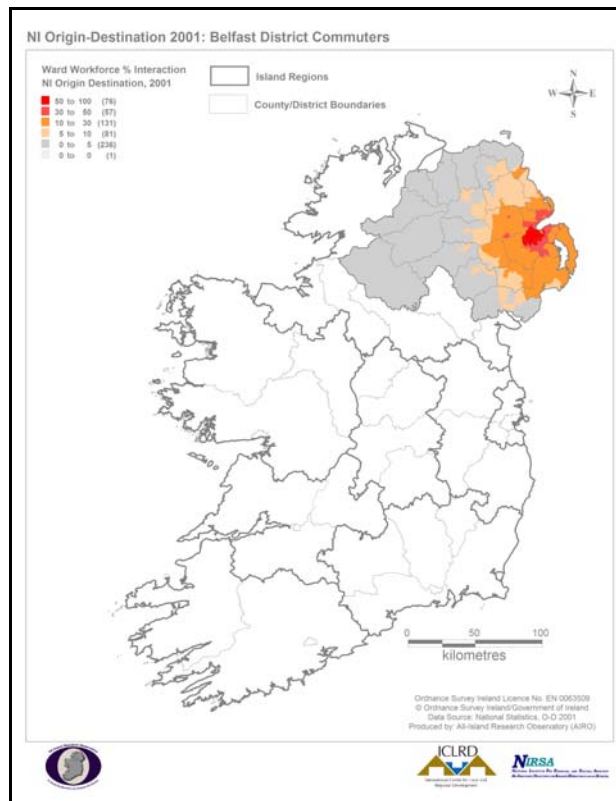
The Place of Work Census of Anonymised Records (POWCAR) is a detailed dataset developed by the Central Statistics Office (CSO). The dataset contains details on the origin and destination, along with a series of additional attribute data, of all those 'At Work' at the time of Census collection in 2006. With over 1.8 million records in the dataset it is a very rich source of information that can be used to depict the daily mobility patterns of the workforce within the Republic. Individual records have been aggregated to represent levels of interaction from origins (Electoral Divisions) to destinations (Urban Centres – Gateways, Hubs, Other Towns and Northern Ireland Counties) (Map 4.8)

### *Northern Ireland*

The Origin-Destination data available for Northern Ireland is a by-product of the 2001 Census for the United Kingdom. The matrix contains information on the number of trips from every Ward in Northern Ireland to all Wards in the UK. Catchments have been created for all Gateways and Hubs in the North (Map 4.9)



**Map 4.8: Workforce Interaction with the Dublin Gateway, POWCAR 2006**



**Map 4.9: Workforce Interaction with the Belfast Gateway, NI Origin-Destination 2001**

### *Cross Border Commuting*

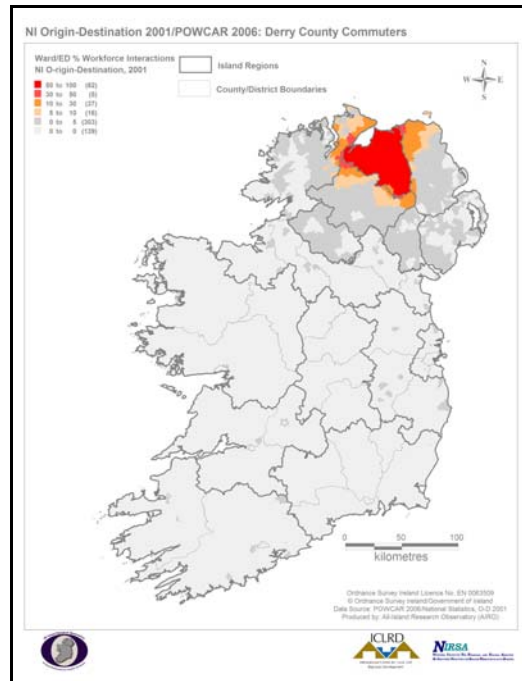
There are a number of data issues that are preventing the creation of continuous and accurate cross border commuting catchments in Ireland. Apart from the temporal issue of the Republic POWCAR data being based on the 2006 Census and the Northern Ireland O-D data being based on the 2001 Census there are a number of constraining methodological issues within each dataset.

Northern Ireland destinations are recorded within the POWCAR data however the destination coding is relatively crude and based on a county level. This results in all Northern Ireland destinations being broken down into 6 separate groupings – Antrim, Armagh, Derry, Down, Fermanagh and Tyrone. It is hoped that the 2011 Census in the Republic will include a Northern Ireland postcode coding rather than county coding; this will allow a much more in depth analysis of cross border commuting patterns on a Republic of Ireland to Northern Ireland basis.

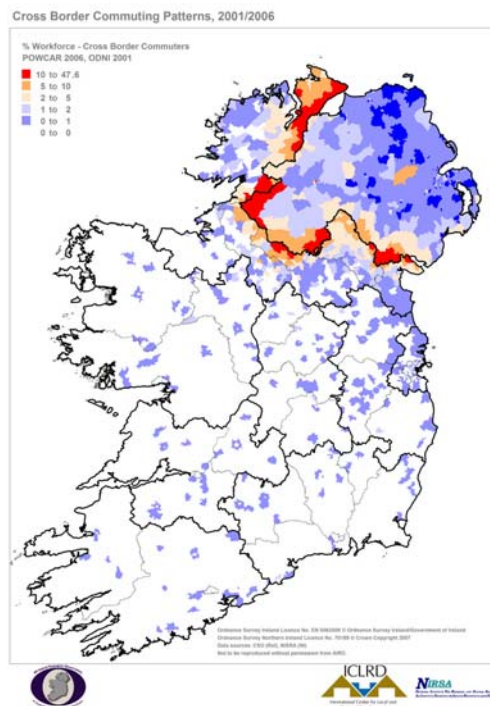
The Northern Ireland O-D 2001 matrix does not contain any coding for the Republic of Ireland. A generic code of “999999” represents outside the UK work destinations. Republic of Ireland destinations are coded within this catch-all category. Again, it is hoped that the 2011 Northern Ireland Census will include more detailed coding for the Republic of Ireland.

Resulting from the above issues it is only possible to partially develop cross border commuting catchments. The more detailed cross border data within the POWCAR dataset combined with the Northern Ireland O-D matrix enables an analysis of commuting catchments to Northern Ireland

counties on an All-Island basis. Map 4.10 details the percentage of the workforce within each ED and Ward that are employed within County Derry. Map 4.11 highlights areas where cross-border commuting is highest on the island. This Map details a different spatial pattern along the border with higher levels of 'southbound' commuting in the eastern border region and higher levels of 'northbound' commuting in the western region of the border.



**Map 4.10: All-Island Workforce Interaction with Derry County, NI O-D 2001 and POWCAR 2006**



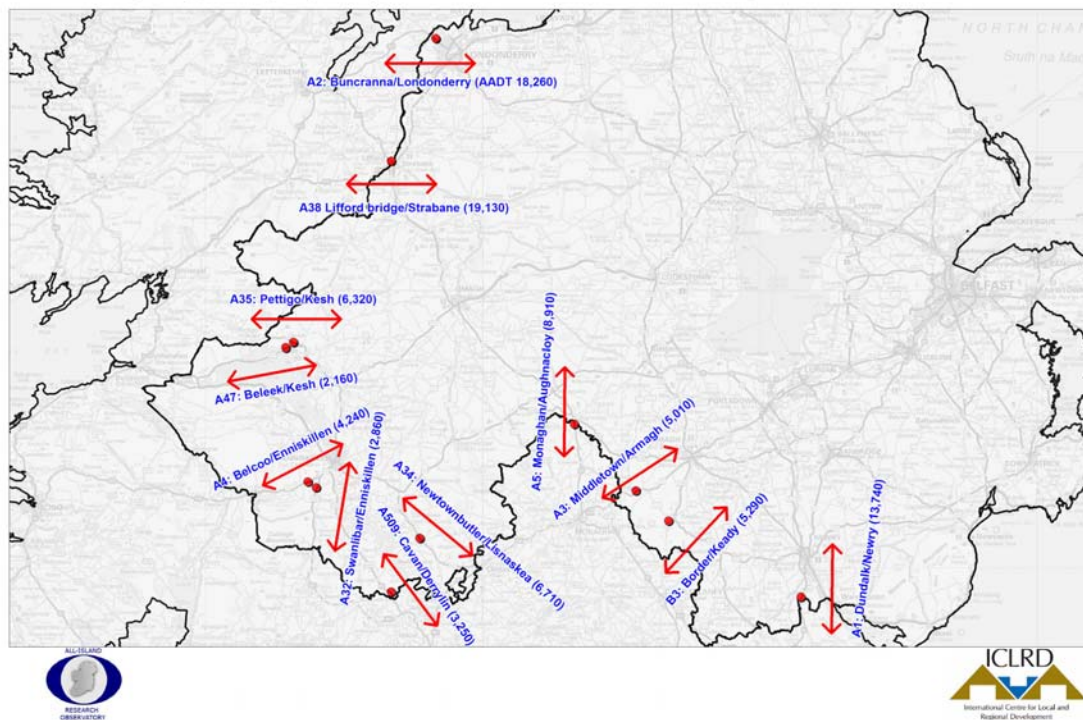
**Map 4.11: Cross Border Commuters, NI Origin-Destination 2001 and POWCAR 2006**

#### 4(d) Cross Border Traffic Flows

There is currently a lack of detailed and readily available data to track the flow of commuters across the border on a more-timely basis than using census data every 5 or 10 years. Such a dataset would be extremely useful in monitoring the inter-jurisdictional commuting patterns that are in place and also provide key information on the flow between cross border linked Gateways such as Londonderry/Derry-Letterkenny and Newry-Dundalk. The Department for Regional Development (DRD) in Northern Ireland do, however, produce an annual Traffic Census for a series of traffic counters across Northern Ireland. They monitor traffic flows at 12 traffic census points along the full length of the border. The data is a little out of date at this stage and relates to 2007 flows, and it is a little limited in nature, but it does give some picture of cross-border movements. The research team is working with DRD to get access to a more detailed breakdown of data – it is hoped that data will be made available for hourly flows at all 12 traffic count sites.

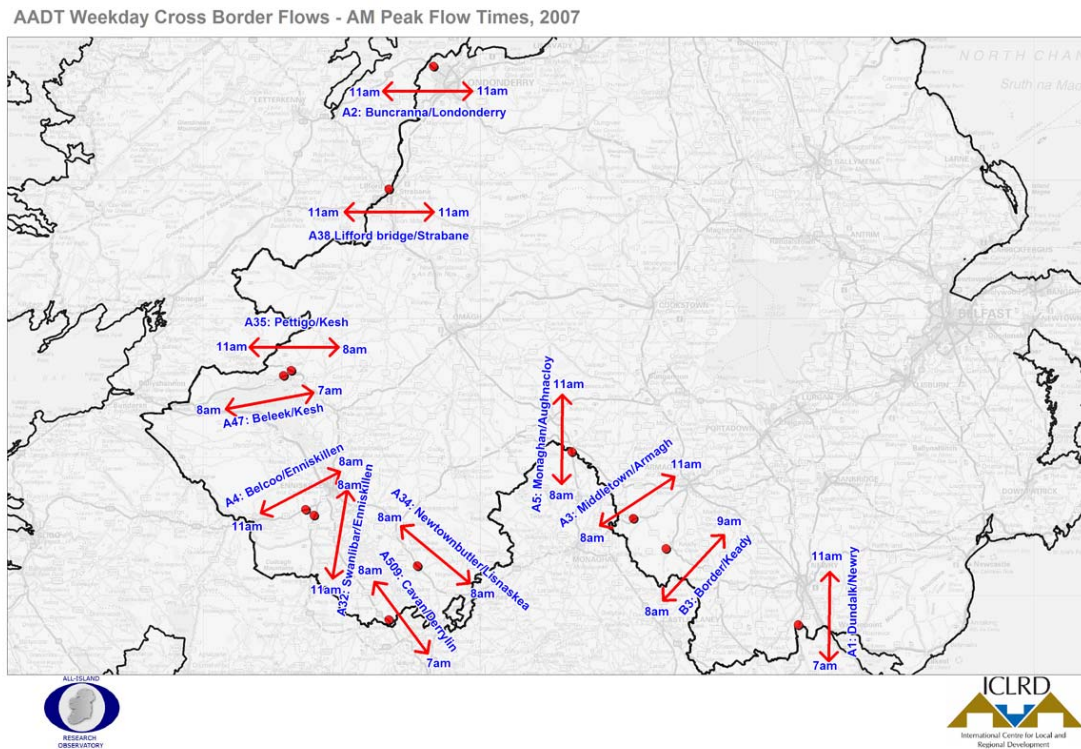
Map 4.12 shows average cross-border daily flows for Monday to Friday, although it does not breakdown the hour or direction of the flow (although a sizable proportion of the vehicles are moving across the border and then back later in the day). The roads with the greatest flow of traffic run between counties Donegal and Derry (A2, Letterkenny/(London)Derry (18,290) and A38, Lifford/Strabane (19,290)). Next, and a little way behind, comes the M1, Newry/Dundalk route (14,140). In total, on an average work day in 2007, 97,190 vehicles crossed the border. Assuming that the vast majority of journeys are bi-directional and have 1 to 2 people in the car, the data would indicate about 1-2 percent of the population of the North and South (c.50,000-100,000 people), cross the border daily.

Annual Average Daily Traffic (7 day week) flows at Border Traffic Census collection points, 2007 (total flows in/out)



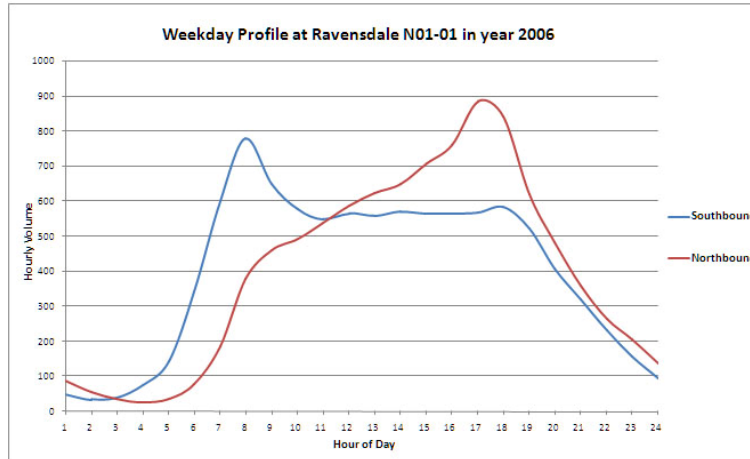
**Map 4.12 Annual Average Daily Traffic Flows**

Map 4.13 details the hour of peak AM flow in each direction. Interestingly, the peak hour of traffic flow on the three routes with the highest traffic is 11am in both directions with the exception of the M1 southbound which is 8am. This suggests that a large proportion of the cross-border journeys, in both directions, are not related to either work or schooling (although such flows undoubtedly occur, but as a smaller proportion of all trips). Along the south-west part of the border, between counties Leitrim/Sligo and Fermanagh, however, it appears that there is relatively substantial work related morning trips in both directions, but especially from the South to the North.



**Map 4.13 AM Peak Flow Times**

The National Roads Authority (NRA) in the Republic of Ireland also release data for a series of automated traffic counter sites however they only have data available on two cross-border sites – George Mitchell Bridge and Aughnacloy. The NRA data is extremely detailed and provides an hourly breakdown of flows throughout the year. The ability to monitor such data on a time-series basis would provide a great insight to the patterns for both employment and retail commuters. A traffic counter was in place at Ravensdale (Newry-Dundalk) prior to the opening of the new MI but has since been disbanded. According to the NRA this will be re-instated on the M1 towards the end of 2010.



**Figure 4.1 Automated Traffic Counter Site at Ravensdale**

### 5. Exploratory Spatial Data Analysis of Population Accessibility

Population accessibility has long been regarded as a critical ingredient in locational and regional development studies (Harris, 1954). Measures of population accessibility offer a useful way for estimating the relative potential of a given location at a national scale. Such measures paint a vivid picture of the impact of population dynamics and redistribution on aggregate levels of access, and how these developments can create economic opportunities for given locations over time.

We undertake an *exploratory spatial data analysis* of population accessibility as per O’Kelly and Horner (2003), where the calculation and visualisation of accessibility indices with GIS help us to explore spatial population issues. The set of areas (Electoral Divisions in the Republic of Ireland and Electoral Wards in Northern Ireland) and their populations are easily incorporated into an accessibility index, such as (2) below.

$$(2) \quad A_i = \sum_j P_j \exp(-\beta d_{ij})$$

Where:

$A_i$ : accessibility of area  $i$

$P_j$ : population of area  $j$

$\beta$  : distance decay parameter

$d_{ij}$  : straight-line distances between areas

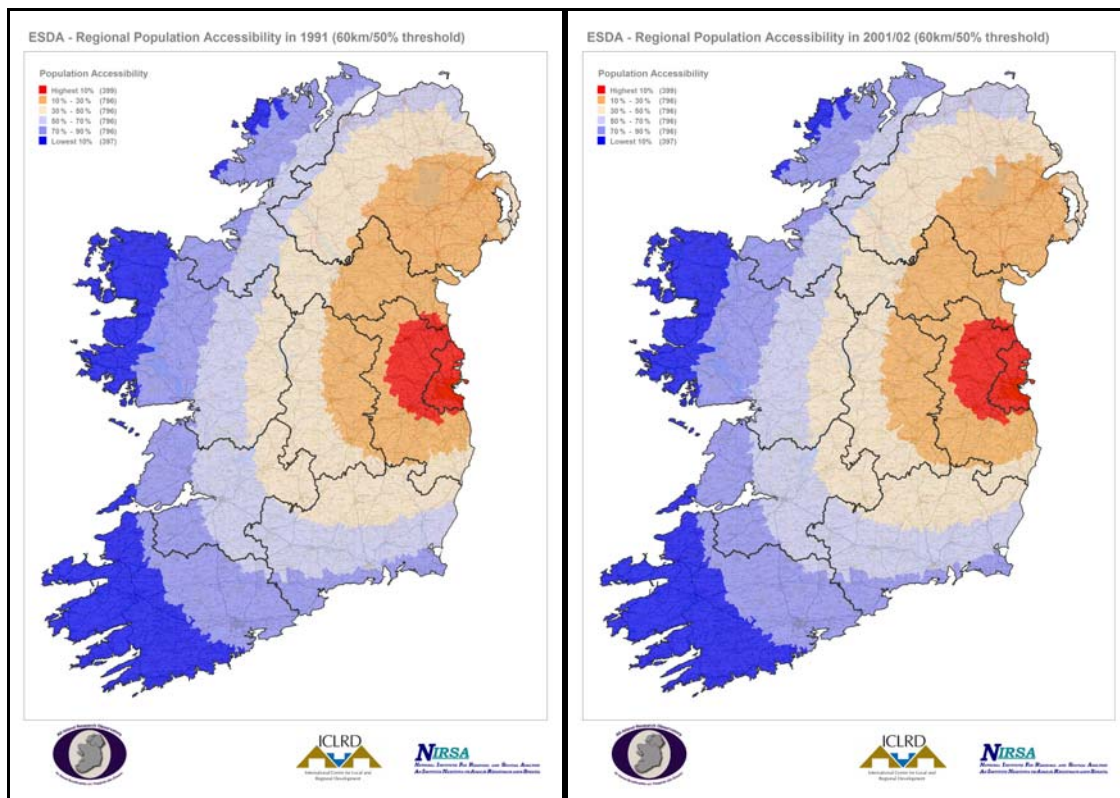


The exponential form of (2) allows us to handle “self potential” i.e. each area’s own population, as well as the population of surrounding areas. The distance decay parameter  $\beta$ , which captures the extent to which increased distance become prohibitive to accessibility, is estimated as per O’Kelly and Horner (2003); Suppose that at a distance  $d$  from area  $i$ , we want fraction  $Q$  of the  $j^{th}$  area’s population to be counted into the  $i^{th}$  area’s accessibility score:

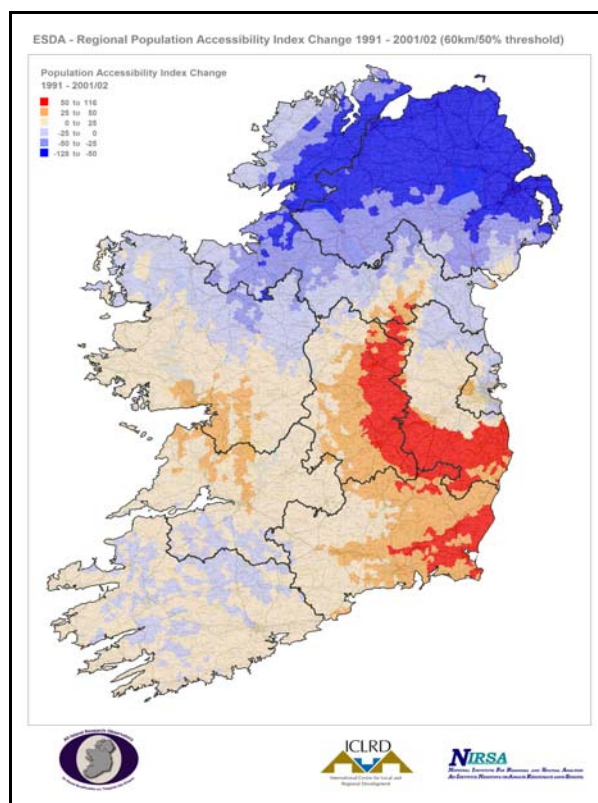
$$(3) \quad \exp(-\beta d) = Q$$

$$(4) \quad \beta = -\frac{\ln(Q)}{d}$$

We can then solve for  $\beta$  by fixing  $Q$  and  $d$ . This idea is best illustrated with an example: due to distance, only 50% of the population in EDs 60 kms away from area  $i$  have access to area  $i$ . In this case the parameter  $\beta = -\ln(0.5)/60 = 0.012$ .



**Map 5.1: Illustrative Example of Potential Population Accessibility 1991 and 2001/02**



**Map 5.2: Change in Potential Population Accessibility 1991 and 2001/02**

As illustrated in Map 5.1 above, the accessibility index provides a “broad brushstroke” view of accessibility at a national scale. Notwithstanding the choice of parameter (which in the above example has been estimated using a “rule of thumb” rather than calibrated to the underlying Irish data), the accessibility index highlights the relative differences in Irish accessibility. A strong east coast, Dublin-centric, corridor is apparent, along with a relative decline in accessibility as one moves further west. Map 5.2 illustrates how this pattern has changed over the 1991-2001/02 period: the east, south east, and western areas around Galway appear to have enjoyed enhanced accessibility, while the northern areas have fallen back somewhat in terms of accessibility.

The accessibility indices presented above provide a vivid overview of accessibility at a national scale and are now computationally feasible thanks to the emergence of detailed ED- and Ward-level population datasets. Pertinent next steps include (i) calibrating parameters that closely match the realities of Irish travel patterns, (ii) matching accessibility trends to underlying socio-demographic data, and (iii) enhancing the temporal dimension of the study using 2006 population data.

## 6. 'Natural Catchment' Gravity Model Catchments

### 6.1 Republic of Ireland Gravity Model Catchments

Following the approach of the Natural Catchments research (at start of this Section), it was decided to further develop this work and produce a series of gravity based catchments for each Gateway. A gravity based catchments has been produced for three sectors: Retail, Hospitals and Culture. This work was initially undertaken for the Republic of Ireland alone but has since been extended to produce the first 'all-island' retail gravity based catchment for Gateways.

The initial Republic of Ireland analysis is based on two main datasets; a travel time from each ED to each Gateway and a proxy for the strength of Retail, Health and Cultural activity in each Gateway. The proxy for the strength of sectoral activity in each Gateway has been developed using a special tabulation from the 2006 POWCAR data. The POWCAR data output used in the model relates to the number of people working in each Gateway who are involved in Retail, Hospitals or Cultural activity.

The gravity model used here is based on the spatial interaction model developed by Huff (1963) for estimating retail trade areas. In its original form, the model considered consumers visiting retail outlets: each store within a given area had some chance (or probability) of being visited by consumers and this probability could be estimated based on the attractiveness of the store and the distance between the consumer and that store. Rather than individual stores, we are interested in Irish hub and gateway towns as retail centres – with retail employment indicating their relative attractiveness to the surrounding electoral divisions (EDs). The initial Huff (1963) set-up is easily extended to this hub and gateway scenario and can also be used to analyse the provision of other services, such as medical services and cultural amenities. The model can be expressed as follows:

$$(1) \quad P_{ij} = \frac{S_j^\alpha D_{ij}^\beta}{\sum S_{ij}^\alpha D_{ij}^\beta}$$

Where

$S_j$  = size of retail centre,  $j$ , in terms of relative employment

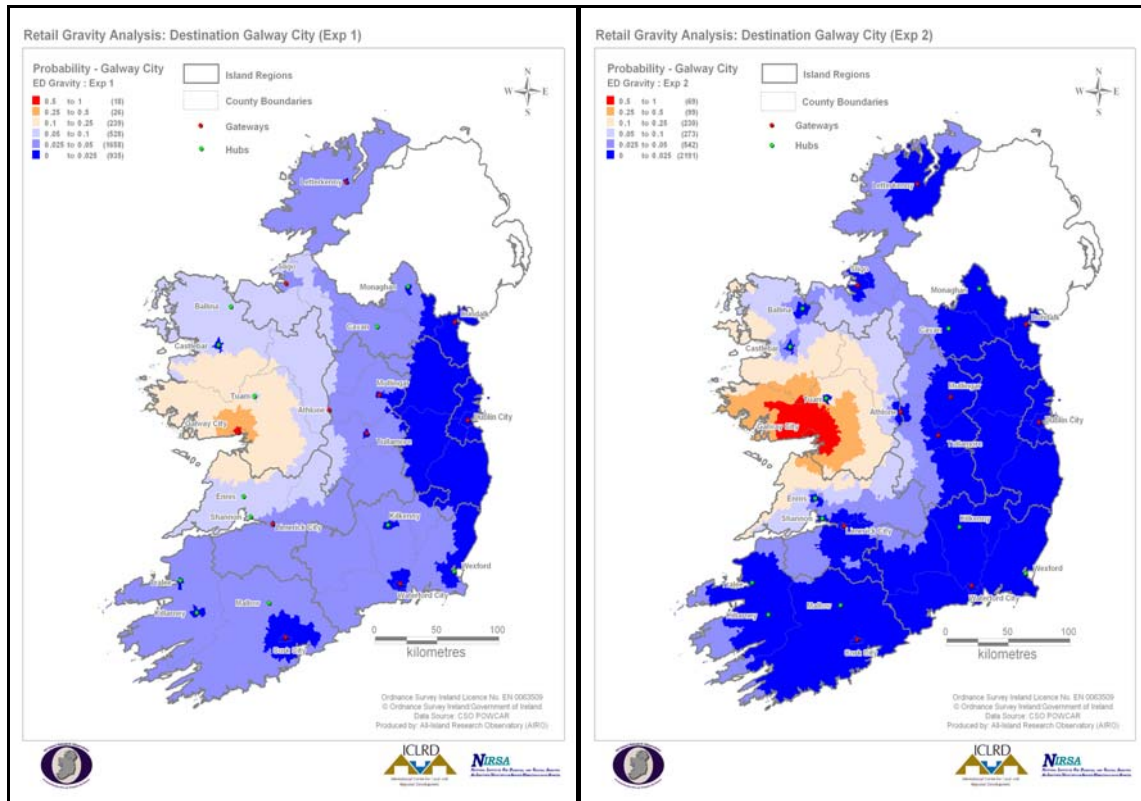
$D_{ij}$  = distance from centre  $i$  to area  $j$

$\alpha$ : attractiveness parameter (set =1)

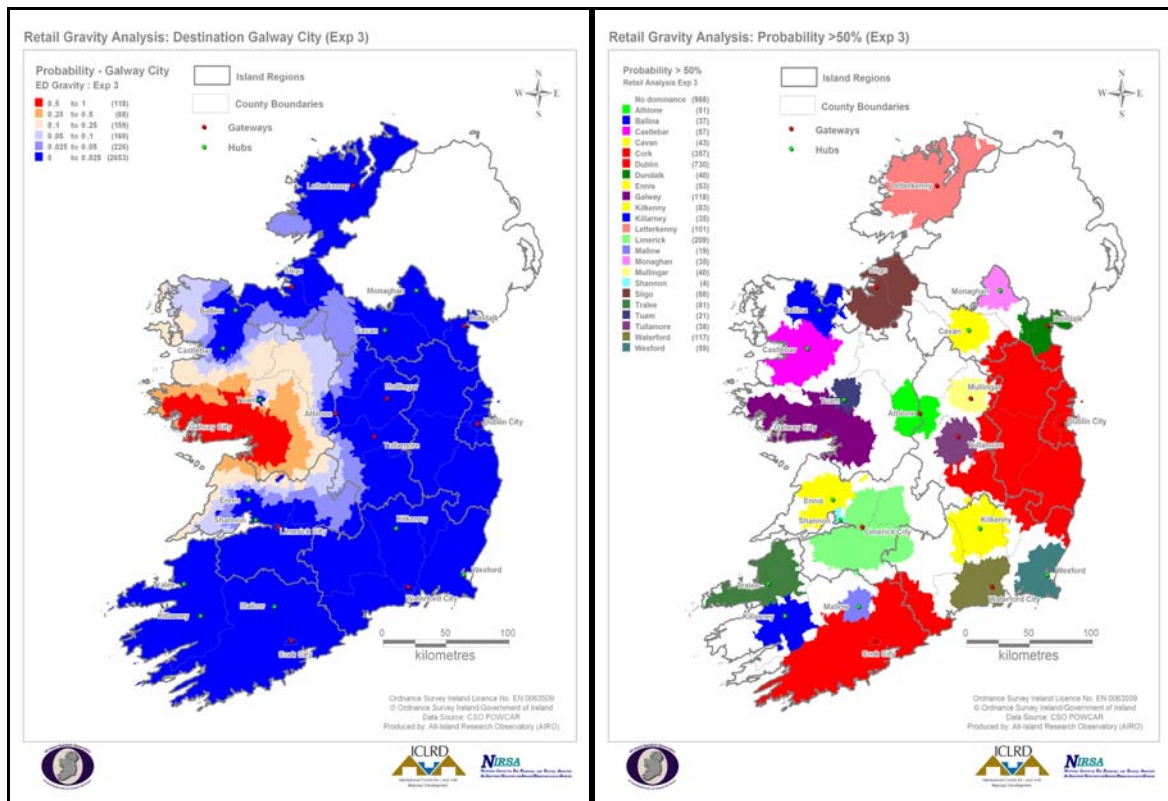
$\beta$ : distance decay parameter

An important consideration in this type of model is how to capture the prohibitive nature of distance. The further away an ED is located from a town, the lower the probability of an ED being attracted to that particular town. In such a case, EDs may actually have equal probabilities of being attracted to a number of towns. In our initial work we have not calibrated the distance decay parameter ( $\beta$ ) to the underlying Irish data. We have merely adhered to the range of values (1.0 - 3.0)

within which existing empirical literature has observed this parameter to reside (Map 6.1 and 6.2). However, as Irish ED level travel-to-work data is now available, this data could serve as a proxy for travel-to -retail or -medical services patterns and in this way could be used to accurately calibrate our distance decay parameter.



**Map 6.1: Galway Retail Gravity Model: Exp 1 (left) and 2 (right)**



**Map 6.2: Galway Retail Gravity Model: Exp 3 (left) and ROI Retail Gravity Model: Prob > 50% Exp 3**

The gravity models illustrated above offer a number of exciting possibilities with regard to the construction of spheres of influence/ functional areas based on the provision of services. Not only can the gravitational pull of competing gateway towns and hubs be estimated and visualised for various services, but the impact of potential redistribution of services between these hubs and gateways can also be estimated. What is more, the spheres of influence of differing types of services can be compared in order to assess how stable this underlying sphere of influence actually is. This can be seen from the above figures by comparing retail, medical services, and cultural spheres of influences and assessing to what extent a town's attractiveness differs across services. The socio-demographic characteristics of the areas over which a town exerts influence with respect to services provision can also be incorporated in our analysis. The gravity model analysis also lends itself well to both a national and regional scale.

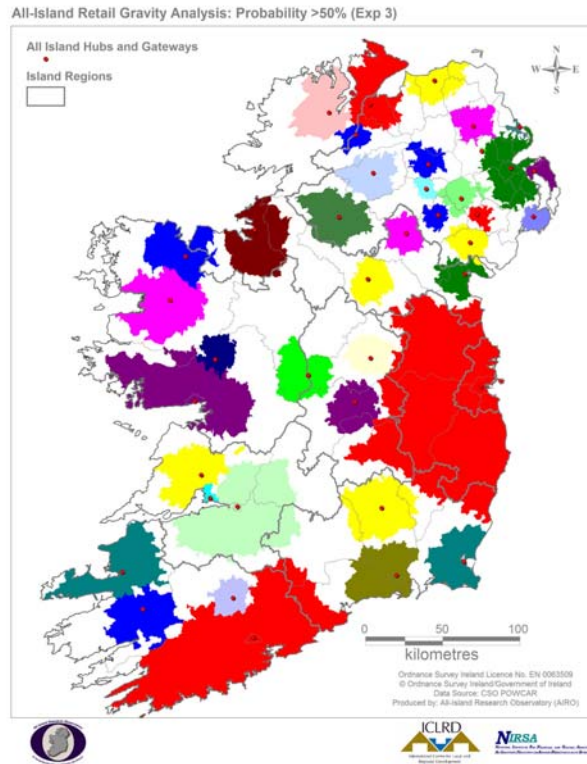
Useful next steps in our Republic of Ireland gravity model analysis include the calibration of a travel-to-work based distance decay parameter, as discussed above, and the incorporation of all available ED-level socio-demographic characteristics into our gravity model framework.

**Table 6.1: Industry of Employment, POWCAR 2006**

<b>Employment Activity</b>	<b>Details</b>
Retail	Retail sale in non-specialized stores with food, beverages or tobacco predominating
Retail	Retail sale of food, beverages and tobacco in specialized stores
Retail	Retail sale of textiles
Retail	Retail sale of clothing
Retail	Retail sale of footwear and leather goods
Retail	Retail sale of furniture, lighting equipment and household articles
Retail	Retail sale of electrical household appliances and radio and television goods
Retail	Retail sale of hardware, paints and glass
Retail	Retail trade nec
Hospital	Hospital activities
Cultural	Library, archives, museums and other cultural activities

## **6.2 All-Island Gravity Catchment**

Using data from the Northern Ireland Census of Employment (2007), it has been possible to develop the first ‘all-island’ retail gravity catchment (Map 6.3). This Census provides details on the number of employees within settlements across Northern Ireland at Ward level. Using the Census of Employment the project team were provided with an aggregation of ward data to represent the number of employees working in the Northern Ireland Gateway settlements. Data was made available for both retail (SIC03 – 52 “Retail Activities”) and hospital employees (SIC03 – 8511 “Hospital Activities”); however, the hospital data was not available for all Gateway settlements due to confidentiality thresholds imposed by the data providers. For this reason the project team could only produce an ‘all-island’ gravity catchment for retail employees. This analysis was undertaken using the same methodology as applied to the Republic of Ireland dataset in section 6.1 above.

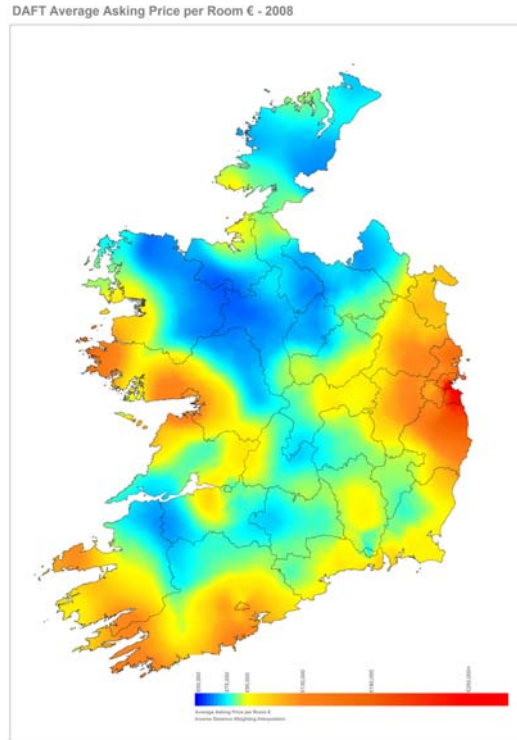


**Map 6.3: All Island Retail Gravity Model: Prob > 50% Exp 3**

## 7. House Price Mapping

The Daft.ie house asking price dataset spans the period April 2007 - May 2009 and contains over 64,000 observations. All the observations can be matched to their respective counties. However, the value of the dataset is that it offers the potential to work at a far more disaggregated geographic scale – that of Electoral Divisions (EDs). At present we have matched over 70% of the observations to their relevant ED, and are currently incorporating an additional 10,000 observations which can be matched to their town-land. Currently, of the 3,409 Irish EDs, our dataset covers 2,389 EDs.

The dataset provides the number of bedrooms and number of bathrooms for each house. Having data relating to a characteristic such as number of bedrooms is crucial as, in the absence of data on the floor space of each house, such characteristics are the only way to ensure that each house is comparable. In this way, house asking prices can be expressed in terms of “house asking price per bedroom”. While we have collected the data for the 2 year period mentioned above, we have only recently discussed with Daft.ie our interest in using their data in our research. It is hoped that they will provide the research team with an additional series of quarterly average ‘asking’ house price data for over 4,000 new spatially defined ‘DAFT regions’. This data will initially be available for the period from 2006 through to the end of 2007 and should allow an easy analysis at either the ‘DAFT region’ scale or at ED scale. The continuous release of such a dataset will be extremely useful in analysing and monitoring change within the Irish space economy.



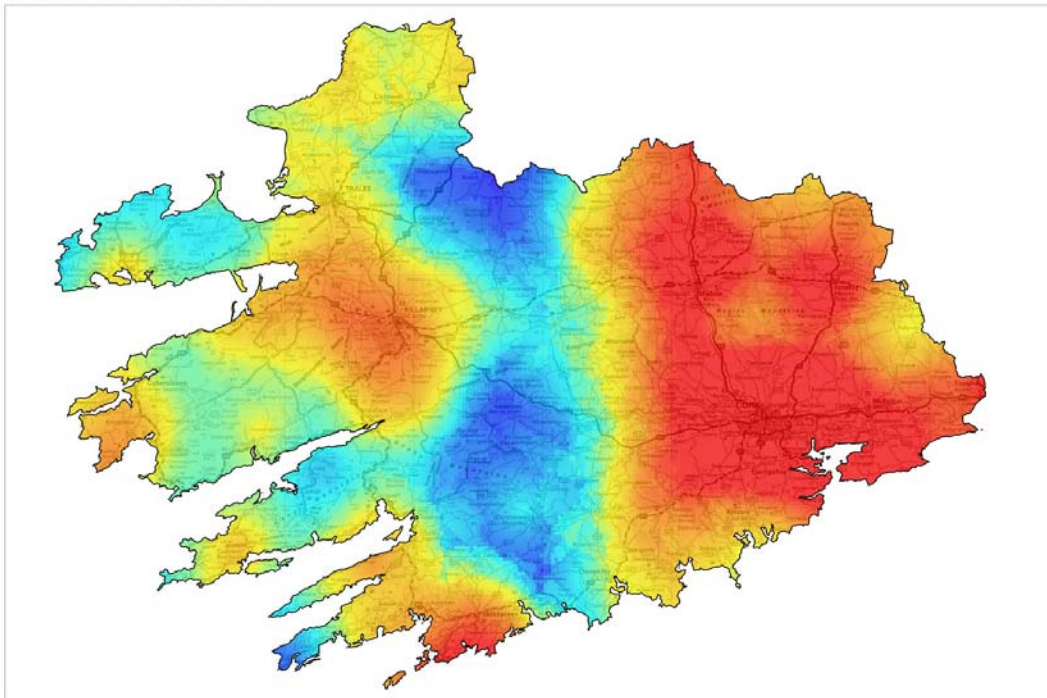
**Map 10.1: Daft Average Asking Price per Room, 2008**

#### 10(a) Potential Uses of the Dataset

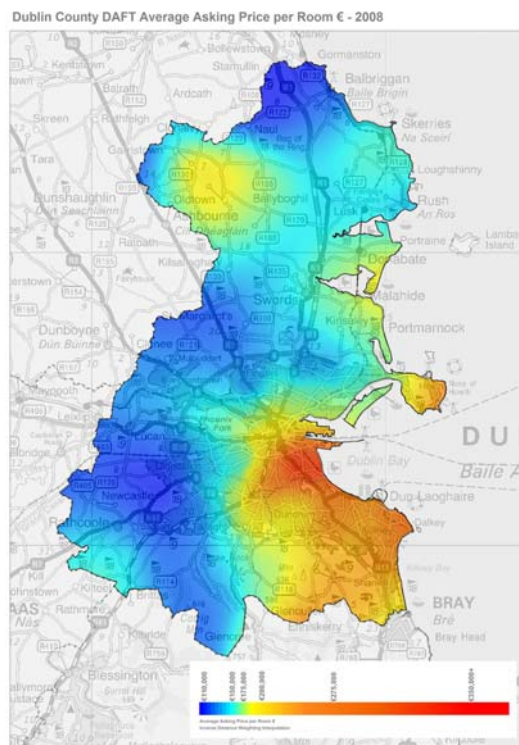
Simply put, ED-level house price data is the missing link in Irish regional research. It offers the potential to distinguish between EDs based on house price differences, and can be used to proxy variables such as ED level wealth and ascertain ED-level housing stock and housing type. Republic of Ireland data on house asking prices can be linked with similar Northern Irish data (adjusted for currency) to create an all-island picture. House price data also allow one to empirically test various theories emanating from the economic geography literature that emphasise regional variation in prices and wages arising from core/peripheral location and ease or difficulty of travel-to –work commuting. Studies on migration flows would also be greatly enhanced by the availability of this type of dataset. What it more, the temporal dimension of the dataset (currently spanning over two years with up-to-date data continuously being added) allows us to assess the impact of newly announced infrastructural projects (such as new incinerators or railway lines) on local house prices. Crucially, the temporal nature of the dataset also allows us to move from house asking price levels to asking price changes and growth rates (using the methods for calculating house price indices discussed below).



Average Price Per Room €



**Map 10.2: Kerry/Cork Extract from Daft House Asking Price data**



**Map 10.3: Dublin Extract from Daft House Asking Price dataset**

## Section II

### Phase II: Proposed Next Steps

The purpose of Phase II of the Functional Territories Research Study is to apply the skills and knowledge gained in Phase I of the Project in a pilot exercise within a specific geographical area. By so doing, the applicability of this work in supporting more effective spatial, and community, planning in a cross jurisdictional context can be tested.

Phase II of this project can be separated into two main sections. Firstly, additional analysis and further research is required to complete a number of the exploratory elements of Phase I of the project. This will form part of the long-term research strategy of ICLRD and is aimed at enhancing the knowledge of functional territories within the island of Ireland. Secondly, and more immediate, the project team will aim to demonstrate the applied use of the outputs of Phase I within policy relevant research in a specific case study area. It is proposed that a more focussed analysis of the existing functionality and inter-relationships between the cross-border towns of Sligo and Enniskillen will be undertaken within Phase II.

#### 2.1 Enhancing our knowledge of functional territories

##### 2.1.1 'Natural Catchments'

To date a series of 'natural catchments' have been developed for all Gateways and Hubs across the island. The output from this analysis is currently in the form of a series of images. It is proposed that ongoing ICLRD research will focus on developing a detailed socio-demographic analysis of each catchment. This will provide the research team with a detailed statistical profile and highlight the relative strength and weakness of the natural catchment of each Gateway/Hub in relation to key variables such as critical mass (population, workforce), levels of education, industry of employment, social class etc. Within Phase I this analysis will be undertaken for the Sligo-Enniskillen catchments. The combined outputs from Phase I, Phase II and ongoing ICLRD research (images and statistical profiles) will be made publically available through the AIRO website and can therefore be widely used in number of different planning and research projects.

##### 2.1.2 'Service Infrastructure Accessibility'

As a follow on to the initial work on accessibility to key strategic services it is hoped to undertake a further detailed analysis of accessibility to the current transport infrastructure across the island of Ireland. This will include the continuation of the analysis of accessibility to airports (weighted based on number of flights and access to international hubs) and also a new piece of research looking at accessibility to train stations and bus stations across the island of Ireland. Following on from a pilot study in the Republic of Ireland the research team intends to work towards the development of the first 'Index of All-Island Accessibility' with a primary focus on delineating aspects of spatial remoteness across the island. This analysis will include a measurement of local proximity (residential

address points) to a) urban settlements, b) train stations and c) bus stops. As part of Phase II a detailed analysis of service infrastructure accessibility will be undertaken for both Sligo and Enniskillen and surrounding area (this will be outlined in more detail below).

### 2.1.3 Urban Functional Specialisation

The Urban Functional Specialisation analysis undertaken within Phase I of the project focussed on 67 towns within the Republic of Ireland and examined industrial employment in 10 categories;

- Retailing/Wholesaling
- Manufacturing
- Hotels/Catering/Recreation
- Medical Services/Social Work
- Education
- Public Administration/Defence
- Hospitals
- Professional Services/Business Services
- Banking/Finance/Real Estate
- Transport/Communications.

In order to extend this analysis to include all urban settlements in Northern Ireland (1,500+ employed in settlement) the research team will require a detailed dataset replicating the data available within the Republic. There is currently some scope to work with the data available through the Northern Ireland Census of Employment however this only includes 'employees' and is not a comprehensive representation of the workforce. At the time of writing the research team has requested details on an inventory of all suitable industrial employment data in Northern Ireland. Within Phase II of this research specific attention will be placed on developing a greater understanding of the industrial functions of both Sligo and Enniskillen

### 2.1.4 Cross Border Traffic Flows

The research team is currently working with DRD to get access to a more detailed extraction of cross border traffic flows at 12 traffic counter sites along the border. It is hoped that average daily bi-directional data will be made available on an hourly basis – this will provide a useful illustration of the different pattern of flows along the border in relation to both 'work based' and 'retail based' commuting. Phase II will concentrate on developing a much clearer understanding of the transport flows of Sligo and Enniskillen and more specifically the transport flows between both Sligo and Enniskillen. Both private and public transport flows will be incorporated into this study.

## **2.2 Functional Territories: Sligo-Enniskillen Case Study**

Phase II will map functional territories relating to a number of priority sectors (to be identified in collaboration with the relevant planning bodies) in the urban centres of Sligo and Enniskillen. It should not be constrained by the administrative boundaries of Sligo County Council or Fermanagh

District Council but should look only at territories which are considered significant for these two centres and their surrounding and dependant urban centres. It should also take account of and map the spatial linkages, identified in both the *National Spatial Strategy* (NSS) for the Republic of Ireland and the *Regional Development Strategy* (RDS) for Northern Ireland, which relate to key settlement pattern strategy. It will identify the significant spatial linkages between these centres and surrounding urban centres, and search for opportunities for shared service delivery.

It is proposed that the Sligo-Enniskillen research programme will cover the following:

1. **Detailed Socio-Economic profile** of the study area: population, housing, social indicators, deprivation, economic status, cultural data etc. There is also a need to look at other non-census datasets such as unemployment indicators, population projections at local and regional levels.
2. **Transport analysis** of linkages between both Sligo and Enniskillen and the linkage from each to a wider set of Gateways and Hubs. This will need to be undertaken using private and public transport data; and following further discussion with the stakeholders, may involve modelling improved transport linkages between both centres and documenting the effects it would have on the region.
3. **Housing Development and Growth.** It will be important to consider housing growth within the catchment area post-2001. This can be achieved using GeoDirectory and POINTER, and Planning Permission data from LA's. Sligo is particularly interested in this area as the current Gateway catchment, as defined by CSO, is losing population. The main reason for this has been the movement of population and housing to more rural and tax-benefiting areas of the county and also into neighbouring Leitrim (this now forms part of the Sligo catchment).
4. **Strategic Employers.** There is a recognised, real need to look at the current employment base within the region. There are a number of key strategic employers in the area that are critical to its economic well-being. The research team believe it would be interesting establish a profile of the employment in both areas.
5. **Inventory of services.** This will look at key services in both areas: health, education, emergency services incl. fire and ambulance, etc. (including the level of access). This is considered to be a good starting point for looking at the issue of shared services.

The work should seek to resolve the problems identified in Phase I around the compatibility of data sources in the different jurisdictions. It will be important to the success of this study – and further research into, and roll-out of, functional territories – that outputs are comparable North and South. Much of the value of the final product to potential users will be its ability to support shared service planning and delivery.

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## **Appendix 1**

### **The International Centre for Local and Regional Development**

A registered charity based in Armagh, Northern Ireland, the International Centre for Local and Regional Development (ICLRD) is a North-South-US partnership established in 2006 to explore and expand the contribution that planning and the development of physical, social and economic infrastructures can make to improve the lives of people on the island of Ireland and elsewhere. The partner institutions began working together in 2004 and currently include: the National Institute for Regional and Spatial Analysis (NIRSA) at the National University of Ireland, Maynooth; the School of the Built Environment at the University of Ulster; the Institute for International Urban Development in Cambridge, Massachusetts; and the Centre for Cross Border Studies in Armagh.

Each of these partners brings together complementary expertise and networks on both a North-South and East-West basis – creating a unique, all-island and international centre. ICLRDR continues to expand its collaboration with other institutions and has built up close working relationships with individual faculty and researchers from Harvard University, Mary Immaculate College Limerick, and Queens University Belfast.

#### ***What does the ICLRDR do?***

- Provides independent joined-up research and policy advice on cross-border and all-island spatial planning and local and regional development issues (economic development, transport, housing, the environment, service provision, etc.);
- Offers professional education and capacity building programmes for communities and local, regional and national government representatives and officials;
- Assists local governments / communities in translating policy into ‘on the ground’ action;
- Acts as a catalyst to bring relevant public and private actors, North and South, together to work on common goals;
- Promotes international cooperation and exchanges.

The ICLRDR uses a variety of strategies to undertake this work, including engaging in action research with local governments, communities and central agencies; undertaking and publishing case study research to evaluate and develop good practice models; hosting conferences and workshops on key themes; and developing and delivering training modules for key stakeholders in the physical, social and economic development of the island of Ireland.

#### ***Why is this work important?***

The ICLRDR’s work is important in relation to four key processes on the island of Ireland:

- Cross-jurisdictional commitment to spatial planning and infrastructure projects;
- Peace and reconciliation, and the regeneration of local communities in the Border area;
- Economic competitiveness and growth on the global stage;
- Multi-level governance and compliance with planning, economic and environmental directives from the European Union.



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