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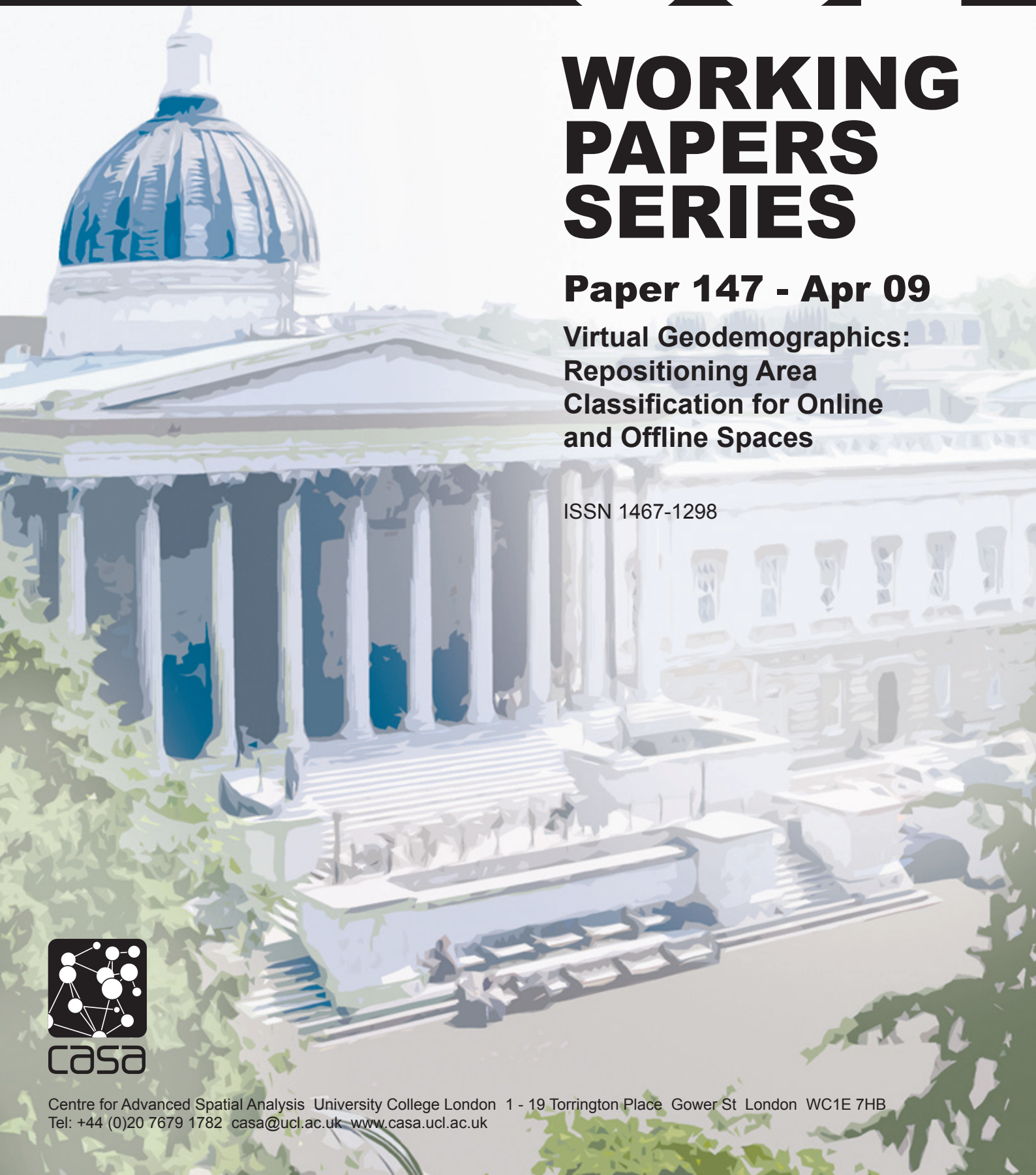

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Virtual Geodemographics: Repositioning Area Classification for Online and Offline Spaces

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Abstract

Computer mediated communication and the Internet has fundamentally changed how consumers and producers connect and interact across both real space, and has also opened up new opportunities in virtual spaces. This paper describes how technologies capable of locating and sorting networked communities of geographically disparate individuals within virtual communities present a sea change in the conception, representation and analysis of socioeconomic distributions through geodemographic analysis. We argue that through virtual communities, social networks between individuals may subsume the role of neighbourhood areas as the most appropriate units of analysis, and as such, geodemographics needs to be repositioned in order to accommodate social similarities in virtual, as well as geographical, space. We end the paper by proposing a new model for geodemographics which spans both real and virtual geographies.

The denudation of real world Geodemographics

Geodemographic classifications work by categorising real world geographic areas into a series of Types which purport to represent homogeneous and multidimensional characteristics of individuals living with neighbourhoods. Fundamental to this view is that the geographical location in which you live shapes who you are, and in the case of commercial applications; what you are likely to buy in the future. This kind of classification has apparently sustained considerable success in the commercial sector by leveraging greater returns through target marketing (Birkin et al. 2002; Harris et al. 2005), and classifications are increasingly used by the public sector for social marketing and customised service delivery (Longley 2005). The assignment of an individual within a classification Type is achieved by address matching against a small area geography equivalent in size to census areas, US Zip Codes, UK/Canadian Postcodes and so forth, an assignment process that is potentially vulnerable to the

ecological fallacy (Birkin et al. 2002) and suppression of diversity within areas (Voas and Williamson 2001). Furthermore, although geodemographic classifications are constructed using data which relate to geographic areas, their mode of construction is avowedly aspatial, in that the clustering procedures that are used to create the classification are optimised by searching for patterns of social similarity, independent of locational proximity. As such, the "geo" prefix to geodemographics perhaps implies greater spatial intelligence than perhaps exists in reality.

Against this backcloth, the growing role of the Internet for mediating relationships between producers and consumers is fundamentally challenging the supremacy of geographic classification as a method of targeting based on homogeneity of behaviours between consumers within a neighbourhood area (Longley and Singleton 2009a; Longley and Singleton 2009b; Longley et al. 2008). The core principle underlying current geodemographic classifications is that 'birds of a feather, flock together' (Sleight, 2001), that is, the locations of consumers with similar traits, tastes and preferences exhibit spatial autocorrelation. For traditional marketing activities such as the provision of targeted mail shots or the location of advertising bill boards, response rates can be estimated simply as a function of the typical characteristics of the local population likely to view these offerings. However, more and more consumer interaction takes place on the Internet, where the similarities between consumer behaviour are less obviously viewed through the lens of geographic co-location. Instead, consumers or potential customers can be drawn together from across large geographic areas. To date, critiques of geodemographics have been limited to offline behaviours occurring across geographic space, and as such little attention has been directed at the challenges that computer mediated communication poses to areal classification. To what extent do social similarities manifest both between and within online virtual spaces supplement or even replace conventional geodemographic classification?

Towards a geodemography of cyberspace?

Before reconsidering the role of geodemographics as a tool for generalised representation it is important to define how online spaces are constructed, as this influences how they can be understood and measured. There is long established interest in how new forms of interaction and place forming processes are enabled by

information and communication technology (Adams 1998; Batty 1997; Valentine and Holloway 2002). A useful typology of online and offline spaces is provided by Batty (1997:340):

1. *place/space*: the original domain of geography abstracting place into space using traditional methods;
2. *cspace*: abstractions of space into c(omputer)space, inside computers and their networks;
3. *cyberspace*: new spaces that emerge from cspace through using computers to communicate;
4. *cyberplace*: the impact of the infrastructure of cyberspace on the infrastructure of traditional place.

For a full review of early developments in computer mediated communication had their implications for the development of *cyberspace* see Rheingold (1994) and Batty and Barr (1994). As discussed in the previous section, geodemographics has demonstrated use across a variety of application areas in *place/space* and more recently *cyberplace* (Longley et al. 2008). Although early commentary argued that communication enabled by the Internet would erode the importance of *place/space* (Benedikt 1991; Caincross 1997), these effects, as argued by Kitchin (1998) were overstated. Today, businesses still cluster in real geographic spaces to build on economies of proximity, and the majority of the workforce do not telecommute from their homes into virtual offices. Connection to the Internet has not replaced our interactions and organisation across real space, and as such, *place/space* areal targeting applications using geodemographics as traditionally conceived still maintain relevance. However, the Internet, since these early commentaries has changed. Goodchild (2007:27) differentiates that 'the early Web was primarily one-directional, allowing a large number of users to view the contents of a comparatively small number of sites, [whereas] the new Web 2.0 is a bi-directional collaboration in which users are able to interact with and provide information to central sites, and to see that information collated and made available to others'. This paradigm shift has enabled numerous and rapidly expanding cyberspaces to develop around multiple different types of digital interaction (Dodge and Kitchin 2001). In this new information age, and as predicted by Castells (2000), networks have become an increasingly important organisational framework on which new organizations have been made. The conception of networks as the building blocks for cyberspaces is

increasingly evident in those new services popularised online that link individuals together through their personal associations, or sharing of common interests. Although the development and success of these social network internet websites is a relatively new but growing phenomenon (Boyd and Ellison 2008) (see Table 1), the study of offline social networks has a longer history extending back to the 1970s (Boornam and White 1976; Freeman 2004; Galaskiewicz 1979; Scott 2007; Wasserman 1994; White et al. 1976) with applications across a multiple sciences including health (Christakis and Fowler 2007), education (Hawe and Ghali 2007), crime (Calvó-Armengol and Zenou 2004) and politics (Crossley 2007).

Table 1: Facebook Demographic Profile – May 2007 versus May 2006 (Lipsman 2007)

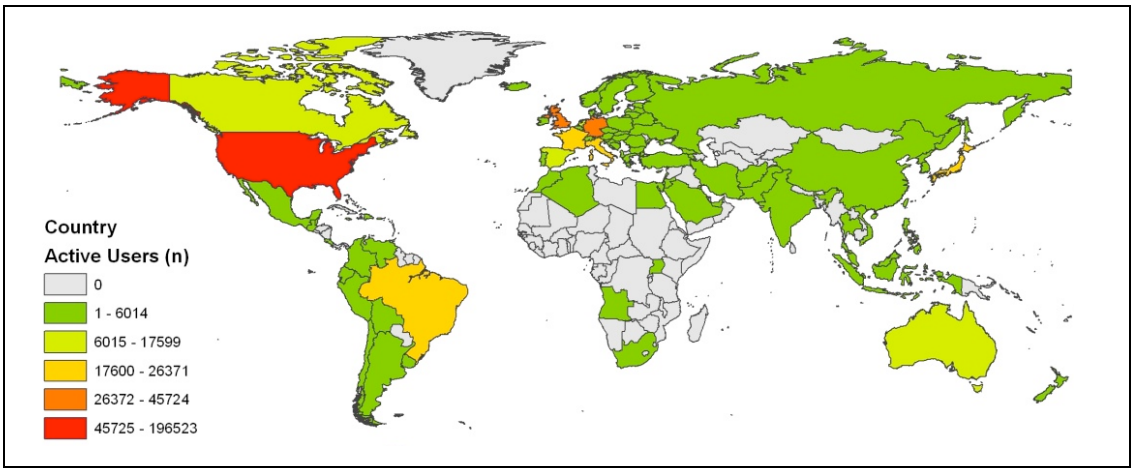
Age Segment	May-06 (000s)	May-07 (000s)	Percent Change
Persons: 12-17	1,628	4,060	149%
Persons: 18-24	5,674	7,843	38%
Persons: 25-34	1,114	3,134	181%
Persons: 35+	5,247	10,412	98%

Although online networks may also demonstrate real world spatial autocorrelation, this offline spatial clustering is likely to be more diffuse, and particularly so for those networks built around niche activities. Thus, the likely success of targeting individuals within *cyberspaces* based on *space/place* geo-location is eroded, thus undermining the value of spatial classification such as geodemographics. Indeed, in a study of LiveJournal (www.livejournal.com/) friendships Liben-Nowell *et al.*(2005) showed that around a third of social-network friendships were independent of geography. In response to this problem marketers have had to develop a range of new strategies to reach networks of individuals communicating online. One example technique which substitutes areal targeting is viral marketing, defined as a method which "takes advantage of networks of influence among customers to inexpensively achieve large changes in behaviour" (Richardson 2002:61). In this type of targeting, marketing messages are sent to a range of individuals within a targeted community who pass these on through their network of social connections. In this type of

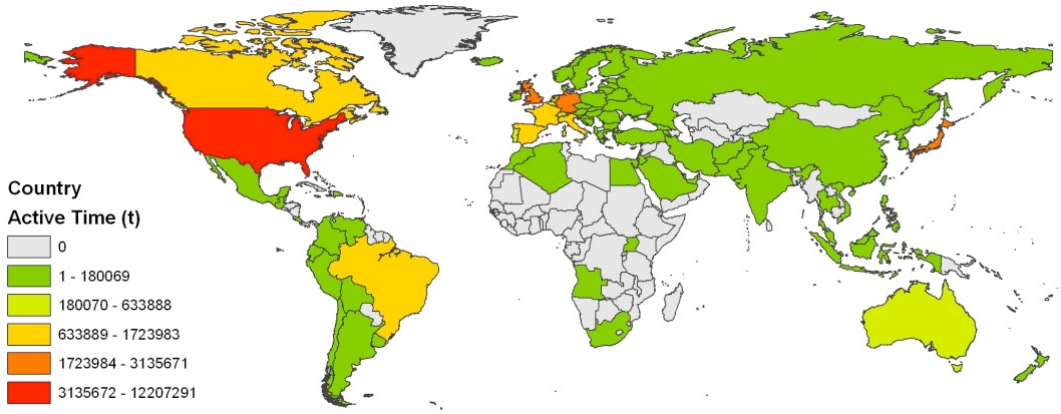
marketing, the individual and their relationships become the focus for targeting rather their geo-location and ascribed geodemographic classification.

Thus far discussion has concerned the implication of online activity served through traditional HTML based websites, albeit with elements of interaction enabled by database connectivity and scripting languages. A developing area of *cyberspace* are those situated in virtual worlds (Bainbridge 2007:472; Butler 2006), defined as "an electronic environment that visually mimics complex physical spaces, where people can interact with each other and with virtual objects, and where people are represented by animated characters". Virtual worlds in their current form extend from the technologies of internet relay chat, through Multi User Dungeon/Domains (MUD) and early graphical representations of MUD such as Active Worlds (Dodge and Kitchin 2001). There are many different virtual worlds which range in purpose, scale and sophistication. One of the most popular is Second Life from Linden Labs (http://secondlife.com/) which as of 26th June 2008 there were 14,123,766 residents[1], around double the total population of London. The frequency of active users, the time spent online and the ratio between the two measures are shown in Figure 1 for each country in the world, illustrating how use of this technology has penetrated numerous disparate but real geographic locations.

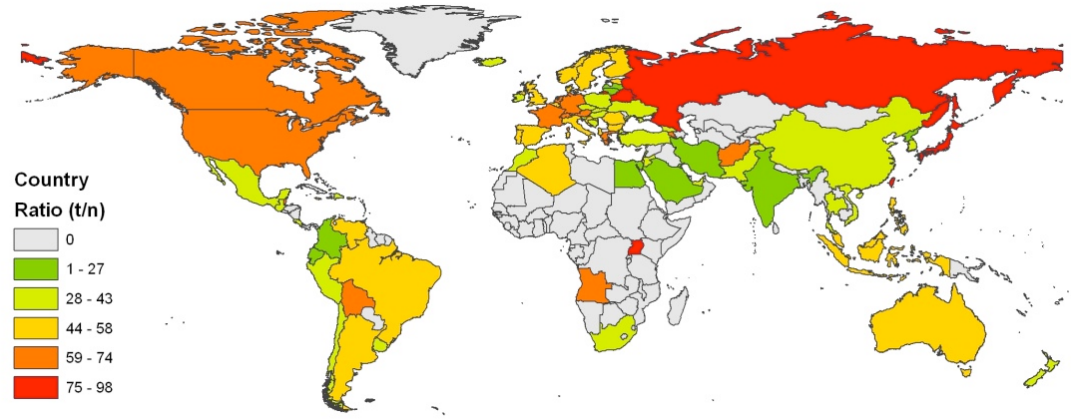
The Second Life operating environment was created with tools which enable an economy, allowing users to both produce and consume products and services sold for virtual money (Linden™ dollars) (See Figure 2). Users can purchase or sell this currency through LindeX™ the Second Life virtual financial exchange, thus making it possible to make real world money from virtual business activities.



a) Second Life: Total Active Users



b) Second Life: Time Spent Online



c) Second Life: Ratio between the user frequency and the time spent online

Figure 1: Second Life Users and Usage (Source: Linden Labs)

Figure 2: Users interacting in Second Life to make a door (Bainbridge 2007)

Virtual worlds present further challenges for marketers and social scientists looking to understand and segment consumer behaviour. In addition to interactions enabled by social networks between individual users of these *cyberspaces*, virtual worlds also partition activities across a Euclidean space, that is, each building, home, shop and avatar is located at a specific set of spatial co-ordinates, thus re-engaging the possibility of spatial targeting. However, despite early calls (Batty 1997), there has been little research to date on how the relationship between activities, space use and organisation are comparable to our real world understandings of geographic processes. This has however not deterred the many large corporations with real world presence including Ford, Coca Cola, MTV, IBM and American Apparel entering Second Life as an opportunity to expand their market and brand with limited cost. Second Life consumer intelligence will have an increasing value for all types of companies wishing to target their selling and is recognised by a number of real life market research companies who have produced a range of panel surveys conducted with Second Life residents (Tarran 2007).

Cyberspaces enable real-time and scale free interaction between their inhabitants, be this through passing association in virtual worlds, or via connections within social networks. In a sense, cyberspaces decouple the association between behavioural patterns and place, thus undermining the prerequisite of traditional geodemographics that affiliate people into typologies based on consumption patterns of those people in the area where you live. Area becomes far more difficult to define and specifically so given that interactions and activities in Cyberspace do not necessarily have to occur at a fixed place, or even in place at all as traditionally conceived. For example, what is the place of a send email? Given these challenges, it can be argued that in Cyberspaces the appropriate geographic scale of analysis is the individual. However, analogous to those challenges of linking individual records from within multiple and large administrative data in *space/place*, identifying an individual's digital footprints across multiple cyberspaces is equally challenging. For example, how can you link the behaviours of an individual on the social networking website Facebook to their activities in Second Life given that there is no unique ID? There is an acute need for more research in this area, specifically as online and offline interactions will increasingly overlap.

Virtual choices and information asymmetry

A related challenge for offline targeting solutions such as geodemographics is that they are optimised to predict homogeneous consumption patterns of limited and well defined behaviours. For example, the earliest examples of commercial geodemographic classifications examined the readership of newspapers (Batey and Brown 1995), a product category which tends to correlate highly with political allegiance(Newton and Brynin 2001), voting patterns (Johnston and Pattie 2006) and socio-economic status (Chan and Goldthorpe 2007). In these examples there is a close correspondence between the specification, or the indicators used, and the outcomes as measured by the classification. In an era of online mass customerization (Wind and Rangaswamy 2001) online retailers offer the ability to customise product offerings to meet the specific needs of individuals. An example of such a service is provided by the computer retailer Dell who offer the ability to customise products down to the level of individual components. Although traditional classification may be useful to predict those neighbourhoods likely to purchase new computers, it is unlikely to have successes at discriminating between disaggregation with this group based on niche tastes and preferences of individuals. This issue of nice tastes is explored by Anderson (2006) who develops a thesis for the long tail of retail, where those companies who provide 'endless choices' online in turn are matched by consumer 'unlimited demand'. This business model is enabled by the removal of the physical limitations of retail such as geographic location and shelf space, and as such negates the opportunity cost of stocking more items. In a physical store, each product has to occupy shelf space, and there is a cost associated with each of these items in terms of ground rents, staffing, heating and lighting. As such, the physical store will generally cater for those items which are popular and can be sold in large quantities. Anderson (2006) describes these as the "hits", and it is posited here that, like newspaper readership, it is these large and well defined hits which traditional geodemographic classifications are predominantly suited to target. The challenge for future geodemographic classification will be how they can adapt to better account for the plethora of niches which make up long tail of future online retail markets.

The Internet democratises the dissemination of information and provides consumers with a plethora of tools which enable them to compare products or services, read reviews and search for the best prices. Some of this information is prepared by teams of professional or semi-professional reviewers (e.g. www.gizmodo.com), and some

is based on the opinions of the public (e.g. www.tripadvisor.com/). Around 52% of consumers on the Internet use it to compare product information (Nie and Erbring 2000), and in previous studies the provision of third party consumer information has been shown to have a significant and cumulative effect on consumer online shopping behaviour (Ward and Lee 2000). Although Levitt and Dubner (2005) argue that these websites have the effect of reducing 'information asymmetry' (Akerlof 1970), the uneven access between those who do and do not engage with new information and communication technologies (See Longley and Singleton 2008; Longley et al. 2008) will likely create a more complex spatial arrangement of those benefiting from these information. As access grows to online resources which govern more informed consumer choices this will likely affect the aggregate retail behaviours of the "e-engaged"(Longley et al. 2008). This therefore has implications for those neighbourhood level segmentations that do not account for such patterning of internet use. For example, a targeted mail shot advertising a new low price for a product may not be as effective if the potential consumer has access to price comparison information indicating that the same product could be purchased elsewhere for the same or lower price.

Implications and Challenges

This brief review of those online technologies affecting the usefulness of geodemographics demonstrates a need to revisit the underpinning philosophy and methodology used to justify and construct these spatial representations. There are a number of implications which need to be investigated in this new research agenda. With an assertion that individuals subsume the role of neighbourhood as the most appropriate scale of analysis; where transactional information creates a significant resource for targeting effective promotions linked through either a website logon, or virtual identity; this in turn requires new insight into issues of privacy and surveillance, particularly in the way in which information gathered about individuals online can be collected, collated and reused. Privacy concerns for geodemographic classification is not a new phenomenon (Goss 1995), however, if these classification are to be extended to measure virtual as well as real geographies, further research is now necessary to address a growing body of concern about the way in which online information may impinge on privacy, security and civil liberties(see Alessandro and

Ralph 2006; Miyazaki 2008; Whysall 2000). Users of the internet are becoming increasingly aware of these risks (Madden et al. 2007), and indeed a number of companies now provide consumers with various ways of assessing their digital footprint, both in terms of data transferred[2], and those occurrences of your details across various websites[3]. These issues are complex, and also have parallels with other real world methods of data collection, for example, in those activities of retailers operating store card schemes. When users collect points on their store card based on the value and items in their shopping basket, they also are providing retailers with a plethora of information about their shopping behaviour. This information is used by retailers to provide targeted promotions and inform store intelligence (Hunby et al. 2007), and in the case of some schemes, these information are available outside the borders of the stores in which the data was collected. A further implication for geodemographic classification builders is a requirement for better understanding of how information gathered online relates to offline behaviours, and indeed analysis if these are either complementary and as such reinforcing, or; contradictory, thus providing new insights. Some research has been completed in terms of social capital accumulation (Wellman et al. 2001) and specifically how these constructs may influence offline behaviours (Blanchard and Horan 1998; Matei and Ball-Rokeach 2001). Other researchers have looked at the relationship between engagement with new information communication technologies and the arrangement of these behaviours across real geographic space(Longley and Singleton 2008; Longley et al. 2008). The link between online behaviours for offline applications are beginning to be explored, for example Sulake, a Finnish provider of a virtual world have started utilising the platform to produce market research data by surveying 42,000 consumers across 22 countries (Jana 2007). Additionally, with the advent of geocoded online content, such as the real geographic location of Twitter[4] feeds, this offers new online information which could potentially be mined for offline spatial intelligence at an individual level, with resulting implications for privacy. An example of this is demonstrated through Twittervision[5] which plots the spatial location of Twitter feeds onto a Google Map.

In order to action further research on the challenges and implications posed by those new technologies discussed in this paper we propose a new framework through which geodemographics can be repositioned. This is a matrix made up of offline (space/place), hybrid (cyberplace) and online (cyberspace) geographic spaces; cross

tabulated against three levels of increasing purchasing complexity ranging from initiation, regular purchasing and customisation (see Table 2). Of the nine cells in Table 2, which each contain examples of a range interactions between suppliers and consumers, traditional geodemographics arguably only have function as traditionally conceived for space/place initiations which are based on the area in which a person lives. Although it could be argued that area classification may add insight into the types of neighbourhoods in which an individual consumer lives (where address is known), and as such could be applicable across multiple areas of the matrix, this information is likely to be far less insightful than information mined at an individual level.

Table 2: A new framework for geodemographic analysis

	Space/Place	Cyberplace	Cyberspace
Initiation	Direct Mail targeted by home address.	Direct Mail targeted by online and offline purchasing linked to a store card.	Targeted website adverts based on a search criteria – e.g. Google Adverts.
Regular Purchasing	Walk in store recording customer information – e.g. Evans Cycles	Using websites to purchase items which are collected in store.	Recording of online purchases.
Customisation	N/A – Too expensive for the majority of stores to uniquely customise products.	Online recommendations tailored by offline shopping behaviours linked to a store card.	Online recommendations tailored by previous online shopping behaviours.

In this paper we argue that the benefit of examining behaviour at a neighbourhood level is eroded by increased consumer activity within multiple cyberspaces, and that because of these interactions, more sophisticated methods are required to identify and map homogeneous clusters of behaviour at the scale of the individual. Although one can adopt a dichotomous view of consumer transactions, where online and offline behaviours are neatly partitioned, online behaviour have relevance to real world consumer habits and the mining and linking of this type of information could potentially lead to new insights. Given significant evidence that the role of traditional advertising media channels are being eroding as an effective tool for engaging potential consumers (Anderson 2006; Webster 1992), we posit that geodemographics in its current form will experience gradual erosion of their effectiveness unless the

concerns we present in this paper are addressed. Our established understanding of the behaviours which govern consumption are clearly challenged by the new e-infrastructures described in this paper, and as consumer responses to areal targeting initiatives changes; investigation is now required as to how better response rates can be garnered through new methods of segmentation and engagement. These changes represent a shift in our understanding of how consumer behaviours can be modelled, from a top down hierarchical approach where classification builders produce automated spatiality (Thrift and French 2002) based on users postcode, to the type of generative bottom up social science discussed by Batty (2008) and Epstein (2007).

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