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THE WEB, THE GROCER AND THE CITY: ON THE (IN)VISIBILITY OF GROUNDED VIRTUAL RETAIL CAPITAL

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By

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1. Introduction

A vehicle pulls up outside. Another day, another delivery of food to the home. Another van plying the backstreets, saving customers a trip of their own. This scene fits a number of possible extensions of retail capitalism to the "last mile" to the customer's doorstep: the daily milk round, still available in countless streets in Britain, but a dying (if not already well interred) business elsewhere; or a hot pizza delivery. Of interest in this paper is the delivery of food purchased via the internet. Home delivery of food is nothing new; in fact, many supermarkets offered this service in limited form in their early days (Figure 1), and some still offer home delivery of items purchased by the customer in-store, often to assist the less abled or aged. However, systems pre-dating e-commerce were limited in scale, and were either inherently unresponsive to changing customer needs (by supplying a standing order of staples, for example) or expensive to operate (due to the time required by store staff to take and process orders, largely via telephone). Fax ordering did make an

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appearance in some stores, but using fax ordering is complicated both for customer and store, due to the sheer number of Stock Keeping Units[2] carried by a modern supermarket.

Figure 1: Sainsbury Home Delivery, c. 1910

Source: Sainsbury Virtual Museum
www.jsainsbury.co.uk/museum/museum.htm

The internet, therefore, was heralded in the 1990s as a means to overcoming the problems of order complexity and time costs that beset other home delivery systems (Jones and Biasiotto, 1999; Management Horizons, 1997; Reynolds, 2000). A virtual grocer could *potentially* offer a wider range of items than even the largest store, at a lower cost than was previously possible – much in the same way as Amazon.com promised to be the "largest bookstore on earth" (Dodge, 2001), given sufficient order volume to offer economies of scale *and* scope. Thus electronic grocery shopping (EGS) was thought, in

[2] A Stock Keeping Unit (SKU) is the basic identifier of a good: different SKUs may be assigned to variations of sizes and flavours/colours within a brand.

some quarters at least and like so many other sectors potentially disrupted by electronic commerce (Christensen and Tedlow, 2000), to herald the "end of geography" (O'Brien, 1992; Cairncross, 2001; Thrift, 2001). It could be 'the ultimate technology for shortening many channels of distribution between the supplier and the consumer' (Jones and Biasiotto, 1999: 77).

In this view a "weightless economy" (Coyle, 1997; Quah, 1999) could develop, unhindered by national borders or traditional retail market area analyses, and the considerable sunk costs in buildings, personnel and networks that have always accompanied the distribution of goods and services (Clark & Wrigley, 1995). While this conception may have some relevance for digitalisable ("bit") products such as music, media and film, it has not applied to grounded ("atom") commodities such as food and bound books (Negroponte, 1995; Leyshon, 2001; Currah, 2002). Thus music, which in essence is recorded information, has traditionally been stored in atom form: the vinyl scratched by needles, the tape read by magnetic heads, and most recently gold-sheeted plastic discs read by lasers. But this information can easily be stored digitally, and the trading of "MP3" music shows just how "bit-able" this industry is (Leyshon, 2001). Space means little to "bit" industries, because downloading an MP3 song or reading a newspaper article from across the world takes only little longer and costs no more than from within the same neighbourhood. The distribution logistics for "atom" industries, however, has been made, if anything, more complicated by online ordering. Organisations such as

Amazon.com for books or Webvan or Tesco for food and other everyday items have had to sink significant sums into their distribution systems.

This paper explores how capital – the circulating wealth available for investing into business practices and places by companies and individuals, and the core engine of capitalism – has been "grounded" in the urban retail system, with a particular focus on electronic commerce. In other words, what are the material impacts on the city from the last few years of explosive growth in interest and activity in the internet by customers and businesses? To a customer purchasing products from a computer at work, arriving home to find the ordered products on the doorstep (or perhaps more commonly, a "sorry we missed you" note from the deliverer), the order, picking and delivery processes initiated by their custom may remain out of view and out of mind. This paper aims to uncover this "hidden geography" of e-commerce, considering how the seemingly simple act of doorstep food delivery is explicated in urban form, and in transportation and communication infrastructure. The paper begins by reviewing the various models of organisation that virtual retailers have experimented in, then evaluates how these models have impacted on the urban landscape, both in fixed and fluid terms.

2. E-Grocery Business Models

A veritable explosion in experimentation occurred in internet-enabled home delivery of food during the late 1990s. Out of this three distinct types of computer-mediated retail ("e-

tail") systems can be discerned, although as always there are numerous variations (see Reynolds, 2000 for a balanced view). The quickest and cheapest to establish is in-store fulfilment, where an existing retailer utilises its established store network (the so-termed "bricks and clicks" method) (Murphy, 2003; Currah, 2002; Oinas, 2002). The most expensive method is to construct a purpose-built e-commerce fulfilment warehouse (a "pure-play"[3] if the operator has no "bricks and mortar" store network). A third option is for (usually small) existing retailers to contract out the web ordering and customer management functions to an intermediary (sometimes termed an "infomediary") (Mendelson, 2001a,b; Kämäräinen, 2001; Wrigley et al, 2002) whose core function is to pass stock, order and delivery information between the customer and the retailer.

Numerous "e-tailers" have tried various forms of these models. Tesco, the largest UK nationwide supermarket chain, began "bricks and clicks" operations in 1996, and was roundly criticised in the US press for its "backward" and "limited" store-based methods:

> The Tesco Direct service is so low-tech it's bizarre. Orders are sent to the Tesco store nearest the customer's home, then "pickers" pull the desired items off the shelves. You read that right - no warehouse. … Tesco better invest in infrastructure, including "dedicated picking centres" free of day-to-day shopper traffic … [because] the Web is an unforgiving place. *Source: Industry Standard (2000)*

and only half-heartedly defended in the British press:

> There is one big "e-tailer" whose star shines more fiercely than ever. The surprise is that this is no Silicon Valley digital hotshot, but a dull old British grocer. *Source: Economist, February 5, 2000*

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[3] Pureplay is generally taken to mean "unemcumbered by non-internet activities" and sunk retail capital, and at the turn of the millennium was seen as epitomising the modern, progressive and nimble, compared to the staid and conservative "bricks and mortar" organisations (***Economist***).

In the 'bricks and clicks' model "pickers" roam the aisles with computerised order scanners, which direct the picker to the location of the next item for picking, sorted by store layout. (Figure 2). Tesco's model is to pick multiple orders at the same time, with the picker informed by the system as to in which of the many bins (which could represent several customers) to place the item. Orders are thus divided by the computer system among multiple pickers, and reassembled at the end. While this system is subject to potential pick errors if pickers place items in the wrong box, it is faster than using a single picker to pick the entire order. Once complete, orders are assembled in the "Home Shopping" area in the backroom (Figure 3), and loaded into custom-built multiple-temperature trucks (Figure 4). Trucks follow a route pre-determined by head office computers, according to a least-cost algorithm. This path is factored into the ordering stage, since customers order goods for particular delivery "slots", combinations of space-time which are only available if sufficient other neighbouring slots are also being utilised (Murphy, 2003). Should demand at a particular time lie elsewhere in the delivery area, slots are closed where there is less demand and opened where the demand is greater. Tesco has fulfilment centres in hundreds of its stores across the UK, and boasted of being within economical reach of 90% of the UK population by 1999. (Economist, 2000; Tomlinson, 2000). It has exported its model to subsidiaries in Ireland and South Korea, and to the United States in a joint venture with Safeway. In the year to June 2002 Tesco.com (the online division) sold nearly £400 million of groceries, appliances, books, DVDs, CDs and clothing. Just before Christmas 2002 it claimed to have delivered to more

than one million households around the UK, and to 100,000 homes in one week alone via its fleet of 950 vans. Tesco interpreted this 'as confirmation that Britain has now accepted online supermarket shopping as a normal part of day-to-day life' (Tesco press release, 5th December 2002).

Figure 2: Store Pick: Tesco

Source: photo by author

Figure 3: Tesco HomeShopping

Source: photo by author

Figure 4: Tesco Delivery Truck

Source: Photo by author

The US media's favourite fulfilment model at the time was that of Webvan, a company with a surrounding mythology to rival that of Amazon.com (Dodge, 2001). Founded by Louis Borders, previously the founder of the US bookchain Borders, Webvan attracted George Shaheen as CEO, previously the legendary chief of Andersen Consulting.[4] His shift to online grocery was discussed in the press with bewildered incredulity ("giving up

[4] George Shaheen is credited with dramatically expanding the size of Andersen Consulting, and as CEO would have inherited substantial shares in the renamed demutualised firm Accenture. He is held responsible for insisting on the permanent separation of the consulting and auditing/consulting arms, for which the consultants are no doubt relieved given the subsequent implosion of Arthur Andersen. His decision to join Webvan in 1999 was seen as a vindication

consulting for groceries?") and missionary zeal. Apparently the teenage years Shaheen spent working in a local store gave him a lifelong drive to improve the inefficiencies of the system:

> The Webvan Group is "not an Internet grocery play," Shaheen said. "This is a last-mile play. Webvan has always been about delivery. That's where it has strength. We view ourselves as an Internet retail company, delivering the last mile." (Sandoval, 2000)
>
> Shaheen sees his potential market as $1.5 trillion -- not just groceries but the whole projected Web-based shopping pie. […] The ultimate target […] as Moritz puts it, is to make "Webvan a frigging juggernaut you don't want to compete with." (Perman, 2000)

It might also have been prompted by a favourable Andersen Consulting report on Electronic Grocery Shopping (Kutz, 1999). Webvan's mission was to automate the grocery business, by picking from large warehouses in edge-of-town locations. At 300,000 square feet these "dedicated picking centres" are three times the size of the largest supermarkets, and would hold "miles" of conveyor belts and computer-controlled rotating racks that would literally bring the goods to the picker (see for example Perman, 2000; Dotcon).

Going public in November 1999, Webvan was one of the largest Initial Public Offerings of that banner year for technology stocks, raising nearly $800 million in public and private finance (Murphy, 2003). It had significant expansion plans, wanting to enter 16 cities across the United States, each of which with a single large fulfilment centre hub and neighbourhood delivery managed from drop stores as spokes across the city (Mendelson,

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of pureplay investment, and a desire on Shaheen's part to "walk" the consultant "talk": facing 'a question all

2001a) The fulfilment centres cost up to $40 million each to build, and Webvan announced a $1 billion investment programme to fund it. By mid-2000 the strategy changed: Webvan acquired via a US$1.2 billion stock purchase its key Seattle competitor Homegrocer (affiliated with Amazon.com), and set about converting Homegrocer's smaller and less automated (but nearly profitable) centres to the Webvan model. Analysts continued to gush about the wonderful experiment, interviewing delirious customers and marvelling over the miles of conveyor belts, the live lobster and the potential for 50,000 other items and 8,000 deliveries per day:

> In a recent speech Fred Smith, the entrepreneurial founder of FedEx, questioned the business of companies like Webvan. He revealed that Federal Express lost money every time it delivered a package to a home. And since he thinks of home delivery of goods and services as a fancy version of mail order, he wondered how Webvan could ever make a profit. … Just a form of fancy mail order? I don't think so. Webvan's a whole lot more – a kind of customized, personalized, timely service that has huge potential. Smith's critique is part of the latest knock-the-Net fad, and he's dead wrong. Whether you're sheepish, a lemming, or just an old-economy guy, it's nuts to believe that consumers don't want and need the Net. *Source: Alsop (2000)*

This wasn't to be, at least for Webvan. The bursting tech stock bubble put paid to prior plans to seek a further $300 million in financing. By July 2001, out of IPO cash and with all but one of its centres haemorrhaging red ink, Webvan closed virtual shop. Shaheen jumped a little earlier and negotiated a large pension in doing so, infuriating redundant workers (CNET 2001; Sandoval. 2001; Wolverton, 2001), but the collapse of the company put paid to that.

Andersen lifers eventually do: How good are you, really?' (Perman, 2000)

Nonetheless, warehouse-based operations continue to exist on a smaller and less automated scale in Canada, particularly Toronto-based GroceryGateway and Vancouver-based Quick.com. Quick estimate their set-up costs at less than 1/60th of Webvan's with a warehouse 1/10th the size (Murphy, 2003).

3. Bring in the Infomediary

The third method for organising e-tailing is provided by the infomediary (Hagel & Rayport, 1997; Kämäräinen, 2001; Wrigley et al, 2002). These are "pureplay" operations that don't actually handle the physical fulfilment, concentrating instead on managing the link between customer and retailer. Infomediaries host the web pages and retail databases that lie behind the virtual storefronts, and pass on the orders to the retailer through email, fax or link to the store's database. The store then picks, packs and delivers the goods. The advantage to the store is the costs saved in developing their own web store, and in some marketing expenses. Several store- and warehouse-pick operations started as variations of this: Woolworths Supermarkets New Zealand (a nationwide supermarket retailer and leader in electronic grocery shopping) began its operations as part of the "Great New Zealand Shopping Mall", a joint website along with a bank and other retailers, but hosted and fronted by Ad-Pacifica (see Murphy, 2002; Davis & Buchanen-Oliver 1999, 2000 for details on this setup and its subsequent demise). Likewise, Quick.com has its web server hosted by a third party in Calgary, and relies on fast connections between its head office (and customers) and the web server farm located thousands of kilometres away. Small

Potatoes Urban Delivery (SPUD, a Vancouver, Canada based online organic operation) likewise has its server located elsewhere, but within the same city, while Woolworths and Tesco have their servers located within the hub of internal IT.

For each of these models there remains a further choice: should the e-tailer deliver the goods to a customer in attendance, or unattended? Within the latter there are further options: to the home/workplace, or to a dedicated "drop zone". Aoyama (2001) discusses the existence of such neighbourhood drop zones in Japan, where 7-11 stores act as receivers of goods (much in the way that local postal outlets become de-facto outlet stores for Amazon.com and other bulky product shippers, if the customer is not at home during delivery). Currah (2002) and Wrigley et al. (2002) note the interesting case of Empori.com, which acted as the equivalent of a postal box outlet for bulky goods. Empori established contracts with a number of e-tailers, who would then deliver to a specified secure box at the Empori outlet nearest the customer (Figure 5). The customer could then pick up the goods at a time that suited them. While this was a good solution (but ultimately not a successful one – the company shut down during 2001) for books, music and computer products, it would not work well with perishable items. An alternative option for unattended delivery was trialled by Streamline of the US and Homeport of the UK, involving the installation of secured box at the customer's home (Figure 6; Reynolds, 2000). The e-tailer would add items to the insulated box at a time of their choosing; customers then pick up the items at their convenience. Streamline would make these

deliveries at night, when the streets were less congested; it would also pick up and process clothes for drycleaning,[5] video rental returns and films for processing.

Figure 5: Empori centre

Source: Currah (2002: 1428)
Photo © Andrew Currah; see also Currah (2002:1428)

Figure 6: Homeport Box

Source: http://www.homeport.info
© Homeport Ltd

4. Ch … ch … Changes

The merger of Webvan and Homegrocer, and the subsequent collapse of the combined operation was not the only outcome of David Bowie's musical advice to "turn and face the strange". Other US startup companies had already tried and failed: Peapod tried picking in others' stores, then built its own warehouses, and finally was taken over by Dutch retailer Royal Ahold and converted to in-store fulfilment using Ahold's US chains (Murphy, 2003). Netgrocer had tried using FedEx to send groceries across the US, but this proved

[5] The combination of dirty clothes and food in the same box would give food safety experts some concern.

prohibitively expensive. Streamline tried unattended deliveries to installed boxes at customer homes, but the boxes proved too expensive and too small to outweigh cheaper delivery costs (Reynolds, 2000). Priceline had set up the bizarre reverse-auction company WebHouse Club, whereby customers would bid the lowest price for individual grocery items, and winning bids would receive an emailed coupon that could then be exchanged for goods at participating grocers (it didn't last very long). GroceryWorks, a Texas-based warehouse pure-play and a professed expert at "cross-docking" operations (whereby goods coming in are redirected out without storage), was purchased by a combination of Safeway US and Tesco UK, with the latter's online technology being used to direct fulfilment out of Safeway stores, in an interesting alliance of international competitors (Murphy, 2003; Wrigley et al., 2002).

In New Zealand, a single-store competitor to Woolworths named TheSupermarket.co.nz attempted to send groceries around the country from a small country town, and lasted about six months. Across Canada and the US other small retailers using the infomediary Peachtree Network were left without an internet shopfront when the network collapsed in late 2001; several of the participating stores have since reverted to simplified fax ordering or locally-designed websites. Finally in the UK Tesco competitors ASDA (bought by Wal*Mart) and Sainsbury gave up on their warehouse fulfilment plans (after earlier deriding Tesco's more "limited" vision), and reverted to in-store fulfilment themselves.

After all the at-times bizarre experimentation of the late 1990s and early 2000s, retail capital was left with two options: continuing the slow growth of in-store fulfilment, or hanging on for dear life (and economies of scale) with small warehouse centres.

5. The Grocer and the City: Urban implications

The logistics for groceries is complicated – not as problematic as scheduling aircraft, to be sure, but providing the thousands of grocery lines in-store or online is a lot more difficult than selling books or CDs online (Amazon), or acting as an auctioneer (EBay). Food is sourced on a daily to weekly basis from thousands of manufacturers located all over the world, and distributed on a daily basis to millions of customers through thousands of stores. Moving this convoluted system over to the net was never going to be a straightforward task.

Supermarkets have increasingly paid attention to the logistics of distribution management, realising that this can make or break the supermarkets which survive on razor-thin margins. According to Sparks (1994: 331): 'logistics and systems became a significant frontier of cost-control activity and enhanced profitability in UK food retailing', as major firms 'progressed from simply being the innocent recipients of manufacturers' transport and storage whims, to controlling and organizing the supply chain, almost in its entirety'. "Bricks and mortar" food retailers have developed sophisticated behind-the-scenes "grounded" infrastructure to act as an efficient intermediary between the many suppliers

and many customers. The increasing size of supermarkets during the 1970s required backroom areas to receive, bulk-break and store product inventory prior to shelf restocking (Murphy, 2003). Some of this inventory came directly from manufacturers, but the larger chains began to build centralised distribution centres (DCs) to serve groups of stores, as a means of improving efficiency. The further upscaling of store sizes during the 1980s and 90s reduced the backroom space for individual stores, as the DC became more important. It also became larger and more sophisticated, designed to send single truck deliveries to the stores to remove the task of coordinating multifarious manufacturer deliveries to the store. The modern regional distribution centre caters to many stores through automated "continuous replenishment" systems, and can range up to 700,000 square feet (Figures 7, 8), more than six times the size of the largest hypermarket.

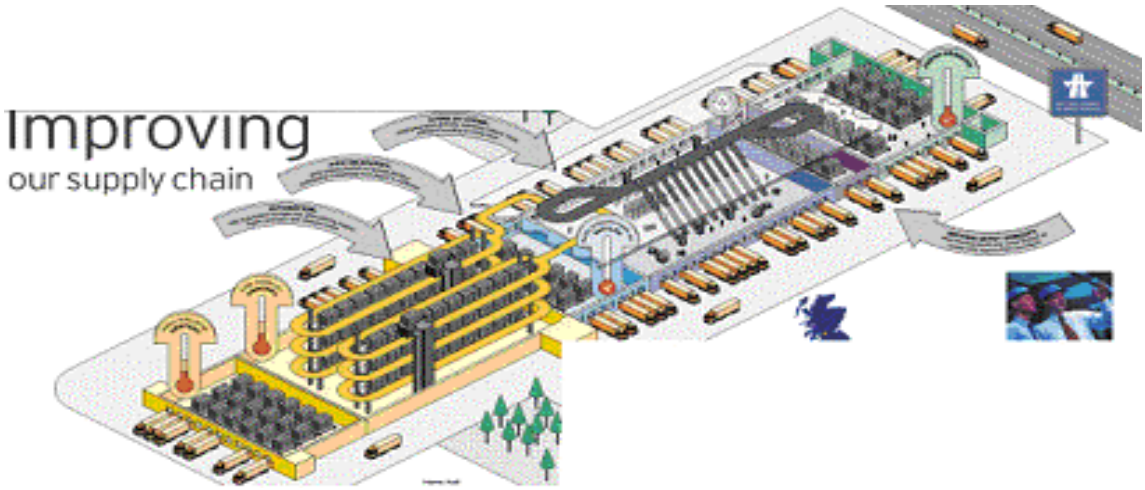

Figure 7: Schematic of Sainsbury DC, Birmingham UK

Source: J Sainsbury Annual Report, 2001

Figure 8: Tesco DC, Thailand

Source: Tesco Annual Report, 2001
© Tesco plc

These regional distribution centres are designed for one purpose only: the fastest and most efficient restocking of a chain store. Manufacturers' deliveries are often already labelled with their destination stores and quantities, with the pallet contents bulk-broken and re-routed to the store loading bays without on-site storage, in a process known as "cross-docking" (Maloney, 2000). Full-truck loads are then sent to the store, with goods often already ordered and pre-stacked for easy shelf display in roll-in cages. Goods therefore spend little time in transit or storage, thus quickening the turnover of retail capital and fattening retailer margins. The emphasis of this business model is on scale: large trucks to large stores using as few deliveries as possible at the greatest speed.

Because of this dedicated purpose, the regional distribution centres do not make ideal assembly points for single-customer orders to be delivered to the home. For one thing, a store's product range may come through multiple distribution centres:

> In terms of our logistics model and our supply chain, the only place that all our product range comes together is in a store. In terms of our warehouses that we have at the moment, we've got dry goods warehouses, we've got separate chilled and frozen warehouses, and separate fresh warehouses, and typically they are physically never in the same location. They might be in the same city, but that is about as close as they get. (*Source Manager interview, Woolworths Supermarkets NZ, March 2000*)

Even if ambient, chilled and frozen goods were co-located, as Figure 8 with its three-temperature areas suggests, along with produce, meat, fish and bakery items, the breaking of bulk necessary to supply individual customers would require quite different sorting areas, with goods tied up in storage much longer. This would definitely be going against recent retail logistics trends (Murphy, 2003).

By placing e-tailing fulfilment within stores, existing retailers are able to capitalise on the already grounded infrastructure. Retail grocery operates on very thin margins (Mendelson, 2001a; Caicco, 2001), and have developed the logistics for the cost-efficient resupply of goods. Bricks and mortar retailers have also off-loaded some of the most expensive parts of the business onto their customers: the picking, packing and delivery. Modern customers do not like to – or perhaps do not know how to – calculate the costs involved in getting to the grocery store (Kämäräinen et al., 2001), or the opportunity costs of their labour whilst

there, which in many places includes bagging the groceries and in some even doing the scanning.[6] As one online grocer put it on their website:

> In the past grocery stores were built of bricks and mortar anchored to huge parking lots. They had few marketing means to coax you into their stores. The colored insert in our daily paper, the endless jingles and TV ads describing the reasons to visit bigger and bigger food stores. But no matter what, we still had to spend hours each month, waiting in line, while we inched closer and closer to the check out clerk. Once there, scanners have made the clerks' work easier, but we still wait and wait […] now we have to wait until all the products are scanned […] come to think of it, in the last 20 years, not too much has happened to make the grocery shopping experience better for the consumer…just better for the store! (*Source: www.quick.com, accessed 15 June 2001*)

In providing these services for the customer, e-tailers are adding significant fulfilment costs which customers may be unwilling to pay. Customers tend to resist the embedding of delivery costs within raised prices, and thus the extra costs of home delivery must be recouped by increased order sizes (which means either fewer customer trips to the same store, or business pinched from a rival) and/or by using the virtual store to sell other products. Tesco's well-diversified product line includes credit cards, mortgages and bank accounts; a wine club, a baby products club, books, electronics and even car sales; these can be heavily promoted to the online customer as a part of building the "customer relationship". Tesco claims that its operations contribute to the bottom line, in that the actual Home Shopping operating costs are covered by the margins on the products sold; these contributions are quite significant, as online sales reached over £447 million (US$681m) (Tesco, 2003). The Tesco.com unit is not truly profitable in the stand-alone

[6] UK-based Sainsburys has invested considerable sums in these systems, whereby customers use a held-held scanner to record their selections while roaming the store. A cashier simply processes the total at dedicated tills, although randomly selected orders are rescanned for verification (as a form of surveillance). The process benefits both customer, who can monitor total expenditure during the selection process and has a faster exit (although the scanning of each selection adds time), and the store, which can process more customers with fewer staff. The investment in in-store equipment held Sainsbury back from following Tesco's lead in online shopping, with whom it is only now beginning to catch up.

sense: the online division relies heavily on the existing infrastructure for buying and supplying competitively-priced products. Indeed this is a clear advantage of the in-store model: the in-store customers generate a large turnover of stock, thus guaranteeing the freshness and variety of products. Warehouse-based models were relying on building to an equivalent scale, but ran out of cash before getting there. As the finance director for Tesco put it:

> Think of the store as a warehouse. It is close to where people live, it is simple to pick from because the layout is designed for customers to navigate, infrastructure is there and it is already part of a supply chain. (*Source: Economist, 2001 p. 58*)

6. On the Road, Jack

Where the in-store and warehouse models converge is in facing the logistics difficulties of getting the products to the customer. As mentioned earlier this can be done either customer-attended or unattended. Because of food safety requirements and to promote an image of good service, most operators prefer attended delivery: this guarantees that the delivery is paid for (for some, including Quick and Webvan, on the spot using wireless payment systems) and that frozen and chilled items do not spoil. However, communicating with the customer – even bringing the groceries inside – significantly increases the "drop time" and reduces the number of drops that can be accomplished by a single truck, to an average of 3-4 per hour (Kämäräinen, 2001; Mendelson, 2001; Caicco, 2001). Companies using the unattended method are faced with a difficult choice: install a sealed box as per Streamline and HomePort, or hope that the contents do not spoil. Small Potatoes Urban Delivery of Vancouver has partly overcome this problem by restricting the

type of goods sold to (very) fresh organic produce and frozen goods, and provides chill-packs to reduce the heat stress. It is not always successful, as some customers may not unpack bins for up to 8 hours after delivery. However, SPUD argues that its produce is fresher by several days and is handled better than the organic offering in-store; and by not providing delicatessen items or chilled meats[7] it reduces the risks of food contamination.

SPUD is also active in campaigns to reduce the impact of humans on the environment in ways other than organic food production. It promotes the use of more environmentally-friendly fuel in its trucks, and the use of back streets for deliveries which reduces the congestion on main streets. As it states in a Frequently Asked Questions page on its website:

> *Q: Aren't you contributing to smog, traffic congestion, and global warming by having a bunch of delivery trucks travelling all over town dropping off groceries?*
>
> A: We applaud you for your environmental concern and admit that we were concerned about this issue as well. However, our research shows that one delivery vehicle delivering to 80 homes has a lot less environmental impact than 80 residents travelling to their local grocery store in separate cars. Furthermore, our vehicles are fueled by natural gas or propane, which has 30% lower emissions. (*Source: SPUD website, accessed 15 July 2001*)

Thus one form of urban space utilisation – the weekly (or more frequent) trip by car to the supermarket by practically every household in the city – is being replaced for some with another: the articulation of retail capital to the customer's home, through collective delivery. SPUD has engineered this articulation in interesting ways: it specifies a particular day of the week for delivery to specified zones, much like rubbish collections

[7] Or frozen red meat at all for that matter – only organic chicken and sustainable-yield fish.

(Figure 9). Because it delivers a highly attractive product, in monetary and quality terms as well as the organic concept itself, SPUD has convinced sufficient numbers of punters so as to have a high drop density (Figure 10). In the Vancouver neighbourhood of Kitsilano, I observed a SPUD driver taking more than two hours to navigate a one kilometre square grid of suburban homes, with more than 30 deliveries made in that time. This is more than twice the rate Webvan expected each driver to achieve in a *day*. Admittedly these are relatively small deliveries, as the average order size from SPUD is less than a third of that from Tesco, Woolworths or Quick.com. Nonetheless, the urban impression made by a SPUD truck is much more akin to a rubbish collection or mail delivery – stopping frequently along a street – than the discrete and isolated stops made by a full-service grocery company (which is more akin to a courier drop). For potential customers who like to be assured that a service is popular, viewing a SPUD truck in action is a more impressive sight.

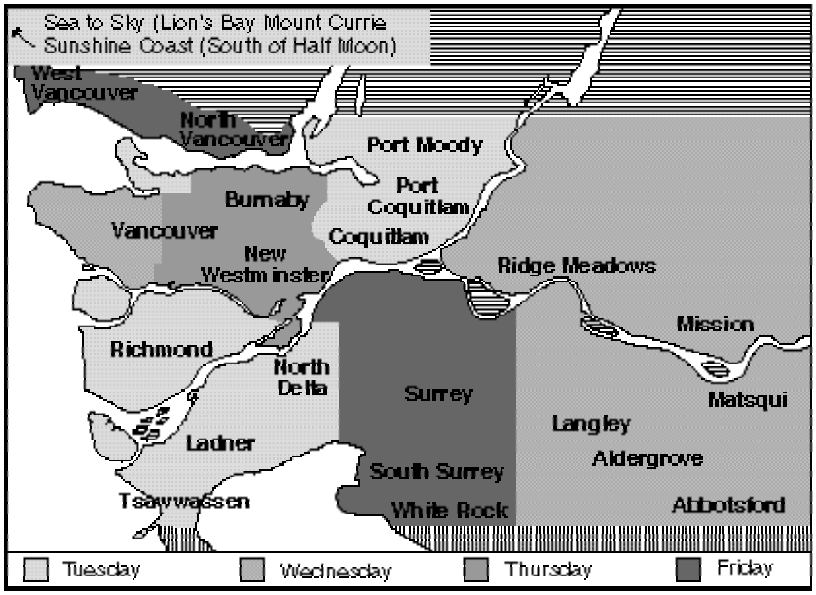

Figure 9: SPUD delivery map

Source: www.spud.ca

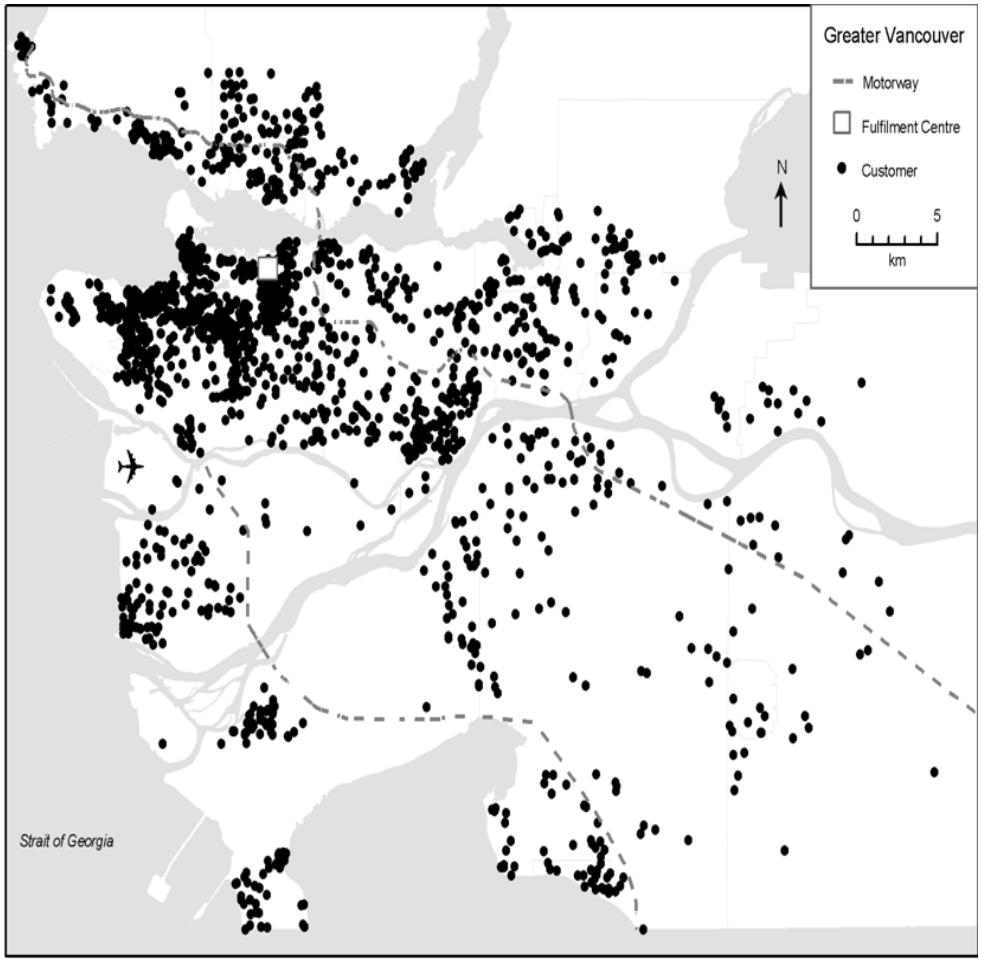

Figure 10: SPUD customer locations, Vancouver

Source: data from SPUD

7. The Future of Electronic Grocery Shopping?

This is not a rhetorical question. Despite the highly publicised demise of a number of online grocers in the United States, there are good reasons to expect the continued

existence, if not rude health, of online food retailing. The first is that grocery shopping is not a favoured activity for many people. The concept of ordering groceries online is attractive to quite different market segments, including:

1. the "time-poor": wealthy households that are busy with time-intensive jobs and/or social lives (or would like others to think this of them)
2. parents with young children: food shopping with them can be a nightmare
3. the carless: getting back from a store can be backbreaking
4. the less-abled and elderly: getting to, from and around a store is very tiring
5. technofreaks: using a computer is much more fun than dealing with stressed parent customers and bored teenaged cashiers
6. lifestylers: ordering online is the best way to obtain hard-to-get items, like specialty foods[8] or good organic produce

Groups 1 and 2 are big spenders in grocery stores and are attractive customers for would-be profitable e-tailers, while group 5 (early adopters of technology) is a key market for extending the range of products offered by the company. Customers of the various e-tailers tend to be quite devoted to the service; media reports of Webvan customers showed how "devastated" some of them were on the demise (E-Commerce Times chat boards, July 10 2001):

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[8] A good example of this is allergy tolerances: Electronic Grocery Shopping systems have the capability of providing far more information about products than can fit on the label (even if the manufacturer is happy to disclose such information), making product selection simpler for the concerned consumer. The task of adding this additional information often falls to the EGS e-tailer, however, pushing up administration costs. Some have managed to obtain detailed ingredients lists from manufacturers, but these must still be entered manually. Similar processes help those concerned about Genetically Modified foodstuffs, in the absence of "proper" disclosure.

> Our family had used HomeGrocer/Webvan for about 7 months. For us it was a godsend. I'm disabled, my husband is critically ill and it's very hard for my 79 yr. old mother to do the shopping (*Liz*)
>
> Those vans, to me, were kind of a symbol of the melding of cyberspace and the real outside world. (*TedDrew*)

The second reason why EGS is a long-term solution is that the logistics are not impossible. As customer numbers build (even Webvan was still growing just before collapse), the delivery logistics become simpler and more flexible, as drop density rises and economies of scale come into play. In-store fulfilment might become a bit more hectic, as pickers and customers compete for scarce shopfloor space and products, but additional stores can always be utilised if the backroom allows. Warehouse fulfilment only becomes viable with relatively large turnover: Webvan's theoretical breakeven point was 2000 deliveries per day per centre, with a total capacity of 8000, which was never achieved (Mendelson, 2001a; Guglielmo, 2000). Of the companies I have interviewed[9] (and others for which I have seen the statistics), only SPUD comes anywhere near that minimum point for a single centre, and that is for a much smaller total value, and is due to their specific and limited organic product range. Even Tesco, with its significant turnover and hundreds of thousands of customers across the UK, Ireland and Korea has not achieved sufficient scale to warrant construction of a dedicated DC.

[9] Altogether 50 customers of Woolworths Supermarkets of New Zealand, Quick and SPUD of Vancouver were interviewed between March 2000 and July 2001, along with all aspects of the companies' operations. See Murphy 2002, 2003 for more detail.

Third, grocery websites can provide a combination of intelligence and ease of use to simplify the weekly replacement shop. Tesco and Woolworths have now had more than five years to learn their trade and how customers operate. They have built significant databases of customer product searches, which tells them what products customers are looking for that they may not currently supply – information physical stores simply do not get.[10] Unlike other e-commerce activities, food customers have regular prompts for further custom, such as an empty fridge. Experimentation in "smart" fridges, which include a scanner and computer that can be used to record fridge and cupboard stock usage, might make the ordering process even simpler. The well established trend toward ready meals (Hughes, 1996) can be helped (or reversed) by the more intelligent incorporation of online meal planning, including integrated recipes and ingredient ordering.

In-store fulfilment has a limited impact on the urban scene (although store retailers might spend considerable money advertising the provision of service from the local store – Figure 11), but does bring e-commerce closer to where customers are likely to live – and into their everyweek experience (by being able to observe pickers in the store). The dedicated warehouse, on the other hand, is likely to be placed where land is cheaper and near transportation routes – the sort of place where courier companies like to locate

[10] A good example of this is own-label products: online stores can direct customers searching for a "Safeway Select" pasta sauce to the equivalent Tesco brand, and provide marketing information to convince the customer that the Tesco product is equal or superior to the preferred brand.

(Figure 12). Indeed, Quick.com is located in such a place, next door to a UPS courier site, and in the premises of a former store distribution centre.

Figure 11: Tesco banner

Source: photo by author

Figure 12: Quick Fulfilment Centre, Vancouver

Source: photo by author

While the behind-the-scenes fulfilment aspects of online grocery may give the appearance of a weightless economy (Quah, 1999; Coyle, 1997), these companies try to be visible to customers. This may be done through brightly coloured trucks, as per Quick's bright green (Figure 12), or through advertisements: a common target is buses and bus stops.[11] The presence of many trucks on the road can act as rolling advertising boards, with drivers as sales agents answering questions from the interested general public and handing out flyers and samples. When sales were weak for one internet home delivery company, it is alleged that it encouraged its drivers to circulate around desirable neighbourhoods anyway –

[11] This is (only) partly to communicate to a mobility-challenged target market.

empty – to visibly spread the message and tempt custom.[12] SPUD takes the opposite approach in using a bicycle trailer to cart its boxes around neighbourhoods close to its distribution centre, in an effort to minimise environmental externalities and to promote its business (Figure 13).

If the behaviour of customers of EGS operations in Vancouver, Canada and Auckland New Zealand can be considered representative,[13] then online grocery shopping is a primary purpose for using the internet, along with email and general-interest surfing. It is an important e-commerce purchase for customers, both in regularity and in value: a weekly food shop of £100 or more vastly outweighs the occasional acquisition of a book or even a flight, only superseded perhaps by virtual banking in transactional value. The point, however, is that online grocery shopping is an attractive form of electronic commerce for many, and by building familiarity and trust may lead these customers to further e-commerce transactions. It also is a rather intensive use of bandwidth, and has prompted several of the customers I interviewed to trade up to faster internet connections. Again this can only improve the likelihood of using other forms of electronic mediation of communication, entertainment and commerce. This in turn is likely to boost the utilisation of higher-speed internet pathways, which in turn may lead to further investments in infrastructure, and the resulting disruption to urban streets.

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[12] Even for Woolworths, which uses contract drivers from a courier company, it is in the drivers' interest to generate as much business as possible.

[13] Admittedly, a rather biased group

Figure 13: SPUD bicycle trailer

Source: photo by author

8. Conclusions

It is difficult to avoid the fleets of home delivery vans these days, at least in the UK: small in size but fleet of foot, they scurry from store or warehouse to home. They are perhaps the most visible urban aspect of online shopping, promising to relieve consumers of the hassles of the grocery shop. Of course home delivery of products is nothing new: postal organisations, newspapers and milk have been beating the last mile for many years, and many food stores organised local delivery of goods a long time ago, and catalogue sales have been popular since the 1800s. But in scale, and in hype, the new internet-based home delivery organisations claim something new and significant: the ability to habituate their customers to the remote ordering and delayed delivery of products from and to the customers' home, on a regular basis. Through controlling this "green mile", online retailers hope to extend the product offer to higher-margin and more problematic products,

which are in themselves unprofitable to distribute direct to the customer, but which can be profitably combined with a grocery shop.

Because of the requirement for dedicated distribution systems as opposed to the use of preexisting mail or courier networks, online grocery is primarily an urban experience. There is a distinct spatial hierarchy of provision, almost entirely due to the density of the customer base (itself a function of population density). While retailers may make considerable effort to support outlying rural areas (eg SPUD more than 60 miles to Whistler; Woolworths more than 50 nautical miles to Great Barrier Island), this is usually at greater expense and or reduced frequency and product provision (due to coolchain requirements). Nonetheless these serviced rural pockets can be lucrative, such as skiers or beachgoers at their badly-stocked holiday/weekend homes, or the wealthier small-lot farmsteaders whose nearest supermarket may be quite some distance away.

Online grocery is reliant on a number of networks, new and pre-existing, digital and diesel. The websites are, at least for smaller operations, run through specialist webhost facilities, sometimes in a different city. What matters is not where the server is located, but the speed of its download connection to the customer and upload connection to the fulfilment centre. Since fulfilment centres (warehouses or stores) are not typically located in prime internet backbone locations, it may well be better to locate the web server in a server farm in the CBD. The fulfilment centre requires good transportation links, both for incoming replenishment (using large trucks from manufacturers or regional distribution

centres) and for local delivery vans. While the warehouse distribution centres and thus the real 'work' behind online food fulfilment may be out of the public eye, the vans that ply the road are a regular reminder of the materiality of virtual commerce.

One day, with sufficient growth to support their economies of scale, large automated dedicated distribution centres of the style of Webvan may be the norm. In the meantime, it is the "bricks and clicks" food retailers such as Tesco and Woolworths that are thriving, able to leverage their existing urban infrastructure to profitably service a geographically disparate market. Specialist "pure-plays" such as SPUD, Grocery Gateway and Quick are also able to utilise their small distribution centres profitably, as they build scale with the business. As the once-hyping, then increasingly sceptical US media put it:

> One of the hallmarks of the dot-com crush [sic] has been the presumption that you needed to get big fast, which worked for Amazon.com and virtually no one else […] The enormous infrastructure that Webvan thought to establish in multiple geographic areas just proved to be too great a cost. Here's a radical thought: The future of the online grocer market belongs to the grocery stores […] They know the business, they can mix (sales) channels, and they can take their time. *(Source: Farmer & Sandoval, 2001)*

The "golden age" of virtual shopping may yet be with us.

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