
Suburban mixed-use centres and urban dispersion: what difference do they make?

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Abstract. In a context of growing car dependency and suburban sprawl, planners search for ways of intensifying urban development and reducing reliance on the automobile. The creation of planned mixed-use centres intended to become hubs of transit and pedestrian movement within the dispersed suburban environment represents one such intensification strategy. I investigate three suburban mixed-use centres in the Greater Toronto Area, selected for their advanced level of development, and identify the planning rationales and objectives that have led to their creation. To verify the extent to which they meet their intensification goal, I monitor the three selected centres' level of development, modal split, land-use pattern, inner synergy, and inner movements. Findings are mixed. If the suburban centres have been successful in attracting development and attaining levels of transit use, pedestrian movement and inner synergy exceeding those of the typical suburban area, they are not as distinct from the remainder of the suburb as intended and thus fall short from their planning objectives. I conclude that a strategy combining the creation of nodes (such as suburban mixed-use centres) with high-density, transit-oriented corridors within the suburban environment would be more effective in bringing intensification to this portion of the metropolitan region.

As suburban-style growth increasingly dominates North American metropolitan regions, concern mounts about its sprawling and car-dependent nature. Prominent among proposed remedies is the creation of transit-oriented and pedestrian-oriented mixed-use centres with densities far in excess of the suburban norm. In this paper I explore the feasibility of developing nodes that break with surrounding land-use and transportation patterns, and hold the potential eventually to alter the prevailing suburban morphology. I thus examine the possibility of modifying the car-oriented, low-density, and functionally specialized landuse that has characterized urban development over the last 55 years. In this sense, the present investigation fits within a collective effort to find and evaluate alternatives to habitual patterns of suburbanization (such as new urbanism, for example) (Boarnet and Sarmiento, 1998; Cervero, 1996; Handy, 1992; 1996; Southworth, 1997). The discussion is grounded in the observation of existing suburban mixed-use centres and looks ahead at the future evolution of this type of development.

To verify the possibility of producing such distinct environments, I investigate the three mature Greater Toronto Area (GTA) suburban mixed-use centres (North York Centre, Scarborough Centre, and Mississauga Centre), concentrating on their growth level, land-use pattern, inner dynamic, and modes of transportation used to access these centres. Findings are inconclusive. Growth has met objectives and, as intended, suburban centres have attracted different categories of activities. Job density is above that of other types of suburban employment districts, as is transit reliance, car pooling, and pedestrian-based inner synergy. Yet, despite planning objectives to the contrary, these centres end up espousing many features commonly found in suburban areas. For one, consistent with an enduring heavy reliance on the automobile, these centres have adopted a car-dominated layout offering little incentive for walking. It is not so much attracting development as integrating activities within a highly interactive

pedestrian-friendly environment that causes problems. In sum, notwithstanding undeniable signs of success, the suburban centres investigated here do not fully live up to expectations.

In this paper, I first discuss the suburban land-use – transportation dynamic in a North American context. I then describe the GTA urban structure and the circumstances that have led to the formulation of a suburban mixed-use centre strategy in this metropolitan region. I consider planning rationales and objectives for the three GTA suburban mixed-use centres under study. The main body of the paper is devoted to a monitoring of the extent to which these centres meet expectations regarding land-use and transportation patterns. I close with a reflection on factors that account for the achievements and shortcomings of the centres. The paper draws its information from documents from the Office for the Greater Toronto Area, Metro Toronto (a second-tier government that was disbanded in 1998 when its six constituent municipalities were amalgamated into the new City of Toronto), and the municipalities with jurisdiction over the sites under study, interviews with eight planners and four economic development officers from these municipalities, aerial photographs, field observations, origin–destination statistics, census data, and a survey of office workers from the three centres.

Urban dispersion and suburban mixed-use centres

Since the 1950s, steep CBD-focused accessibility patterns have made way to much flattened gradients shaped by the combination of widespread car use, an abundant provision of expressways and arterial roads, and the scattering of structuring activities such as employment, retail, and public institutions away from the CBD (Bunting and Filion, 1996; Cervero, 1986; Hartshorn, 1992; Rowe, 1991). (The term ‘dispersion’ is used here to refer to this low-density, car-dominated urban environment which is increasingly disconnected from the CBD.) The emergence of suburban mixed-use centres must be understood in the light of this dispersion trend (see Matthew, 1993a). Market forces have induced a clustering of activities in those suburban locales that are most accessible. Hartshorn and Muller (1989) have documented the predilection of such centres for high-accessibility suburban locales, particularly locations at the junction of beltways and radial expressways. There is another way in which suburban centres are associated with urban dispersion. Some planned suburban mixed-use centres are given the mission of intensifying suburban areas and thereby reducing their car use and land consumption (Bourne, 1991; Haines, 1986; Lewis, 1993). These centres can thus be seen as belonging to the recent wave of models—primarily new urbanism, pedestrian-oriented development, and transit-oriented development—that purport to abate dispersed urbanization.

My understanding of suburban mixed-use centres shares the general drift of the definition of edge cities Garreau proposed some ten years ago (1991, page 425). Suburban mixed-use centres must contain a diversity of activities, with a strong office employment and retail complement, and be developed at a density that is much higher than the suburban norm. This broad definition allows for a variety of suburban mixed-use centre categories. As amply demonstrated in Garreau’s survey, they are frequently the outcome of market forces with minimal planning input. In contrast, as is commonly the case in Canada and Europe, suburban mixed-use centres can derive largely from public sector interventions in the form of planning regulations and the siting of transportation infrastructures and public sector establishments. Suburban centres can also be categorized according to the land-use features of their site prior to their development (Sheer and Petkov, 1998). Some result from the redevelopment of urbanized sectors, others have grown around large shopping malls, and a final breed of centres were erected on greenfield sites. The amount

of space they take and their density can also serve to distinguish types of suburban mixed-use centres. Some occupy large often ill-defined territories, while others adopt a more compact form (for example, Fulton, 1996; Sheer and Petkov, 1998). And, finally, centres can be differentiated according to their level of transit reliance (Cervero, 1996; Matthew, 1992).

The GTA centres under study have all been the object of a high level of public sector involvement. Their development has been subsequent to their designation as mixed-use centres and the adoption of zoning bylaws compatible with this purpose. In addition, their growth has been abetted by the presence of public institutions and community facilities. As we are about to see, these centres were given the planning mission to raise density and transit use within the suburban portion of the GTA. One of the investigated suburban mixed-use centres (North York Centre) is the outcome of the redevelopment of an urbanized area (a 1950s retail strip), and the other two have developed on empty sites surrounding regional malls. Data presented below confirm that, in comparison with many US suburban mixed-use centres, the three centres under study are relatively compact. All three centres are points of high public transit accessibility and two (North York Centre and Scarborough Centre) register transit use well in excess of the suburban norm.

The planning objectives of suburban mixed-use centres

Planning in the GTA is administered by three levels of government. The provincial government is influential in setting metropolitan region development trends through its planning policy guidelines and participation in major transportation infrastructures as well as trunk water and sewage system development. In 1987, the province set up the Office for the Greater Toronto Area (OGTA), an advisory body mandated to formulate metropolitan-wide planning options. Second-tier municipal administrations, the five GTA regional governments (Halton, Peel, York, Durham, and, until 1998, Metro Toronto), are mandated for planning with region-wide implications, such as major arterial roads and broad land-use designations. Third, local municipalities are responsible for the contextual adaptation and implementation of many regional planning policies as well as for municipal infrastructure and land-use planning. We shall see that while there is a great deal of support for planned suburban mixed-use centres among planning agencies, motives behind this endorsement vary according to the level of government considered.

Rapid CBD office floor space expansion, from 0.75 to 2.5 million m² between 1953 and 1971, to approximately 4 million m² in 1976, raised apprehensions about infrastructure capacity. It was expected that, in the absence of countervailing measures, this area would endure both a crowding out of nonoffice activities (housing, for example) and a deterioration of its urban environment through overbuilding (Gad, 1979). The 1976 City of Toronto Official Plan prescribed a downzoning of the CBD in order to moderate an anticipated escalation in employment growth (City of Toronto, 1976; Metro Toronto, 1980, page 21).

To accommodate office development diverted from the CBD, Metro Toronto Council adopted in its 1980 Official Plan a suburban mixed-use centre policy (Metro Toronto, 1980). The plan designated two major centres (North York Centre and Scarborough Centre), each intended to achieve agglomeration economies and sufficient density to produce favourable transit modal splits—both centres being located on rail transit lines. The layout of both centres was to be conducive to intracentre pedestrian movement so as to reproduce the intense pedestrian-based interaction between activities characteristic of traditional downtowns. The purpose of the two major Metro suburban centres was not exclusively to capture offices diverted from the CBD, but also to attract

offices that would have otherwise opted for car-oriented suburban locales. It was felt that it was high time to take action to halt or at least temper office space explosion in largely car-dependent, low-density, business parks. Between 1976 and 1990, office space in six Metro business parks grew by 55.3%, from 0.75 to 1.2 million m² (Metro Toronto, 1992).

If the former City of Toronto provided the initial impetus for suburban mixed-use centres, it was Metro that formulated and implemented this policy and that broadened its scope to include intensification objectives. It is noteworthy that while the original impetus for suburban centres was to address what was perceived as potential over-centralization, the purpose of this strategy soon shifted to a mitigation of urban dispersion. In its 1994 Official Plan, Metro reaffirmed its strong commitment to the suburban mixed-use centres strategy as a way to raise density and bolster transit use (Metro Toronto, 1994, pages 7–36). Likewise, the last former City of Toronto Official Plan reiterated the city's adherence to the policy (City of Toronto, 1993). From the early 1990s, the policy has been extended to the scale of the GTA as a whole under the guise of the OGTA nodal strategy. The OGTA and Metro share the same suburban mixed-use-centre objectives. In both cases, mixed-use centres are meant to blend retail, employment, and housing, as well as to make intensive use of transit and provide a pedestrian-friendly environment (BLG and MMM, 1994; IBI Group, 1990; OGTA, no date). Mixed-use centres are key to the nodal concept, the mainstay of the OGTA's urban structure strategy, which is a compromise between prevailing sprawling tendencies and the confinement of all future development to the present urbanized perimeter. The nodal approach does not rule out dispersed peripheral development, but suggests a convergence of some of the growth on medium to high-density nodes, many of which are to be situated within existing built-up areas. The larger nodes (which encompass substantial suburban mixed-use centres such as those studied here) are to be of sufficient density to allow one third of their employees both to live and to work within the node, making it possible for them to commute by foot, and are to be located on main transit lines in order to permit another third of their employees to use public transportation (Burke, 1996; IBI Group, 1990, page 20). Mixed-use-centre objectives formulated in municipal official and secondary plans are generally consistent with those adopted by Metro and the OGTA. All of this planning activity demonstrates clearly that GTA suburban mixed-use centres are not of the spontaneous, market-driven variety, but are intended to achieve a number of metropolitan-wide planning objectives.

This mixed-use-centre strategy was thus intended to counteract trends towards urban dispersion in the GTA. While this region remains highly centralized by North American standards with its CBD amounting to approximately one quarter of total metropolitan employment and transit usage well above that of comparable size US cities, most of its development has taken place in relatively low-density and car-oriented locales over the last decades (Wong, 2000; see also Code, 1983; Gad, 1985; Newman and Kenworthy, 1989).⁽¹⁾ GTA density outside the City of Toronto registers at 2100 person km⁻² and the transit modal split is a low 4% by comparison with a density that is twice as high and a 22% transit reliance level in the City of Toronto

⁽¹⁾The definition of Downtown Toronto used here is broader than the one relied upon in tables 7 and 8. Within the part of the metropolitan region serviced by the Toronto Transit Commission (that is, the City of Toronto), there are 277 annual unlinked transit trips per capita. Corresponding figures for the portions of Boston, Chicago, and Washington DC that are covered by their main transit property are respectively 120, 120, and 127 (Soberman, 1997). Transit-use differences between the remainder of the GTA and suburban parts of other North American metropolitan regions are far less pronounced, however.

(Filion, 2000; Miller and Ibrahim, 1996; 1998; Royal Commission on the Future of the Toronto Waterfront, 1992, page 28; TTS, no date). As expected, in dispersed areas most activities, including workplaces, opt for fully car-oriented sites (Cervero and Wu, 1997; Gad, 1985; Henson Consulting and the Coopers and Lybrand Consulting Group, 1993, page 64; Matthew, 1993a; 1993b; Metro Toronto, 1992, pages 27–33; Pivo, 1990; 1993).

The empirical substance of this paper is in keeping with its preoccupation with whether or not suburban mixed-use centres are meeting their planning objectives and evolving into environments that depart from predominant suburban land-use and transportation patterns. There are presently six GTA suburban mixed-use centres at various stages of realization—some are still on the drawing board whereas others have reached an advanced level of development. I concentrate on the three most developed suburban centres: the two largest centres planned by Metro and constituent municipalities, North York Centre and Scarborough Centre, and a third, Mississauga Centre, resulting from initiatives taken by the City of Mississauga, an out-of-Metro (now out-of-City of Toronto) jurisdiction.⁽²⁾ Municipal goals for the three centres as expressed in official and secondary plans are in full accord with Metro Toronto and OGTA intensification objectives. This conformity is most sharply reflected in the adoption of highly ambitious public transit modal split targets (City of Mississauga, 1994a; City of North York, 1991; 1994; City of Scarborough, 1996). Municipal plans also include arrays of measures aiming at stimulating pedestrian movement within suburban centres. The most common among these are lining streets with stores, avoiding setting buildings back from the street line, erecting arcades and canopies, and providing a variety of landscaped public spaces (City of Mississauga, 1994a; City of North York, 1994; City of Scarborough, 1996). Official plans are also unanimous in designating all three suburban centres as the most densely developed district within their respective municipality.

The interest of municipal administrations in suburban mixed-use centres is not exclusively driven by pure planning objectives, however. There is equally a fiscal facet to this strategy which, while understated in planning documents, came up repeatedly in interviews with economic development officers and municipal planners. Many interviewees indeed tied their municipality's commitment to planned mixed-use centres to a desire to provide an environment that combines architectural sophistication with high accessibility and expressway visibility in order to appeal to 'class A' office buildings and thus widen the scope of investments a municipality can lure. One economic development officer put it as follows:

"[Mixed-use centres] are seen as primarily high-order office and commercial activity locations, ribbons are for commercial and retail activities, and the highway system and major arterials are for business park locations... [We adopted the mixed-use centre concept] to maximize the office potential that is out there, to attract our share of the office market."

In the next sections, I concentrate successively on the location and morphology of the three investigated suburban mixed-use centres, their level of development, land-use patterns, inner dynamics, and modes of transportation used to reach these centres.

⁽²⁾ For the sake of brevity, throughout the paper the three suburban mixed-use centres under study are referred to as North York Centre, Scarborough Centre, and Mississauga Centre. Their official designations are Uptown and Downtown North York, Scarborough City Centre, and Mississauga City Centre.

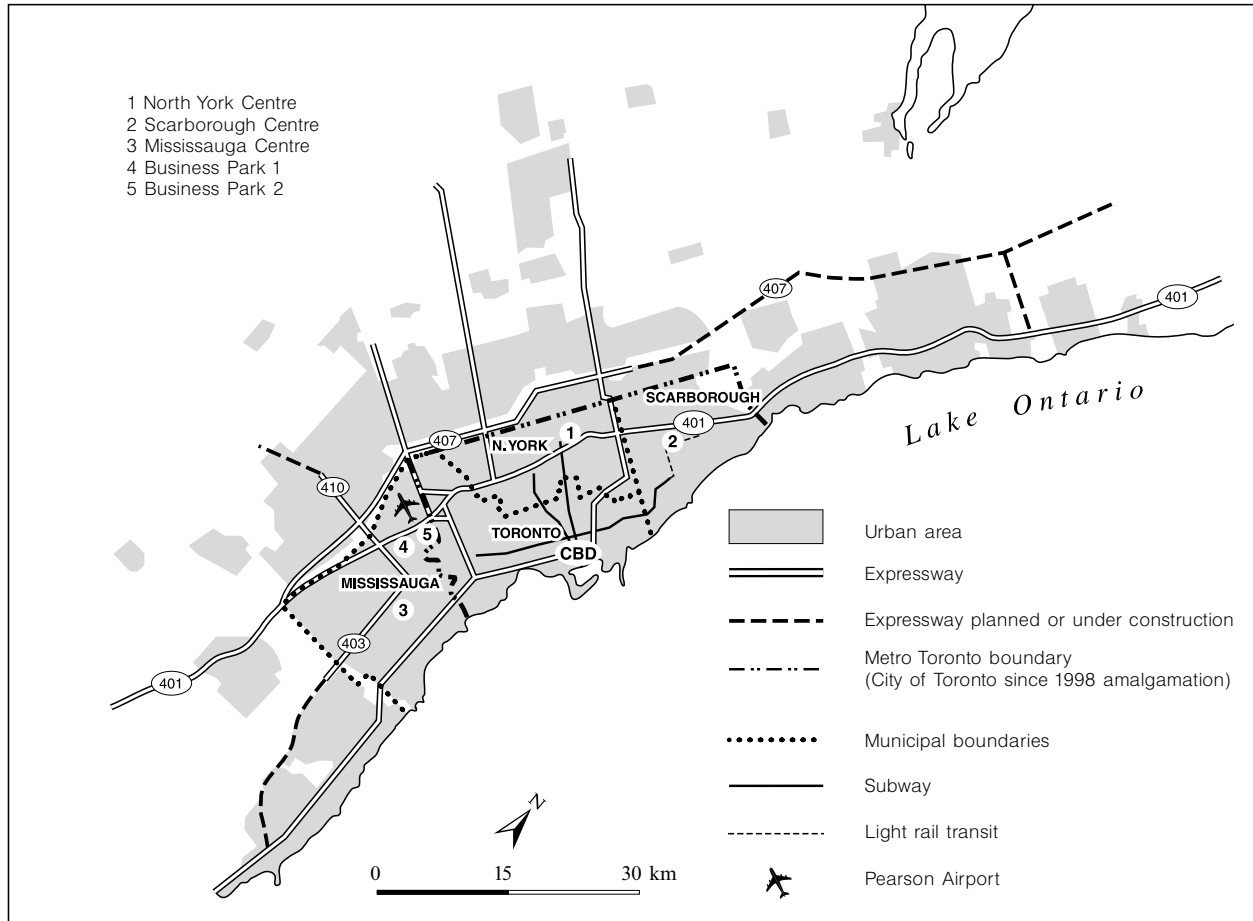


Figure 1. The location of studied suburban mixed-use centres and of business parks selected for comparative purposes.

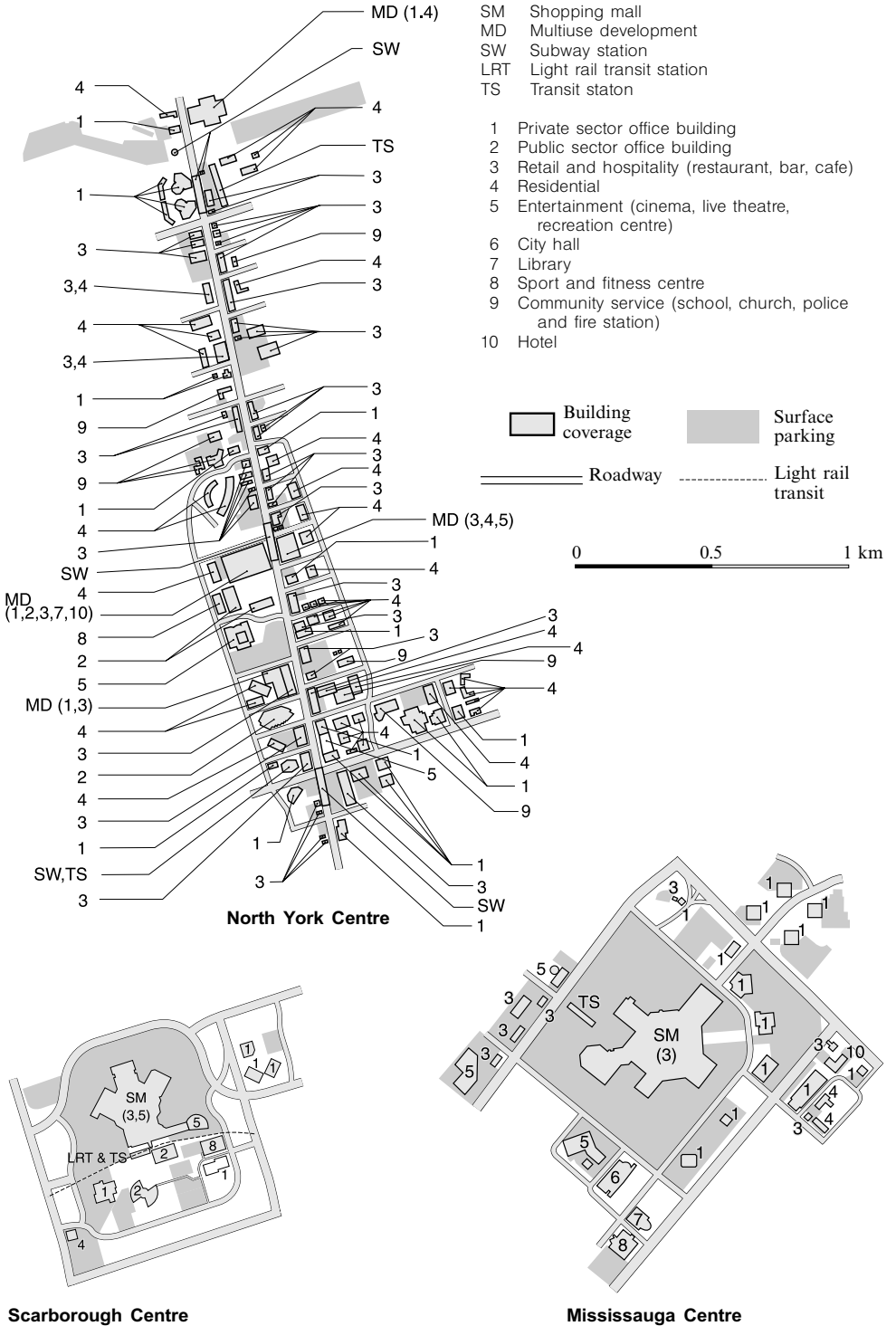


Figure 2. Morphology and land uses of suburban mixed-use centres under study.

Accessibility and morphology

North York Centre is 13 km, Scarborough Centre 18 km, and Mississauga Centre 24 km from Downtown Toronto's financial district. As seen in figure 1, Scarborough Centre and North York Centre are located beside Highway 401 (the most travelled expressway in the GTA) and Mississauga Centre along Highway 403. In surveys conducted by Matthew (1992; 1993b; 1996), a majority of managers from North York Centre and Scarborough Centre firms cited highway accessibility as the primary reason for their decision to locate in these centres (the surveys did not include Mississauga Centre).

All three centres are convergence points for bus lines; they each constitute the foremost bus hub within their respective portion of the metropolitan region. Most importantly from a transit perspective, North York Centre sits atop three Yonge Street line (Toronto's most travelled line) subway stations.⁽³⁾ Scarborough Centre is also served by rail transit. In this case, however, the system in place is a light rail transit line which reaches Toronto's east-west subway line, some 5 km away. Among the three centres, Mississauga Centre is alone in not having a rail connection, although a bus line connects the centre to a commuter train station 2.5 km to the south.

Morphologically, Scarborough Centre and Mississauga Centre are similarly structured. At the core of both centres stands a regional mall surrounded by abundant parking. Beyond this are office buildings, a civic centre, and, further away, housing. The size of Scarborough Centre is approximately 1 km by 1 km, and that of Mississauga Centre 1.7 km by 1 km. In contrast, North York Centre assumes a linear form stretching 3 km along Yonge Street (Relph, 1991) (see figure 2).⁽⁴⁾

Real estate development

The three suburban centres have been highly successful in attracting development. North York Centre has approximately 27 000 and Scarborough Centre 15 000 jobs (City of North York, 1995a; 1995b; City of Scarborough, 1994; Metro Toronto, 1995). Mississauga has also been growing rapidly and registers approximately 17 000 jobs (City of Mississauga, 1999; 2000).⁽⁵⁾ As expected, much of the floor space within suburban centres is found in office buildings. North York Centre contains 625 000 million m², Scarborough Centre 240 000 m², and Mississauga Centre 340 000 m² of office space. Although the vast majority of their office space is occupied by private corporations, there is also a substantial public sector presence in these centres. Before the amalgamation of Metro Toronto, all three centres were the site of their municipality's city hall. Although amalgamation has caused North York Centre and Scarborough Centre to lose their city hall, these premises are now occupied by departments of the

⁽³⁾ This service is to be complemented by the 6.4 km Sheppard line—the only major public transit investment presently underway in the GTA—which will meet with the Yonge line in North York Centre.

⁽⁴⁾ Areas covered by Scarborough Centre and Mississauga Centre on figure 2 do not coincide with official plan definitions. On the figure, these territories are delineated so as to encompass the portions of suburban centres that are already built-up, including empty sites within, but not those without, their developed perimeter. Centre boundaries on figure 2 are meant to highlight the current, rather than anticipated, development of centres. Housing areas separated from the core portions of these centres by open land are not depicted on these figures.

⁽⁵⁾ Employment counts in North York Centre and Scarborough Centre planning documents have been updated by using 1996 Transportation Tomorrow Survey rush-hour journey data (TTS, 1996). Although they leave out employees working irregular hours, these figures do provide a reliable approximation in districts such as these where most workers hold office jobs. Mississauga Centre data originate from a 1997 Planning and Building Department estimate.

new City of Toronto. Located outside Metro Toronto, the City of Mississauga has been unaffected by this restructuring.

The three centres include an important retail component. Mississauga Centre hosts Canada's third largest shopping mall, the 130 000 m² Square One Mall. Scarborough Centre also contains a large regional mall, the 100 000 m² Scarborough Town Centre. North York Centre's retail configuration differs markedly from that of the two other suburban centres. Whereas North York Centre contains an amount of retail space that is comparable with that of the two other centres, its approximately 120 000 m² are predominantly found in the shopping concourses of five office complexes, three of which also contain housing. This distribution reduces the potential for comparison shopping, and the tendency for these concourses to replicate each other's retail offerings limits the overall selection available within North York Centre. The three centres are also assuming a prominent entertainment role. Each is the site of recent multi-screen cinemas, with a total of 24 screens in Scarborough Centre, 20 in North York Centre, and 14 plus an IMAX cinema in Mississauga Centre. Both North York Centre and Mississauga Centre host live theatres. And Mississauga Centre has recently witnessed the construction of a recreation centre specializing in high-tech games.

All three centres include a residential component. With 7000 units (3000 of which are in complexes mixing offices, retail, and housing), North York Centre is far ahead of the other two centres. Scarborough Centre and Mississauga Centre contain approximately 2000 and 1000 residential units, respectively. A broader measure of the impact the three suburban mixed-use centres have had on housing is provided by changes in the number of dwellings in census tracts within and abutting these centres. As shown in table 1, between 1986 and 1996, the total number of occupied dwellings has risen by 12.44% and 20.65% in and around North York Centre and Scarborough Centre, where developed residential areas were already in place at the beginning of this period. As expected, at 69.86%, growth was much higher in and around Mississauga Centre where greenfield residential land predominated. Rising density is most indicative of the residential transformations wrought by the mixed-use centres. In and around all three

Table 1. Changes in the number of occupied housing units in census tracts within and abutting suburban mixed-use centres, 1986–96 (source: Statistics Canada, 1987; 1999).

| | Single detached housing | Apartments (including condos) in buildings with 5 storeys or more | Other housing types | Total (all occupied dwellings) |
|---------------------------|-------------------------|---|---------------------|--------------------------------|
| North York Centre | | | | |
| 1986 | 5990 | 1 725 | 1930 | 9 645 |
| 1996 | 5950 | 2 595 | 2300 | 10 845 |
| Percentage change 1986–96 | -0.67 | 50.43 | 19.17 | 12.44 |
| Scarborough Centre | | | | |
| 1986 | 2740 | 2 405 | 255 | 5 400 |
| 1996 | 2280 | 3 245 | 890 | 6 515 |
| Percentage change 1986–96 | -16.79 | 39.09 | 249.02 | 20.65 |
| Mississauga Centre | | | | |
| 1986 | 3305 | 5 355 | 2470 | 11 130 |
| 1996 | 4930 | 11 085 | 2890 | 18 905 |
| Percentage change 1986–96 | 49.17 | 107.00 | 17.00 | 69.86 |

centres the number of occupied apartments (including condo units) in buildings with five storeys or more has grown much more rapidly than the total housing stock, by 39.09% in Scarborough Centre, 50.43% in North York Centre, and 107% in Mississauga Centre (Statistics Canada, 1987; 1999). The three centres are currently experiencing a high-rise condo construction boom not registered in available published data.

Suburban centres appear to have been successful in meeting their mixed-use objectives. They have indeed attracted a variety of land uses: private and public sector offices, shopping centres, entertainment, and housing. What is more, their advantageous location and the erection by municipal administrations of live theatres, architecturally distinctive civic centres, as well as their creation of carefully designed public squares have been a source of prestige. This strategy has paid off insofar as the centres have lured as intended 'class A' office buildings and prestigious corporate tenants. Mississauga hosts one and North York Centre six head offices of the *Financial Post* largest 500 Canadian firms (*Financial Post 500* June 1999). Two of the three centres post office-rent levels that exceed the annual average for twenty GTA suburban sites, Can\$186.10 m⁻². North York Centre scores at Can\$287.60 m⁻² and Scarborough Centre at Can\$207.21 m⁻². At Can\$181.59 m⁻², the Mississauga Centre value is slightly inferior to the suburban average (compiled from Toronto Office Guide, 1998). It is noteworthy that office-rent levels in the three centres are proportional to their distance from the CBD and to the quality of their public transit services. This suggests that, even if aesthetic features of their built environment play a role in setting rent values, the impact of accessibility is greater. Further factors explaining the capacity of these centres to lure investors are their energetic promotion by local politicians alongside lower property tax levels than in Downtown Toronto (Greater Toronto Area Task Force, 1996, page 78).

Land-use patterns

The suburban mixed-use centres, especially North York Centre and Mississauga Centre, have become symbolic focal points within their respective suburban environment. For example, North York Centre's Lastman Square is a venue for numerous community festivals, and Mississauga City Hall with its indoor garden is a favourite backdrop for wedding photographs. With gross densities approximating 34 000, 15 000, and 10 000 km⁻², respectively, North York Centre, Scarborough Centre, and Mississauga Centre clearly outperform two typical expressway-oriented business parks chosen for comparative purposes, which record 4000 and 2100 jobs km⁻². But if suburban mixed-use centres are in the process of achieving respectable density levels and have attained their goal of attracting different categories of activities, land-use patterns in Scarborough Centre and Mississauga Centre are highly segregated, in a fashion that is consistent with habitual suburban planning norms (albeit with smaller zones than in most contemporary suburban developments). North York Centre with its multiuse complexes, shows considerably more integration (see figure 2).

The adverse effect that land-use specialization has on interfunctional integration is compounded by an unappealing pedestrian environment, a consequence of the car orientation of the landscape of the centres. Table 2 exposes the amplitude of the surface of suburban mixed-use centres that is devoted to the car (roads and parking areas) and the limited space taken by building footprint. In comparison, much more of Downtown Toronto's surface is occupied by buildings and far less by car space and other forms of open land. Compact environments are generally perceived as conducive to pedestrian movement while the opposite holds for car-dominated landscapes (Gehl, 1987; Jacobs, 1961; Untermann, 1984; 1987). Still, among the three suburban mixed-use centres, there is far less car space in North York Centre than in the other districts.

Table 2. Percentage of surface occupied by different land uses (Downtown Toronto and suburban mixed-use centres) (source: measurements from 1996 digital orthophotography).

| | Built-up area (building footprint) | Space devoted to the car (roads and parking areas) | Other land uses (squares, parks, other green space, unoccupied lots) |
|---------------------------------|--|--|--|
| North York Centre ^a | 20 | 42 | 38 |
| Scarborough Centre ^a | 22 | 53 | 25 |
| Mississauga Centre ^a | 22 | 57 | 21 |
| Downtown ^b | 56 | 26 | 18 |

^a Land uses have been measured within the built-up portion of these centres rather than within boundaries defined by official plans to avoid factoring in undeveloped peripheral land.

^b Downtown Toronto measurements were taken from a sector bounded by Yorkville and Church Streets to the north, Bay Street to the west and Church Street to the east, and a line approximately 30 m to the south of Breadablane and Maitland. This sector covers approximately 1 km north–south and 0.5 km east–west. It encompasses a portion of the city's foremost commercial street, Yonge Street, and of another prominent commercial street, Bloor Street. It also includes part of Yorkville, a lively retail and entertainment district.

Walking conditions are further impeded in Scarborough Centre and Mississauga Centre by a total absence of building alignment to the street. All their structures are set back and/or encircled by parking. Even in North York Centre, which grew on a commercial street lined with stores, only 43% of the Yonge Street (the centre's main street) frontage is presently occupied by buildings.

Inner synergy and pedestrian movement

In this section I report some findings of a survey of office workers from the three suburban centres.⁽⁶⁾ Two measures from this survey will serve to gauge interactivity synergy within these districts: (1) the frequency with which office workers patronize restaurants within their centre but outside their own building; and (2) the proportion of their total nonfood shopping carried out within their suburban centre. In this section I also examine intracentre journeys and interaction between residents and workplaces.

Table 3 (over) indicates that under half of the respondents (43%) frequent restaurants located in their centre but outside their office building twice or more weekly. There is wide intercentre variation in this proportion, with Mississauga Centre's score exceeding those of North York Centre and Scarborough Centre. This can be attributed to the large number and diversity of restaurants within Mississauga Centre's regional mall and to the relative proximity of many of this centre's office buildings to the mall.

With regard to intracentre shopping trends, as shown in table 4 (over), 56% of respondents declare spending less than 10% (and only 15% more than 50%) of their total nonfood shopping expenditure within their suburban centre. There are again considerable intercentre differences: North York Centre registers the lowest average (10% of nonfood shopping going to centre stores), significantly less than that of either Scarborough Centre (34%) and Mississauga Centre (31%). The inducement effect on intracentre shopping of the wide choice offered by regional malls explains the high Scarborough Centre and Mississauga Centre values. And the more limited

⁽⁶⁾ Questionnaires were distributed to all employees of seven randomly selected firms that agreed to participate in the survey. Of 880 distributed questionnaires, 530 (60%) were completed and mailed back. Among these, 260 originated from North York Centre, 124 from Scarborough Centre, and 146 from Mississauga Centre. The survey was carried out over the spring and summer 1998.

Table 3. Office workers' use of their suburban mixed-use centre's restaurants.

| Twice per week or more | All centres (<i>n</i> = 530) % | North York (<i>n</i> = 260) % | Scarborough (<i>n</i> = 124) % | Mississauga (<i>n</i> = 146) % |
|--|------------------------------------|-----------------------------------|------------------------------------|------------------------------------|
| In own building mean ^a | 46 1.9 | 58 2.3 | 50 2.1 | 21 0.9 |
| Regional mall mean ^b | 16 1.4 | none | 22 1.1 | 41 1.6 |
| Elsewhere in city centre mean ^c | 31 1.3 | 44 1.8 | 13 0.6 | 23 1.0 |
| Total out of own building mean ^d | 43 2.2 | 44 1.8 | 31 1.7 | 52 2.6 ^a |

^a $F = 30.6, p < 0.001$ ^b $t = 2.9, p = 0.004$ ^c $F = 33.3, p < 0.001$ ^d $F = 12.5, p < 0.001$ **Table 4.** Office workers' proportion of total nonfood shopping carried out in their suburban centre.

| Percentage | All three centres (<i>n</i> = 523) % | North York (<i>n</i> = 256) % | Scarborough (<i>n</i> = 123) % | Mississauga (<i>n</i> = 144) % |
|------------|--|-----------------------------------|------------------------------------|------------------------------------|
| <10 | 56 | 82 | 33 | 29 |
| 10–49 | 29 | 15 | 39 | 44 |
| ≥ 50 | 15 | 3 | 28 | 26 |
| Mean value | 22 | 10 ^a | 34 ^a | 31 ^a |

^a $F = 69.1, p < 0.001$.

shopping options provided by underground concourses—exemplified by the absence of department stores in these shopping areas—is a reason for North York Centre's lower performance.

Table 5 displays the modes of transportation used for intracentre journeys. Respondents were asked to state the mode generally used for trips between their place of work and other destinations within their centre. Only slightly more than half (55%) of respondents from the three centres walk to their intracentre destination. This proportion ranges from two thirds (67%) in North York Centre, to somewhat more than half in Mississauga Centre (56%) and to less than one third (30%) in Scarborough Centre. Differences between centres can partly be accounted for by their respective parking conditions. Relatively important intracentre car use in Scarborough Centre and Mississauga Centre can be imputed to the availability of plentiful free parking around regional malls, whereas

Table 5. Mode of transportation for intracentre journeys.

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|---------------|--|-----------------------------------|------------------------------------|------------------------------------|
| Car | 26 | 16 | 31 | 38 |
| Walking | 55 | 67 | 30 | 56 |
| Bus or subway | 19 | 17 | 39 | 6 |

 $\chi^2 = 12.8, p = 0.001; \phi = 0.40$

free parking is absent from North York Centre. Meanwhile, Scarborough Centre's high level of bus use results from heavy reliance on a shuttle bus to bridge the 300 m distance between the centre's main office complex and the regional mall.

Because the office-worker survey does not throw any light on synergy involving residents living in and around the suburban mixed-use centres, I resort to another source of data. The 1996 Census of Canada included a question concerning the principal mode of transportation relied upon for the journey to work. By gauging the percentage of employed residents inhabiting census tracts located in or around the centres who walk to work, it is possible to verify the intensity of the relationship between workplaces and close-by residents. For the sake of comparison, 35.72% of employed residents living in and around Downtown Toronto walk to work. It is obvious from the results in table 6 that suburban mixed-use centres do not reproduce, even at a much reduced scale, this type of synergy. All their scores are under 5% and they are not, with the exception of the Scarborough Centre results, significantly different from those of the suburban jurisdiction in which they are located.

Table 6. Percentage of employed residents who walk to work (source: Statistics Canada, 1999).

| | Percentage |
|----------------------------------|------------|
| North York Centre ^a | 3.93 |
| City of North York ^b | 3.76 |
| Scarborough Centre ^a | 4.26 |
| City of Scarborough ^b | 2.53 |
| Mississauga Centre ^a | 2.61 |
| City of Mississauga ^b | 2.38 |
| Downtown Toronto ^a | 35.72 |

^aProportion of employed residents who live in census tracts within or abutting suburban mixed-use centres or Downtown Toronto.

^bProportion of employed residents of the municipality as a whole.

The mere fact that the three centres generate interfunctional synergy within a relatively confined territory sets them apart from more common forms of suburban development. Especially when it involves walking, interaction of this nature—such as that observed here between workplaces and retail and services—is made impossible in most other suburban areas by functional segregation within extensive low-density single-use zones. So, bringing together different land uses within a relatively high-density area does generate interfunctional synergy with obvious rewards for involved activities. For example, retail and services benefit from the patronage of close-by office workers and firms may find it easier to recruit when located in districts that offer a rich shopping and service environment. There are also clear environmental advantages to such inner synergy insofar as many of the short walking journeys taking place within suburban mixed-use centres would involve longer distances and car trips in more typical suburban sectors. Yet, one could well argue that, with less than half of office workers patronizing restaurants within their centre (but outside their own office building) on a regular basis, a majority making less than 10% of their nonfood purchases within their centre, and very few employed residents who live in and around the centres walking to work, synergy levels could be higher. Perhaps most disturbing is the observation that only a slight majority of intracentre journeys are made on foot. No doubt, functional segregation and a less than hospitable pedestrian environment go a long way in explaining these disappointing statistics.

Journeys to the suburban mixed-use centres

Table 7 portrays the 1986–96 evolution of the public transit modal split for journeys to the three centres. In all cases, proportionally transit use fell between 1986 and 1991, but this decline was compensated by a rise over the following five years, resulting in a slight increase over the entire ten-year period. In light of these findings, one cannot be optimistic about these centres ever meeting their highly ambitious transit-use objectives, however. Plans pertaining to each centre formulate these objectives in different ways: a lowering of North York Centre auto-driver modal split to 33% during rush hours; a 55% transit modal split for Scarborough Centre workers; and a 50% overall transit modal split for Mississauga Centre (City of Mississauga, 1994a; City of North York, 1991; 1994; City of Scarborough, 1996). Rather, data indicate that, as these centres expand and mature, the public transit share of their incoming journeys remains quite stable, at a level far below these targets. A comparison with Downtown Toronto underscores the wide gap between this district's transit use and that of the three suburban centres. Even the transit modal split of North York Centre, which far outweighs that of the other two centres thanks to its three subway stations, is less than half that of Downtown Toronto. Yet, the data in table 7 can also be seen in a favourable light. A comparison of the total number of journeys demonstrates that, in sharp contrast with Downtown Toronto, these centres have been left unscathed by the 1989–92 recession and/or have benefited considerably from the recovery that followed. Whereas the total journeys to North York Centre have remained constant between 1991 and 1996, those to Scarborough Centre and especially to Mississauga Centre have increased appreciably, suggesting growing economic activity. What is more, table 7 reveals that suburban centres have not endured the ongoing decline in transit patronage felt in Downtown Toronto and, for that matter, the GTA as a whole. As downtown transit modal split fell between 1986 and 1996 by 6.5 percentage points and that of the GTA by 3.2 percentage points, corresponding North York Centre, Scarborough Centre, and Mississauga Centre proportions gained 1.1, 0.6, and 0.3 percentage points, respectively.

Table 7. Total journeys to, and transit modal split, for Downtown Toronto and suburban mixed-use centres, over 24 hours, in 1986, 1991, 1996 (source: TTS, 1996).

| | 1986 | | 1991 | | 1996 | |
|--------------------|----------------|-------------|----------------|-------------|----------------|-------------|
| | total journeys | transit (%) | total journeys | transit (%) | total journeys | transit (%) |
| North York Centre | 52 655 | 21.3 | 72 293 | 18.9 | 72 239 | 22.4 |
| Scarborough Centre | 36 475 | 14.8 | 41 945 | 14.3 | 45 297 | 15.4 |
| Mississauga Centre | 29 950 | 9.0 | 42 209 | 8.6 | 50 372 | 9.3 |
| Downtown Toronto | 337 948 | 55.3 | 372 677 | 53.9 | 341 245 | 48.8 |

Table 8 paints a fuller picture of 1996 modal splits for the three suburban mixed-use centres. For comparative purposes, it also introduces data from Downtown Toronto and two low-density business parks abutting Highway 401 (see figure 1). Transit use, and to some extent walking and car pooling, appear to be responsive to density, functional diversity, and the quality of transit services. Walking and cycling figures indicate that, once more, of the three suburban centres, it is North York Centre that comes closest to Downtown Toronto values, although as in the case of transit use the gap between the two districts remains considerable. Table 8 also reveals that the two listed business parks post public transit modal split scores that are considerably inferior to those of Mississauga Centre, the least transit reliant of the three suburban centres. Remarkably,

Table 8. Total journeys to, and modal split, for three suburban mixed-use centres, Downtown Toronto, and two business parks, over 24 hours, in 1996 (source: TTS, 1996).

| | All modes | Auto driver (%) | Auto passenger (%) | Public transit (%) | Walk and cycle (%) | Other (%) | Auto passenger to driver ratio | Average trip distance (km) |
|--------------------|-----------|-----------------|--------------------|--------------------|--------------------|-----------|--------------------------------|----------------------------|
| North York Centre | 72 239 | 58.8 | 14.3 | 22.4 | 4.3 | 0.2 | 0.24 | 9.21 |
| Scarborough Centre | 45 297 | 66.0 | 17.4 | 15.4 | 1.1 | 0.1 | 0.26 | 9.74 |
| Mississauga Centre | 50 372 | 71.7 | 17.5 | 9.3 | 1.3 | 0.2 | 0.24 | 9.47 |
| Downtown Toronto | 341 245 | 32.2 | 8.0 | 48.8 | 10.6 | 0.0 | 0.25 | 11.50 |
| Business Park 1 | 5 653 | 89.2 | 6.6 | 4.3 | 0.0 | 0.0 | 0.07 | 15.03 |
| Business Park 2 | 20 562 | 84.3 | 11.9 | 2.8 | 0.8 | 0.2 | 0.14 | 15.43 |

the auto-passenger modal split as a proportion of the auto-driver percentage (a measure of car pooling) hovers around one quarter in the three suburban centres and Downtown Toronto. By comparison, this proportion in the two business parks is only 7% and 12%. Finally, shorter incoming journeys distinguish suburban mixed-use centres from the two other categories of districts listed in table 8. These findings indicate that, more so than Downtown Toronto and suburban business parks, these centres draw from a local or intermediate catchment area.

In sum, although the three suburban mixed-use centres do not live up to expectations voiced in planning documents and perform poorly by comparison with Downtown Toronto as regards transit patronage and walking, they do register higher automobile passenger and transit use than other suburban locales. Intercentre differences in transit use appear to mirror closely the quality of their transit services. But like intracentre movements, transit patronage may also respond to the predominance of parking for a fee in North York Centre and the availability of free parking in Scarborough Centre and Mississauga Centre.

Suburban mixed-used centres: distinct enough to make a difference?

The three investigated suburban mixed-use centres have, as intended, attained densities that far exceed the suburban norm for employment areas. By clustering offices, retail, entertainment, public services, and housing, these centres have met their mixed-use objectives, another feature distinguishing them from common suburban development. These centres have become focal points within the suburban landscape. They attract community events and have acquired a measure of prestige among developers and residents of their respective suburban areas. They have also achieved a degree of synergy that is unique within the suburban portion of the GTA. The suburban mixed-use centre strategy has taken advantage of suburban accessibility plateaux along expressways and most particularly at locations that combine high expressway accessibility and rail transit. Centres that are served by rail transit record a public transportation modal split that is closer to that of Toronto's prewar than that of its postwar areas.

If suburban mixed-use centres have achieved some distinctiveness within the suburban environment, this distinction only goes so far because the centres also reproduce many traits defining suburbia. Impeded by limited intracentre pedestrian movement, their inner-synergy potential is not fully realized. As successful traditional downtowns teach us, the more pedestrian friendly a district is, the more people walk, the higher the potential for impulse shopping and service use, and overall the greater is intracentre interaction (Alexander et al, 1987; APA, 1982; Francis, 1984; Whyte, 1980). We have seen that land-use specialization, the amount of space taken by the automobile, buildings that do not relate to the street, and long distances between activities, all contribute

to discourage pedestrian movement within these centres. These impediments account for moderate rather than high synergy levels and a surprisingly heavy reliance on the car for intracentre journeys (especially in Scarborough Centre and Mississauga Centre). If suburban mixed-use centres have been successful in juxtaposing different land uses, their integration of these uses has been far less impressive. The suburban centres are less distinguishable from the suburban environment by their inner dynamic than by their mixed use and density.

Ideally, to function as intended in the plans, there should be a finer grained mixing of land uses within these centres. Most notably, housing in Scarborough Centre and in Mississauga Centre should be interspersed with other land uses to assure around-the-clock activity. The three centres should also increase their building coverage, cut back on their surface devoted to parking, bring façades to the street line, and fill these with pedestrian-oriented establishments (as recommended in City of Mississauga, 1994b).

Recent developments do not point to a movement in this direction, however. There are a number of explanations for the distance between this ideal vision and reality. First, as long as the vast majority of people accessing these centres rely on the automobile, much of their space will be given to vehicles. Meanwhile, reliance on underground parking—the utmost way of de-emphasizing the presence of the car—is an expensive proposition unlikely to appeal to mall owners eager to maintain abundant visible and free parking. Shopping malls in Scarborough Centre and Mississauga Centre are indeed competing with close-by suburban retail establishments where free surface parking is plentiful.⁽⁷⁾ Second, local administrations may have hesitated to press for rigid design regulations intended to foster pedestrian compatibility for fear of losing investments in an environment where suburban localities compete fiercely with the central city and among themselves for fiscally lucrative developments. And, third, given the saturation of suburbia with malls of various sizes and big-box stores, it is doubtful that sufficient retail and hospitality establishments will ever be found to create the desired pedestrian-engaging street-level environment. To a large extent, it is then the reverberation of features of dispersed urbanization on suburban mixed-use centres that thwarts their adoption of a highly distinctive urban form and land-use dynamic.

Findings from this paper challenge the view that a nodal approach, such as the suburban mixed-use centre strategy, can contribute significantly to transform the suburb into a more compact and transit-oriented and pedestrian-oriented environment. More appropriate to an abatement of dispersion would be the creation of corridors concentrating high-density and medium-density residential areas along high-speed, high-frequency, transit routes (see Pushkarev and Zupan, 1977). The meeting point of two such corridors would lend itself to the development of transit-oriented and pedestrian-oriented mixed-use centres. The advantage of such a configuration would be to secure advantageous conditions for transit both at the origin and at the destination of a journey, hence creating sectors rather than points of transit viability. Such a strategy could raise transit use and thus lessen the amount of mixed-use-centre space devoted to the car and potentially improve these centres' pedestrian environment. More importantly, additional transit patronage within the suburb could confer a distinct accessibility advantage to mixed-use centres over other locations with equally good

⁽⁷⁾ Scarborough Centre is 5 km from two large malls, Fairview Mall with 65 000 m² and Yorkdale Mall with 120 800 m², providing 4250 and 6566 parking spaces, respectively. (Some Yorkdale Mall spaces are available in a parking structure for a fee. These are, however, largely used by Downtown Toronto commuters who walk to a nearby subway station.) Likewise, Mississauga Centre is 8 km from a 61 600 m² and 9 km from a 46 500 m² mall, Dixie Value Mall and Sheridan Mall, with 2100 and 2000 parking spaces (Metro Toronto, 1992).

expressway connections. This advantage could then procure an incentive for activities locating in mixed-use centres to assent to the additional controls and expenses required to produce a pedestrian-oriented setting. In agreement with the observation that journeys to suburban mixed-use centres tend to originate from a middle-range distance, a corridor strategy would involve the creation of quality transit services with an intermediary scale, rather than a CBD, focus. But the deployment of such a strategy would not be problem free. For example, it would not be any easier to find establishments to fill street-level store fronts of combined corridors and nodes than of existing suburban mixed-use centres.

Conclusion

There are advantages to bringing together different types of activities within a relatively dense and diversified environment where public transit services are superior to the suburban norm. Reliance on transit within suburban mixed-use centres exceeds typical suburban values, and these districts generate a degree of pedestrian-based inner synergy that is unique within the suburban environment. This synergy yields environmental benefits by reducing car use as well as economic rewards for activities located in these centres. But in all three observed centres, transit patronage and pedestrian-based synergy remain below expectations. The low density and generalized car use of ambient suburban areas account for the dedication of abundant space to the car within these centres and a resulting environment that could be more conducive to pedestrian movement and, consequently, to inner synergy.

Beyond the specificity of its suburban mixed-use centre object of study, this research casts light on conditions a suburban intensification strategy must fulfill for it to be effective. It demonstrates that, on its own, the creation of nodes of density and multifunctionality has limited impact on the suburban land-use–transportation dynamic. A strategy combining such nodes with corridors of residential density offering high-quality transit services would more likely be successful.

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References

- Alexander C, Neis H, Anninou A, King I, 1987 *A New Theory of Urban Design* (Oxford University Press, New York)
- APA, 1982 *Designing Effective Pedestrian Improvements in Business Districts* (Chicago, Planning Advisory Series Report 368), American Planning Association, Chicago, IL
- BLG and MMM, 1994 *The Flexible Region: Regional Structure Strategy, Region of Peel Official Plan, Final Report* Berridge, Lewinberg Greenberg and Marshall Macklin Monaghan, 111 Queen Street East, Toronto, Ontario M5C 1S2
- Boarnet M G, Sarmiento S, 1998, “Can land-use policy really affect travel behavior: a study of the link between non-work travel and land-use characteristics” *Urban Studies* **35** 1155–1169
- Bourne L S, 1991, “Recycling urban systems and metropolitan areas: a geographical agenda for the 1990s and beyond” *Economic Geography* **67** 185–209
- Bunting T, Filion P, 1996, “The dispersed city: its spatial and temporal dynamics”, in *The Dynamics of the Dispersed City: Geographic and Planning Perspectives on Waterloo Region* Eds P Filion, T Bunting, K Curtis, Department of Geography Publication Series 47, University of Waterloo, Waterloo, Ontario, pp 9–54
- Burke S, 1996, “Edge cities: a case study evaluation of the usefulness of the nodal concept as a regional planning strategy for the Greater Toronto Area”, unpublished masters thesis, School of Urban and Regional Planning, University of Waterloo, Waterloo, Ontario

- Cervero R, 1986 *Suburban Gridlock* Center for Urban Policy Research (Rutgers University, New Brunswick, NJ)
- Cervero R, 1989 *America's Suburban Centres: The Land Use – Transportation Link* (Unwin Hyman, London)
- Cervero R, 1996, “Mixed land-uses and commuting: evidence from the American Housing Survey” *Transportation Research A* **30** 361 – 377
- Cervero R, Wu K-L, 1997, “Polycentrism, commuting, and residential location in the San Francisco Bay Area” *Environment and Planning A* **29** 865 – 886
- City of Mississauga, 1994a *City Centre Secondary Plan: Official Plan Amendment 90* City of Mississauga, Planning and Building Department, 300 City Centre Drive, Mississauga, Ontario L5B 3C1
- City of Mississauga, 1994b *Urban Design Vision: Mississauga City Centre* City of Mississauga, Planning and Building Department, 300 City Centre Drive, Mississauga, Ontario L5B 3C1
- City of Mississauga, 1999 *1997 Employment Profile Report* City of Mississauga, Planning and Building Department, 300 City Centre Drive, Mississauga, Ontario L5B 3C1
- City of Mississauga, 2000 *Mississauga Development Profile* March, City of Mississauga, Planning and Building Department, 300 City Centre Drive, Mississauga, Ontario L5B 3C1
- City of North York, 1991 *City of North York Official Plan* City of North York, 5100 Yonge Street, North York, Ontario M2N 5V7
- City of North York, 1994 *Downtown and Uptown: Official Plan Consolidation* City of North York, 5100 Yonge Street, North York, Ontario M2N 5V7
- City of North York, 1995a *City Centre Population Monitoring Report, 1994* City of North York, 5100 Yonge Street, North York, Ontario M2N 5V7
- City of North York, 1995b *Office Survey* City of North York, 5100 Yonge Street, North York, Ontario M2N 5V7
- City of Scarborough, 1994 *City Centre Monitoring Report: 1992–1993—Traffic, Transit, Development* City of Scarborough, Planning and Buildings, Works and Environment Departments, 150 Borough Drive, Scarborough, Ontario M1P 4N7
- City of Scarborough, 1996 *Scarborough Official Plan (Official Consolidation)* City of Scarborough, 150 Borough Drive, Scarborough, Ontario M1P 4N7
- City of Toronto, 1976 *Official Plan* City of Toronto, Planning and Development Department, 100 Queen Street West, Toronto, Ontario M5H 2N2
- City of Toronto, 1993 *Official Plan Part 1: Cityplan* City of Toronto, Planning and Development Department 100 Queen Street West, Toronto, Ontario M5H 2N2
- Code W R, 1983, “The strength of the centre: downtown offices and metropolitan decentralization policy in Toronto” *Environment and Planning A* **15** 1361 – 1380
- Filion P, 2000, “Balancing concentration and dispersion? Public policy and urban structure in Toronto” *Environment and Planning C: Government and Policy* **18** 163 – 189
- Francis M, 1984, “Mapping downtown activity” *Journal of Architectural and Planning Research* **1** 21 – 35
- Fulton W, 1996, “Are edge cities losing their edge” *Planning* **65**(5) 4 – 7
- Gad G, 1979, “Face-to-face linkages and office decentralization potentials: a study of Toronto”, in *Spatial Patterns of Office Growth and Location* Ed. P W Daniels (John Wiley, Chichester, Sussex) pp 277 – 323
- Gad G, 1985, “Office location dynamics in Toronto: suburbanization and central district specialization” *Urban Geography* **6** 331 – 351
- Garreau J, 1991 *Edge City: Life on the New Frontier* (Doubleday, New York)
- Gehl J, 1987 *Life Between Buildings: Using Public Space* (Van Nostrand Reinhold, New York)
- Greater Toronto Area Task Force, 1996 *Greater Toronto: Report of the Greater Toronto Area Task Force* (Queen's Printer for Ontario, Toronto)
- Haines V A, 1986, “Energy and urban form: a human ecological critique” *Urban Affairs Quarterly* **21** 337 – 353
- Handy S L, 1992, “Regional versus local accessibility: neo-traditional development and its implications for non-work travel” *Built Environment* **18** 253 – 267
- Handy S L, 1996, “Urban form and pedestrian choices: study of Austin neighborhoods” *Transportation Research Record* number 1552, 135 – 144
- Hartshorn T A, 1992 *Interpreting the City: An Urban Geography* 2nd edition (John Wiley, New York)
- Hartshorn T A, Muller P O, 1989, “Suburban downtowns and the transformation of metropolitan Atlanta's business landscape” *Urban Geography* **10** 375 – 395

- Henson Consulting Ltd and the Coopers and Lybrand Consulting Group, 1993 *The Outlook for Population and Employment in the Greater Toronto Area* Greater Toronto Co-ordinating Committee, 10 Bay Street, Suite 300, Toronto, Ontario M5J 2R8
- IBI Group, 1990 *Greater Toronto Area Urban Structure Concepts Study; Background Report No. 1, Description of Urban Structure Concepts* IBI Group, 240 Richmond West, Toronto, Ontario M5V 1V6
- Jacobs J, 1961 *The Death and Life of Great American Cities* (Random House, New York)
- Lewis P F, 1993, "Suburban activity centers as public policy", WP 93-1, Woodrow Wilson School of Public and International Affairs, Center of Domestic and Comparative Policy Studies, Princeton University, Princeton, NJ
- Matthew M R, 1992, "Office buildings in office parks and suburban downtowns" *Canadian Journal of Urban Research* 1 39–57
- Matthew M R, 1993a, "The suburbanization of Toronto offices" *The Canadian Geographer* 37 293–306
- Matthew M R, 1993b *Case Studies of Some Suburban Centres in Toronto* Institute of Urban Studies, The University of Winnipeg, Winnipeg, Manitoba
- Matthew M R, 1996, "Another tale of two (or three) cities", paper given at the *Canadian Association of Geographers' Annual Conference* Saskatoon, Saskatchewan
- Metro Toronto, 1980 *Official Plan for the Urban Structure* The Municipality of Metropolitan Toronto, 55 John Street, Toronto, Ontario M5V 3C6
- Metro Toronto, 1992 *Office Space and Employment Characteristics: Metropolitan Toronto and the Greater Toronto Area* The Municipality of Metropolitan Toronto, 55 John Street, Toronto, Ontario M5V 3C6
- Metro Toronto, 1994 *The Official Plan of the Municipality of Metropolitan Toronto: The Liveable Metropolis* The Municipality of Metropolitan Toronto, 55 John Street, Toronto, Ontario M5V 3C6
- Metro Toronto, 1995 *Key Facts 1995* The Municipality of Metropolitan Toronto, 55 John Street, Toronto, Ontario M5V 3C6
- Miller E J, Ibrahim A, 1996, "Urban form and transportation energy and efficiency: preliminary analyses", paper given at the Annual Meeting of the Canadian Regional Science Association, St. Catharines, Ontario; copy available from E J Miller, Department of Civil Engineering, University of Toronto, Toronto, Ontario
- Miller E J, Ibrahim A, 1998, "Urban form and vehicular travel issues: empirical findings" *Transportation Research Record* number 1617, 18–27
- Newman P, Kenworthy J R, 1989 *Cities and Automobile Dependence: A Sourcebook* (Gower, Aldershot, Hants)
- OGTA, no date *Urban Form: Bringing the Vision into Focus* Office for the Greater Toronto Area, 10 Bay Street, Suite 300, Toronto, Ontario M5J 2R8
- Pivo G, 1990, "The net of mixed beads; suburban office in six metropolitan regions" *Journal of the American Planning Association* 56 457–469
- Pivo G, 1993, "A taxonomy of suburban office clusters: the case of Toronto" *Urban Studies* 30 31–49
- Pushkarev B S, Zupan J M, 1977 *Public Transport and Land Use Policy* (Indiana University Press, Bloomington, ID)
- Rolph E, 1991, "Suburban downtowns of the Greater Toronto Area" *The Canadian Geographer* 35 421–425
- Rowe P G, 1991 *Making a Middle Landscape* (MIT Press, Cambridge, MA)
- Royal Commission on the Future of the Toronto Waterfront, 1992 *Regeneration—Toronto's Waterfront and the Sustainable City: Final Report* Minister of Supply and Services Canada, Ottawa (Queen's Printer of Ontario, Toronto)
- Sheer B C, Petkov M, 1998, "Edge city morphology; a comparison of commercial centres" *Journal of the American Planning Association* 64 298–310
- Soberman R M, 1997 *The Track Ahead: Organization of the TTC Under the New Amalgamated City of Toronto* Toronto Transit Commission, 1900 Yonge Avenue, Toronto, Ontario M4S 1Z2
- Southworth M, 1997, "Walkable suburbs? An evaluation of neotraditional communities at the urban edge" *Journal of the American Planning Association* 63 28–44
- Statistics Canada, 1987 *Census Tracts, Toronto: Part 1* Minister of Supply and Services, Ottawa, Catalogue Number 95-163, Statistics Canada, RH Coats Building, Tunney's Pasture, Ottawa, Ontario K1A 0T6

-
- Statistics Canada, 1999 *Profile of Census Tracts in Toronto* Minister of Industry, Ottawa, Catalogue Number 95-206-XPB, Statistics Canada, RH Coats Building, Tunney's Pasture, Ottawa, Ontario K1A 0T6
- Toronto Office Guide, 1998, ICI Technologies <http://officeguide.com>
- TTS, 1996, Transportation Tomorrow Survey, special tabulations, Joint program in Transportation, University of Toronto, Toronto, Ontario
- TTS, no date, Transportation Tomorrow Survey <http://www.jpint.utoronto.ca>
- Untermann R K, 1984 *Accommodating the Pedestrian: Adapting Towns and Neighborhoods for Walking and Bicycling* (Van Nostrand Reinhold, New York)
- Untermann R K, 1987, "Can we pedestrianize the suburb?", in *Public Streets for Public Use* Ed. A V Moudon (Van Nostrand Reinhold, New York) pp 123–131
- Whyte W H, 1980 *The Social Life of Small Urban Spaces* (The Conservation Foundation, Washington, DC)
- Wong T, 2000, "Real sour deal: the economy is now booming, but commercial real estate prices are still lagging" *Toronto Star* February 6, pages E1, E6