FACTORS AFFECTING CHOICE OF RAPID TRANSIT TECHNOLOGY

What Has Changed Since the TTC's 1986 Subway Plan ("Network 2011")?

Summary

1. The nature and location of where people live and work in Toronto is significantly different now from what was forecast in the 1980's. The trend in the private-sector development industry is away from higher-density development at nodes; the new Official Plan has scaled-back the amount and concentration of forecast development; established communities have opposed new high-density development; and all of these have combined to reduce the need and justification for very-high capacity transit like subways.

2. Employment is the single-biggest determinant of transit ridership, and in Toronto -- notably in North York Centre, Scarborough Centre, and in the manufacturing sector – actual 2011 employment, and potential future employment are much lower than had been forecast in 1986, so potential transit ridership is also lower.

3. More than fifty years of experience have given Toronto a clearer understanding of the types of development densities which are required for subways to be successful (e.g. - at stations like St. Clair, Bay, Eglinton, Victoria Park), as well as much evidence that not all of Toronto's subways have been able to achieve this type of development success and strong ridership (e.g. - at stations like Runnymede, Glencairn, Ossington, Ellesmere, Coxwell). There are also a number of stations which have prime developable property available, such as Eglinton, York Mills, Sheppard, Downsview, Islington, Leslie, Eglinton West, which have remained vacant for decades. All of this illustrates that success in subway investment is not a "sure thing".

4. Taxpayers have become increasingly vocal that governments spend taxpayers' money on investments which have a high probability of success and strong payback or benefits. This expectation makes it harder to defend large capital investments in subways which have questionable ridership and economic potential, costly long-term maintenance requirements, and very long and risky pay-back periods.

5. In the 1980's, there was no proven or established transit technology to accommodate passenger demands which were between the capacities of bus and subway operations so, for demands which could not be accommodated on buses, transit agencies usually opted for subways. Today, light rail transit is a proven technology and has become widely accepted as an effective way of accommodating passenger demands which exceed the capacity of bus operations - such as on Toronto's arterial roads - but which do not warrant the capacity or expense of subways. That is why light rail was recommended for implementation in Toronto, why it is being operated and expanded in cities with extensive experience with subways, like Paris and Madrid, which also have corridors with demands not warranting subways, and why it is currently being implemented in over 100 cities worldwide.

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Background

- Investing in transit infrastructure brings many benefits to cities (shaping/increasing land values, giving people access to jobs, improving environment), but its main purpose and benefit is to enable passengers to travel to work, school, shopping, personal business etc.

- Most-important determinant of choice of transit technology: magnitude/volume of transit passengers travelling in the corridor:
  - low level of demand → low-capacity technology (e.g. - bus)
  - medium level of demand → "higher-order" technology (e.g. - light rail)
  - high level of demand → high capacity technology (e.g. - subway, GO Train)

- Subways can carry the same volume of people as 14 lanes of free-flowing expressway
  - subway is justified where extremely-high passenger demand exists

- Passenger demand depends on several factors:
  - location of population, employment, and other activity centres
  - density and proximity of development to the transit service
  - location and density of employment, in particular:
    - o rapid transit works best with high density employment at/near stations
  - population/employment/development densities, locations depend on several factors:
    - market forces - the economics of development and the actions of private developers
    - Official Plan development model (how, where to locate growth)
    - land-use designations
    - zoning/densities
    - local/community support/opposition to development
  - existing and potential future share of total travel demand using transit
    - o observed, actual travel patterns and behaviour
    - o ability to attract inter-regional travellers
    - o ability to alter travel patterns through changes to bus routings
    - o other market forces - e.g. - price of gas, price of parking
    - o projected versus actual/current demands (accuracy of forecasting)

- Other important determinants of technology:
  - appropriate matching of capacity to demand
  - life-cycle cost - breakeven point for large capital investments in high capacity transit
  - understanding/risk of long-term maintenance requirements, costs
  - funding availability, probability (based on historical evidence)
  - world-wide trends, best practices in transit technology
  - current information on relative benefits of new transit technologies