A Tale of Three Cities

M. G. McNally [January 2017]

The images in Figure 1 are based on originals in "Great Streets" (1993) by Alan Jacobs and are taken from Ewing (2010) "Pedestrian and Transit-Friendly Design: A Primer for Smart Growth". Ewing's point was that the number of intersections per unit area improved walkability. My question is not whether walkability is supported by network connectivity; rather, it is whether the selected networks in these cities support this conclusion or indeed are even comparable.

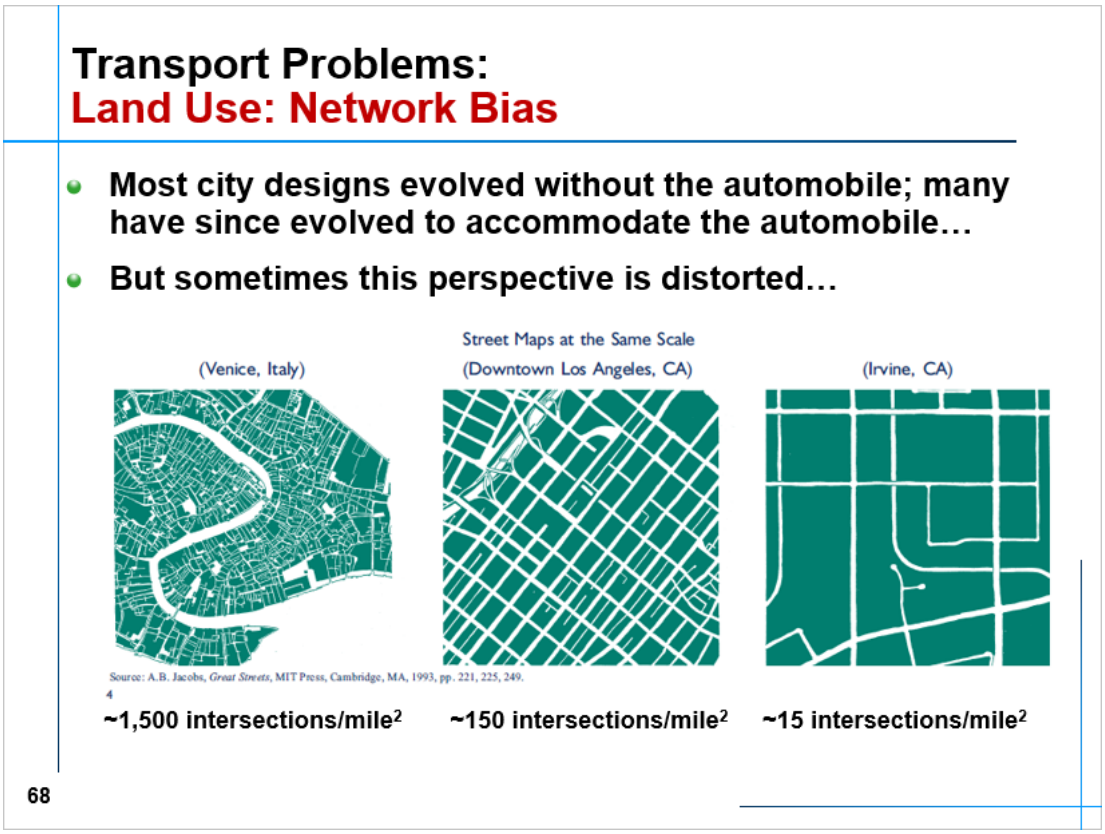

Figure 1

Venice, Los Angeles, and Irvine: It's hard to choose three more diverse urban places.

The aerial images [1] of the same three "square miles" from Jacob's book and Ewing's report appear in Figure 2. The scale of blocks and buildings in each image make clear that we are not viewing similar development landscapes. The Los Angeles aerial does not depict the extensive high rise development in the mile square, although the Irvine aerial does strongly suggest buildings with a very large footprint.

Note that the scale of Irvine development outside the selected mile square in the lower right corner of the same aerial photo: this portion more closely resembles the aerial of Venice than that for LA. What the selection of a single square mile can hide is an underlying sampling bias. It is revealing to look at the street layouts for these same three areas (see Figure 3).

Transport Problems:
Land Use: Venice, LA, and Irvine

- The satellite images of the 3 original square miles:

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Figure 2

Transport Problems:
Land Use: Venice, LA, and Irvine

- Consider the street plans of three (very) different cities:

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Figure 3

These map views provide some fundamental insight at the network level. The street density for Venice is indeed high but it is the waterways that better define, in both positive and negative light, that city's accessibility. The "streets" themselves are really walking paths too small for vehicles (which are not allowed in Venice). Most canals serve as de facto highways, providing faster speeds along them but restricting access across them (there are over 400 bridges in Venice). The LA pattern appears as a regular grid but some streets are one-way along parts of their length and unbeknownst to most (and not shown in this 2-dimensional depiction), LA is quite hilly. This is not a highly walkable area.

The Irvine square mile appears to contain very few streets and, in fact, includes railroad tracks and drainage channels, not at all surprising when one realizes that this is an industrial area. Boeing (2017) describes this square mile as a "business park in suburban Irvine, California [that] demonstrates the coarse-grained, modernist, auto-centric urban form that characterized American urbanization in the latter half of the 20th century." Most of this industrial portion of Irvine, however, has evolved during 50 years of existence into high-rise office, residential, and mixed-use developments.[2] I recommend Google Maps "Street View" to take a virtual road trip along the major arterials that define this square mile of continuously developing real estate in Irvine, a city that is evolving over the years as have most cities, including LA and Venice.

Two Views of Irvine

Compare the section of Irvine selected by Jacobs, essentially an industrial and warehousing district along the flight path and immediately northeast of John Wayne Airport, with a second selection less than one mile east in Irvine's residential village of Woodbridge (see Figure 4). Surprisingly, this selection includes the very neighborhood that Jacobs called out in the same book for its exemplary streetscape design (see the red dot in the upper right of the designated square mile in the associated street map).

Compare this alternative view of Irvine with that for Venice and LA. A rough count for this area is about 130 intersections, comparable to the square mile of downtown LA (150 intersections, according to Ewing). This is not, of course, comparable to the unique, ancient city of Venice, which is now more of a tourist attraction with walking and boats as the only modes accommodated and canals playing the role of freeways, both providing and restricting access.

Also note that Woodbridge enjoys a network of walking and biking paths (including a regional bikeway at the southern end of the square mile) and cul-de-sacs whose bulbs provide direct active transportation access to walkways, the lake, and major arterials and retail areas neighboring this village (as the various neighborhoods of Irvine are deemed). The number of intersections would be significantly greater if these walking paths are included (many more than LA but not near as great as Venice).

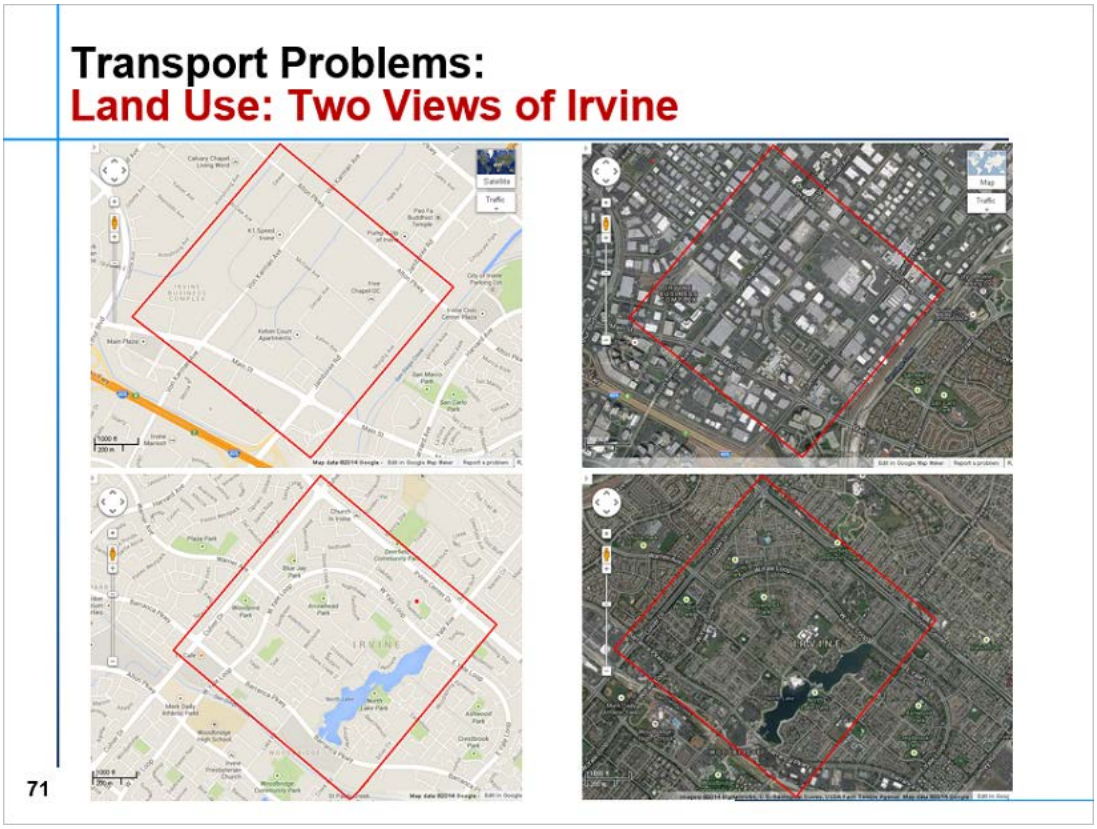

Figure 4

Ewing's selection of Jacobs' business/industrial mile-square was incentive to examine this alternative Irvine mile-square. However, unlike for most cities selected by Jacobs, he provided a second mile-square map for Irvine, a residential area that coincidentally overlaps my independent selection. These areas share transportation and land use design characteristics (see Figure 5). Jacob's second selection holds over 200 intersections in the mile-square.

Conclusions

Any sampling is subject to selection bias; when the results of the analysis are used in support of an hypothesis, the selection bias can invalidate the results. Here, selections in Jacobs' treatise on "great streets" were used by Ewing to illustrate walkability concepts. The planning concept is that smaller block size, and thus more intersections, leads to more walking opportunities. But the evolution of urban design over centuries, the concomitant development of transportation networks and policies, and intra-urban variations in virtually any city, all suggest that drawing general conclusions from the comparison of assumedly similar areas is at best problematic. The second order effect can magnify the problem, as with Boeing's statement that Jacobs' and Ewing's Irvine mile-square "demonstrates the coarse-grained, modernist, auto-centric urban form that characterized American urbanization." While there may be validity in that statement, it cannot be drawn from or applied to the mile-square sections in question, nor to Irvine in general. Too many people are comparing apples to oranges.

Figure 5

Summary Statistics

Summary statistics are provided for each city (not for the square mile depicted).

Venice's population is 265k (2014), thus, density is about 1,700 per sq. mi. However, the population of the *Sestiere* is 55,000 (2014 and declining) in a few square miles and thus is much higher in density.

L.A.'s population is 4,000k (2016), density is about 8,300 per sq. mi. (and increasing). Note that the City of LA covers over 500 square miles with significant variation in land use development and density.

Irvine's population is 258k (2016), density is about 3,900 per sq. mi. (and increasing). The approximately 66 square miles of the city includes about 40 percent permanent, undeveloped, open space.

Notes:

1. Aerial images were accessed from Google Maps in January 2014
2. Boeing selected a slightly different section of the square mile than both Jacobs and Ewing depict, with Boeing's choice adjusted in Nolli-fashion with north to the top.

References

Alan Jacobs (1993). "Great Streets" MIT Press.
Reid Ewing (2010) "Pedestrian and Transit-Friendly Design: A Primer for Smart Growth". EPA.
Geoff Boeing (2017). Blog post and a subsequent email exchange in February 2017.
MG McNally (2017). CEE Course Notes, January 2017