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## Digital intervention in space

Does social media change the movement potential of Oxford Street?

FARBOD AFSHAR BAKESHLOO, & SAM GRIFFITHS

SPACE SYNTAX LABORATORY, BARTLETT SCHOOL OF ARCHITECTURE, UCL

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### ABSTRACT

The concept of movement economy in space syntax theory defines how the spatial configuration of urban space shapes movement flows and distributes socio-economic functions (Hillier 1996). In this theory, this concept has been used to investigate the socio-economic dynamics of the built environment. However, the rise of social media in the 21st century represents a different type of intervention (digital intervention) in the built environment. Digital platforms constitute a new layer of the movement economy in cities, embedding new potentials in space to attract or repel movement flows and activities. This heavy pressure of social media on space has led some to suggest that social media is the new generator of movement and land uses in cities (Castells 2012). The paper discusses this issue in the context of Oxford Street, one of the best-known shopping streets in London. It examines the spatial and functional description of Oxford Street during the historical transition of London from the late-twentieth century ‘modern’ city (1970) to the twenty-first century ‘digital’ city (2019) to assess the socio-spatial consequences of social media on this street. Initially, it employs space syntax methodology to understand the role of Oxford Street in the structure of London in 1970 and 2019. Then, it scrutinises the land-use data of the street to precisely understand the distribution of activities on the street in these two eras. This joint approach makes it possible to explore how Oxford Street functioned as a shopping street in different conditions and keep the balance between its change and continuity.

### KEYWORDS

Movement Economy, Land-use, Movement potential, Oxford Street

## 1 INTRODUCTION

The concept of movement economy in space syntax theory defines how the spatial configuration of urban space shapes movement flows and distributes socio-economic functions. This concept



has been used in research to investigate the built environment's socio-economic dynamics. However, the rise of social media in the 21st century represents a different type of intervention in the built environment. Digital platforms constitute a new layer of the movement economy in cities, embedding new potentials in space to attract or repel movement flows and activities. This heavy pressure of social media on space has led some thinkers to suggest that social media is the new generator of movement and land uses in cities. The paper discusses this issue in the context of Oxford Street, one of the well-known globally shopping streets.

## 2 HILLIER'S THEORY OF THE MOVEMENT ECONOMY

The concept of movement economy explains how movement patterns equip street networks to attract land-uses and building density (Hillier 1996). The analysis of space syntax showed that the main source of these two urban parameters is the configuration of the urban grids (Hillier 2007). In other words, the configuration of the urban grids has a crucial effect on the distribution of land-uses and density in a city. This understanding of the urban grids contrasts with the modern planning approach, where planners consider urban grids as a spatial hierarchy and a facilitator of movement between different functions. These findings debunked the myth of functions as the principal organiser of cities' part-whole structure and offered a new understanding of how cities are working. This concept in space syntax theory is mainly associated with the consequences of physical interventions in the built environment. The rise of social media has shaped different types of intervention in the built environment (Castells 2012), which was not known yet. Under this condition, there is no consensus among thinkers about the main source of land-use in a space. Understanding how space is consumed by land-use, as well as how land-use is distributed in the structure of the digital city will orient the future of the concept of movement economy in space syntax theory.

## 3 CASE STUDY

Oxford Street in the center of London is selected as a case study for this research because it holds two special values. The first one is its history. This street emerged on the pre-urban historical road between London and Oxford and developed into a shopping street. Secondly, Oxford Street has a special status in the history of space syntax theory. This street was the most integrated line in Bill Hillier's pioneering axial model of London in 1996.

## 4 METHODOLOGY

Examining the spatial distribution of land-use data at the fine grain of the urban street shows how urban life has been transformed through time and accommodated new activities. The research gathers detailed information about Oxford Street's land-uses for the modern (1970) and digital (2019) times. This large time span of over fifty years allows the research to clearly detect the change and continuity of activities on Oxford Street in the two distinct periods. Then, the

research assessed syntactical values of Oxford Street in 1970 and 2019 to understand its potential to attract movements in these two eras. Finally, the outcome of space syntax and land-use analysis are combined to understand how social media impacted the potential of different land-uses for consuming the spatial value of Oxford Street.

## 5 LAND-USE ANALYSIS

The findings showed that retail land-use had preserved its continuity during this transition. It is a sign that retail activities were quite resilient to the new waves of change, including social media.

<i>Changes in the quantity of groups between 1970-2019</i>				
Group	1970	2019	Difference	
<b>Accommodation, eating and drinking</b>	26	35	9	34.62%
<b>Commercial services</b>	261	79	-182	-69.73%
<b>Attractions</b>	1	0	-1	-100.00%
<b>Sport and entertainment</b>	8	4	-4	-50.00%
<b>Education and health</b>	31	18	-13	-41.94%
<b>Public infrastructure</b>	21	3	-18	-85.71%
<b>Manufacturing and production</b>	80	3	-77	-96.25%
<b>Retail</b>	237	194	-43	-18.14%
<b>Transport</b>	4	4	0	0.00%
<b>Sum</b>	<b>669</b>	<b>340</b>	<b>-329</b>	<b>-49.18%</b>

 *the principal group (more than 10% of activities) of 1970*  
 *the principal group of 2019*

## 6 SPACE SYNTAX ANALYSIS

<i>T-test between NA choice and NA integration values of Oxford Street for the different radii in 1970 and 2019</i>			
Variable	P-value	Variable	P-value
<b>NACHr400m</b>	<b>0.997</b>	<b>NAINr400m</b>	<b>0.963</b>
<b>NACHr800m</b>	<b>0.824</b>	<b>NAINr800m</b>	<b>0.627</b>
<b>NACHr1600m</b>	<b>0.819</b>	<b>NAINr1600m</b>	<b>0.933</b>
<b>NACH2400m</b>	<b>0.977</b>	<b>NAINr2400m</b>	<b>0.379</b>
<b>NACH3200m</b>	<b>0.969</b>	<b>NAINr3200m</b>	<b>0.967</b>
<b>NACH6400m</b>	<b>0.695</b>	<b>NAINr6400m</b>	<b>0.702</b>
<b>NACH17500m</b>	<b>0.000</b>	<b>NAINr17500m</b>	<b>0.000</b>

 *statistically significant difference*

Oxford Street has remained largely consistent in the structure of London during this massive wave of change. This street carried similar behaviour for various radii and parameters in 1970

and 2019, except 17500m. It meant that new streets in London's street network could only impact the role of Oxford Street for regional journeys. This type of journey is not the case for this street. This consistency highlighted how this street had consolidated its role in the structure of London. Besides, the outcome suggests Oxford Street could attract more global journeys than local ones.

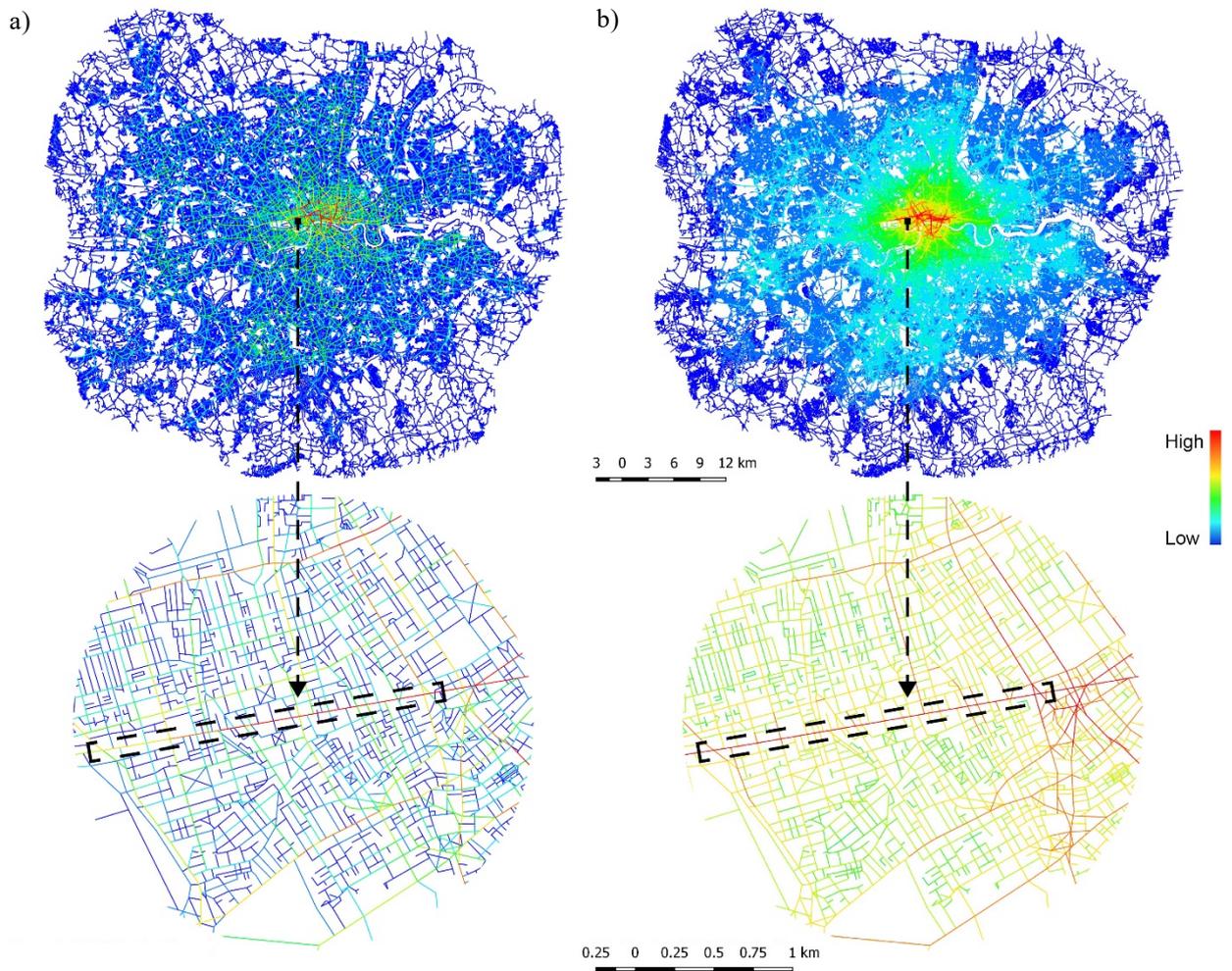


Figure 1: a) London and Oxford Street in 1970, Choice for radius= 6400 meters. b) London and Oxford Street in 2019, Integration for radius= 6400 meters

## 7 SYNTHESIS

The synthesis of land-use and syntactical analyses suggests that the spatial logic of activities on this street has not changed. They represented the same behaviour in 1970 and 2019; they consumed the syntactical values the same as the segments.



<i>T-test between average NA choice an NA integration values of groups and average of Oxford Street in 1970</i>				
Variable	1970		2019	
	P-value (NA choice)	P-value (NA integration)	P-value (NA choice)	P-value (NA integration)
<b>Accommodation, eating and drinking vs Average of Oxford Street</b>	<b>0.366</b>	<b>0.553</b>	<b>0.572</b>	<b>0.909</b>
<b>Commercial services vs Average of Oxford Street</b>	<b>0.135</b>	<b>0.081</b>	<b>0.236</b>	<b>0.177</b>
<b>Attractions vs Average of Oxford Street</b>	<b>0.036</b>	<b>0.135</b>	<i>///</i>	<i>///</i>
<b>Sport and entertainment vs Average of Oxford Street</b>	<b>0.417</b>	<b>0.411</b>	<b>0.059</b>	<b>0.722</b>
<b>Education and health vs Average of Oxford Street</b>	<b>0.017</b>	<b>0.021</b>	<b>0.595</b>	<b>0.381</b>
<b>Public infrastructure vs Average of Oxford Street</b>	<b>0.022</b>	<b>0.035</b>	<b>0.303</b>	<b>0.317</b>
<b>Manufacturing and production vs Average of Oxford Street</b>	<b>0.016</b>	<b>0.194</b>	<b>0.146</b>	<b>0.869</b>
<b>Retail vs Average of Oxford Street</b>	<b>0.341</b>	<b>0.791</b>	<b>0.240</b>	<b>0.571</b>
<b>Transport vs Average of Oxford Street</b>	<b>0.032</b>	<b>0.140</b>	<b>0.857</b>	<b>0.106</b>
 <i>statistically significant difference</i>				

<i>T-test between average of NA choice and NA integration value of groups on Oxford Street in 1970 and 2019</i>		
Variable	P-value (NA choice)	P-value (NA integration)
<b>Accommodation, eating and drinking</b>	<b>0.753</b>	<b>0.351</b>
<b>Commercial services</b>	<b>0.045</b>	<b>0.071</b>
<b>Sport and entertainment</b>	<b>0.341</b>	<b>0.319</b>
<b>Education and health</b>	<b>0.070</b>	<b>0.278</b>
<b>Public infrastructure</b>	<b>0.191</b>	<b>0.511</b>
<b>Manufacturing and production</b>	<b>0.599</b>	<b>0.663</b>
<b>Retail</b>	<b>0.061</b>	<b>0.655</b>
<b>Transport</b>	<b>0.104</b>	<b>0.553</b>
 <i>statistically significant difference</i>		



## 8 CONCLUSION: SOCIAL MEDIA AS A NEW MULTIPLIER

Based on the result, the noticeable decline in a land-use means a shift in the spatial logic of that land-use in the built environment. Therefore, quite stable behaviour of retail land-use (under the pressure of social media) shows the limited power of social media. Also, this outcome put one step further movement economy concept focussing on the number of activities per grid.

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