

Linking Sustainable Urban Development With Town Planning Through Proximity Trade

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Abstract

Losses from commercial activities reflect the decline and deterioration of the downtown, the urban fabric and the social structure of the cities. The dependence on motorized vehicles has grown significantly among consumers who must move to meet their daily needs. Such a process marginalizes vulnerable populations by promoting urban lifestyles less sustainable. Proximity trade is therefore becoming increasingly important for those groups because it encourages dynamism among distinct urban areas and reduces the use of vehicles. This urban model addresses a relevant issue as universal accessibility that allows residents to enjoy an available city and move freely without encountering obstacles. The major role played by trade in the creation of wealth and urban fabric demands the integration of commercial areas provisions into urban policy guidelines. In this context, the study aims at developing a set of indicators that link proximity trade with the promotion of sustainable urban development and the model of compact city to be included in Spanish urban planning guidelines. Sixteen indicators were thus formulated around five areas of action: urban morphology, urban complexity, sustainable mobility, urban metabolism and social cohesion.

Keywords: Proximity trade; Urban development; Town planning; Sustainable mobility; Urban metabolism; Social cohesion; Urban morphology

1. Introduction

The model of compact city has been widely adopted by the European Union (EU) to ensure sustainable development in urban settings. The model is based on a complex and high-density city characterized by mixed uses, local services, social cohesion and where urban renewal and renovation prevail over urban sprawl (Findlay & Sparks, 2009). The concept of “proximity” is related to location, articulation of activities and basic services that require a frequent use and therefore, they should be about habitation (Merlin & Choay, 1988). However, meaningful changes in shaping urban trade have occurred in the last decades as a consequence of the blossoming of electronic commerce and the proliferation of a variety of retail formats in peripheral urban areas, that jeopardize the principles upon which a compact city is founded.

This upward trend has caused a gradual reduction of urban vitality, forcing the closure of small shops and commerce in city centres which has accentuated rising crime and the process of the emptying of the towns due to the abandonment of buildings and the decline in public investment in essential amenities. This urban transformation has been considerably accelerated by the impact of coronavirus pandemic. And the decrease of trading is one of the most significant indicators of the fall and degradation of urban centers

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(Delgado-de Miguel et al. 2019) and the undermining of urban fabric and social structure in cities (Simó et al. 2018). Furthermore, the reliance on motorized vehicles has risen sharply among consumers who are obliged to travel to satisfy their basic needs. That marginalizes groups with fewer economic resources that have no vehicle (9% of the EU population) and the most vulnerable people such as the elderly (17% of the EU population) or disabled persons (15% of the EU population), which weakens social cohesion and promotes less sustainable urban lifestyles (Guy 2007).

Trade in proximity is hence of great importance for those collectivities since it boosts dynamism in different urban areas while limits the use of vehicles. Such a model enables the insertion of commercial structures, business activities and facilities into a spatial scale as the neighborhood where they can be reached in a short walk from the home. Moreover, universal accessibility is arranged as well. Accessibility, an important issue addressed by Spanish urban law, allows inhabitants to move freely through the city without barriers or obstacles (Lasa 2020). To this end, urban and regional planning must drive an urban design inspired by the pursuit of proximity (Barata-Salgueiro & Erkip 2014) in which short distances between dwellings, public transport, workplace, facilities and trade areas predominate alongside with a harmonic distribution of trade in territory where location in city centre is prioritized to facilitate pedestrian accessibility.

Sustainable urban development is thereby linked to a balanced scenario where diverse environments and commercial areas are located (Department for Communities and Local Government 2009) that are able to meet needs and wishes of different segments of consumers. Similarly, a higher quality in urban living conditions contributes positively to strengthen urban sustainability (Knox & Mayer 2009). In this sense, resilience must be studied together with sustainability due to the close connection between them in the urban realm (Wrigley & Dolega 2011).

The integration of the provisions governing trade into urban policy guidelines is prompted by the leading role that trading plays on wealth creation in cities (Jayne 2006) and the condition of structural element in urban fabric (De las Rivas 2007). Despite the relevancy and benefits of proximity trade, the normative support received from the Administration is scant. In this regard, the economic nature of the sector predominates in European Directives which use the principles of free enterprise and competition to regulate commerce¹.

Proximity trade, also known as small shop or neighborhood trade, is defined as retail² that is located closer to dwelling place in contrast to large shopping centres. It is characterized by offering, selling and/or supplying products, goods and services with personalized attention and a further buyer interaction which encourages recruitment, retention and customer loyalty. This study aims at building a set of indicators that associate trade in proximity with sustainable urban development and the model of compact city with the purpose to be incorporated into Spanish land and urban planning guidelines. Sixteen indicators were formulated around five areas of action: urban morphology, urban

¹ Directive 2006/123/EC of the European Parliament and of the Council of 12 December 2006 on services in the internal market, also called the “**Bolkestein Directive**”.

² In accordance with the Legislative Decree no. 7/1996 of 15 January on Retail Trade Management published in the Official Gazette on 17 January 1996, retail is defined as “*that for-profit activity professionally developed that consists of offering to sell any kind of article to the final beneficiaries by means of a facility or not*”.

complexity, sustainable mobility, urban metabolism and social cohesion (Figure 1).

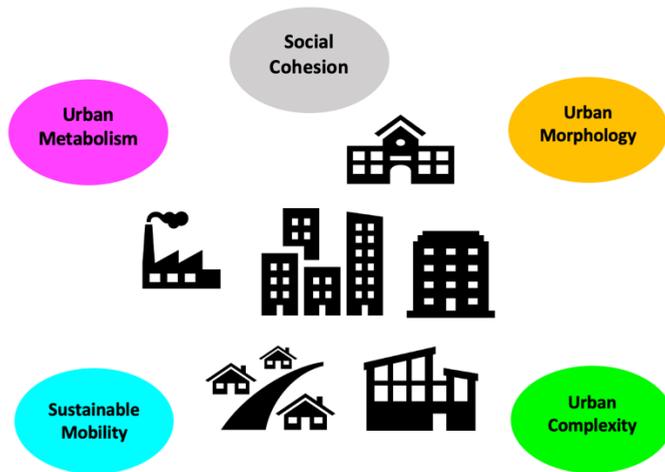


Figure 1. Fields of action represented by the proposed indicators

2. City Sustainable Approach from Commercial Activity

Although there are various patterns employed in the process of urbanization in the territory, the models of compact city and dispersed city are the most outstanding standards (Terán 2001). Nowadays, most new residential buildings are in areas scarcely connected with the urban environment due to the increasing use of cars as a preferred means of personal mobility. Mass production of housings and street development regardless of land and urban planning, and the dearth of a general framework for urban planning and management are the three factors that have fostered the expansion of the dispersed city model. Compact city instead favors spatial concentration through an organized urban development.

Sustainable urban development is principally defined by urban complexity, social cohesion and the search of self-reliance at local level. Moderate land consumption, reduction in the use of basic resources such as water and energy, promotion of urban renewal and renovation projects, construction of pedestrian and bicycle pathways and public transport use are some of the strategies that contribute to higher local self-sufficiency. Some fields of action such as urban morphology, sustainable mobility and urban metabolism are deemed for being measured as well. Interface between the different urban systems serves to depict urban complexity, also conditioned by the combination of uses in the new developments, preservation of natural systems and the decrease of impervious surface in cities. Equity and social well-being are two essential variables to assess the degree of social cohesion. The coexistence of groups with different cultural background and level of income, equal access to basic services, closeness between residence and workplace or the improvement of accessibility for people with limited mobility are some of initiatives that boost social cohesion in urban settlements.

The strong emergence of electronic commerce in the last years has induced important

changes in consumer behavior, modifying the role played by traditional trade in the urban fabric (Dobson 2015). That has a substantial impact on urban sustainability through the economic viability of shops and the vibrancy of commercial areas (Cachinho 2014). Hence, it seems appropriate to bond this profound transformation with urban sustainability and resilience.

The continued evolution and adaptation of retail to technological developments and market pressures suggest the definition of a new term as “commercial resilience” (Dolega & Celińska-Janowicz 2015). Certain considerations are to be stated under the assumption that resilience of a commercial area leans on the ability to adapt to change, shocks and disasters while still serves its intended purpose on a sustainable basis. First, trade performs a prominent function in society, economy and urban planning by facilitating the exchange of goods and services among community members while it seeks to attain an equilibrium between financial returns and its nature of civil service (Ozuduru et al. 2014). On the other hand, resilience does not imply that the specific features of the reference area should be kept permanently, but they should reflect the continuous progress that society experiences given its dynamic character (Gil 1995). Sustainable urban development is thus attached to a balanced system of commercial services able to respond effectively to consumer needs. As such, the most sustainable cities are those with a well-functioning network of zones where goods and services are offered to residents (Rogov & Rozenblat 2018).

3. Development of Metrics Linked to Proximity Trade

The objectives of urban planning are increasingly related to sustainable economic development and urban resilience through endeavors that foster profitability and vitality of the downtown area because the importance in prosperity of local economy (Guillemot 2014). Successive amendments of trade regulations reveal the growing support of public sector to strengthen the urban area due to the prominent role that plays in the sustainable development of cities through some actions, inter alia, pedestrianization of streets or momentum of the use of alternative means of mobility (Gasnier & Guillemot 2011). These measures strive to revitalize the center of the city with particular attention to the improvement of the physical environment of streets and the creation of clean and safe spaces (Yrjänä et al. 2018). Nevertheless, defined criteria and indicators which connect proximity trade with urban planning do not yet exist. With the purpose of bridging this gap, a set of metrics representing five fields of action in cities was designed (

Table 1). Those domains are urban morphology, urban complexity, sustainable

mobility, urban metabolism and social cohesion.

3.1 Methodology

The paucity of literature in urban science that jointly analyzes proximity trade and sustainability has determined the methodology followed to propose the set of indicators outlined below. Metrics were tailored after considering key documents implemented in Spain. First, legislative decree no. 6/1998 of 13 April on land valuation published in the Official Gazette on 14 April 1998 (BOE 1998) provides the legal framework governing urban planning in the country. Second, the Spanish Urban Agenda (AUE 2019) as non-binding guidelines that seek the deployment of the Sustainable Development Goals in urban areas. This agenda updates municipal indicators of sustainability determined by the Spanish government in 2010 (MITECO 2010), also deemed in the study. Some criteria were set to characterize selected indicators such as influence in any of the four sustainability dimensions (social, economic, environmental, institutional), easy embedding in current urban guidelines, quantitative measurement and direct linkage with proximity trade.

3.2 Urban morphology

The success of shops is particularly associated with their location in the urban grid which confers a greater or lesser exposure to prospective clients (Arentze et al. 2005). Hereby, proximity to the households gets special attention, being accessibility the variable that better reflects the ease with which consumers reach shops. The possible formulation of a mathematical expression that can measure accessibility enables its inclusion in urban planning in order to achieve two critical goals such as basic supply and the curtailment of the use of vehicles.

Basic goods are those that people are unable or unwilling to remove from shopping cart, inter alia, foods and beverages, cleaning/hygiene items, alcohol or tobacco. The provision of them demands that customers may access to commercial zones where they can meet their needs. The selection of urban areas where basic supply is suitable is performed by the calculation of the percentage of population with access to basic goods and services within 500 meters from home, which is equivalent to a 10-minute walk. This indicator is named as proximity to basic supplies.

Commercial compactness metric serves to design new commercial zones according to their location or the analysis of existing shopping areas by means of benchmarking between commercial streets or the study of traded clusters in operation. This measure is defined as the proportion of commercial area in use with respect to the total built commercial area.

3.3 Urban complexity

Urban complexity involves a set of integrated variables over time and space which carry information. It refers to the urban fabric, the combination of different uses and functions in the territory and the interactions between inter alia, legal persons and trade activities, organizations and public institutions. Complexity is commensurate to the degree of organization which fosters the stability and continuity of the system. A high grade of organization thus promotes the development of strategies based on information and knowledge to reduce the consumption of resources. For example, an efficient urban plan

seeks the balance between uses and functions through conditioning factors of urban development. A shorter distance from households to workplaces or commercial zones will contribute to lower energy consumption or pollution. Urban morphologies tied to the growth of complexity are generated in spaces endowed with compactness, centrality and accessibility. Although these conditions can be reached as a result of the evolutionary process that affects the urban centre, it can be also advocated by the urban development strategy.

The existence of elements bearing information and mutually interrelated through many and varying manners determines the complexity of a place. The contact and exchange of information among those actors characterize the operation of urban systems. The Shannon-Wiener index (H) measures urban complexity, whose result must be multiplied by the total number of legal persons. The mathematical expression in bits of information units is $H = (-\sum_{i=1}^n (P_i \text{Log}_2 P_i)) \times \text{number of legal persons}$. Where n is the number of types of different activities according to the Spanish National Classification of Economic Activities (CNAE)³ and P_i is the rate of legal persons of the type i with respect to the total number of legal persons.

The definition of proximity patterns requires an analysis of the composition of uses and functions in residential areas of the cities to minimize motorized travel and give consumers easier access to commonly used basic services. Space reservation for commercial premises increases the probability of mutual contact and exchange among legal persons. Streets are the backbone that links commercial zones to residential ones through pedestrian trajectories that shape attraction points in the city. An equilibrium between business activities and residential use is thus necessary to this end. The ratio between built commercial area and the total inhabitants of the zone serves to assess this balance. A percentage of lucrative non-residential use should be established as a minimum reserve for proximity trade purpose, whilst the average of built area for shops should be in the range between 50 and 200 m².

3.4 Sustainable mobility

In the last decades, sustainable mobility has rapidly gained prominence in the urban realm as an effective answer to growing alarm due to the impacts derived from the massive use of motorized transportation in society, economy and environment.

Citizens have traditionally occupied the public space making it a preferential place of social meeting and interaction and therefore, a critical element to build a city, where easy movement without constraints is allowed. But the progressive occupation of public space by vehicles has slowly eroded its leading role in the development and operation of cities.

The urban layout is formed by a grid of streets where driveway and pedestrian space shape public area for transport flows. Urban mobility devises solutions based on promoting and improving alternative forms of transport and measures to limit and discourage the use of cars. Proximity trade can be stimulated by providing customers an easy connection to public transport, pedestrian pathways and lanes for bicycles or personal mobility vehicles (scooter,

³ The last update of CNAE came into force on 1 January 2009, according to the Royal Decree no. 475/2007 of 13 April 2007, where the National Classification of Economic Activities 2009 (CNAE-2009) was approved and implemented.

unicycle, hoverboard, segway). Taking as reference the gravity centre of proximity shop areas, a walking distance within 500 meters that equals to a 10-minute walk is regarded as appropriate to define next indicators. Vicinity to collective public transportation is defined as the walking distance to the nearest stop, whatever the mode of transport. Proximity to bicycle lane is determined as the biking distance to the adjacent bicycle lane, whilst closeness to parking for bikes and electric personal mobility vehicles is the walking distance to the immediate parking space with a recharging point for electric personal mobility vehicles. As a quick supply of goods to proximity shops is essential to ensure their functionality, walking distance to loading docks is also covered by indicators to be measured. A maximum of 250 meters, equivalent to a 5-minute walk is recommended.

3.5 Urban metabolism

“The sum of all technical and socio-economic processes that happen in urban settings creating development, consuming energy and producing waste” is known as urban metabolism (Kennedy et al. 2007). This model depicts and quantifies the major energy and resources flows which are incorporated, used and stored into the urban systems.

Energy management should be oriented towards a more sustainable system that minimizes environmental impacts while guarantees necessary energy supply, for which energy efficiency and the use of renewables should be fostered. Concerning water use, self-sufficiency in consumption is aimed by using local sources. The design of more efficient production and consumption patterns implies the use of fewer resources and generating less pollution, whereby selective collection and recycling are two initiatives to be boosted. Carbon neutral development can be highly stimulated by renewables that enable to reach self-sufficiency in energy. And auto generation of energy from renewables produced in cities can strengthen energy independence and the robustness of systems. In this context, the energy self-sufficiency index of proximity shops assesses the percentage of their energy consumption resulting from renewable sources located in urban areas. A value higher than 35% is right.

Selective waste collection is appraised as the proportion of separate waste deposited by local commerce in the system of selective collection of urban waste (organic material, glass, paper, plastics, etc.). At least, a 75% of each fraction of waste is expected to be separately collected.

Because climate change is the major challenge that humanity must address to conserve the environment of the planet, strategies to drastically cut carbon emissions should be outlined. With this purpose, the index called CO₂ equivalent emissions expresses the amount of Tonnes of CO₂ equivalent produced by commercial activities. An annual decline of at least 5% of emissions generated over the last year would reflect a satisfactory response of proximity trade to this issue.

Noise has an adverse effect on physical and mental health. Although its origin is especially associated with transport and industry, shops are great producers. Noise pollution index measures sound level in dB(A) which is perceived by neighbors at any day or night time. A value lower than 55 dB(A) is prescribed.

3.6 Social cohesion

Social cohesion is a cornerstone of urban sustainability. It refers to the degree of binding among collectives from distinct social strata, income level or cultural background

which live in the same city. Diversity and joint activities within the urban area bring together social cohesion and the model of compact city, being “proximity” the factor which promotes the interplay between those groups. The separation of uses and activities in some urban areas tends to lead social segregation and hence the development of feelings of insecurity and marginalization caused by the mutual ignorance. On the contrary, the higher the diversity, the lesser the previous issues. Within this framework, proximity trade offers a large variety of activities and basic services which articulate a dense urban layout where diverse social groups interact mutually following the patterns of a compact city. The local workforce retention index accounts the ratio of people employed in proximity shops located in their area of residence, which helps to determine staff mobility patterns. The higher the number of employed residents in the area, the higher level of income and the lower labor mobility and therefore, the greater concentration of activities. Besides, the diminution of daily trips has a positive impact on the quality of life for all, pollution level and social cohesion. And, similarly, a robust associative fabric that reflects social, economic, environmental and institutional concerns of population can boost social cohesion and integration of diverse groups by effectively advocating their own interests. Associationism rate is defined as the percentage of proximity shops which are members of a registered association in the municipality.

4. Conclusions

Trade has traditionally been considered as the trigger that prompted the emergence of urban settlements. As such, the examination of interlinkages between commerce and sustainable urban development is paramount to determine the influence of trading in social, economic, environmental and institutional domains. Especially since proximity trade is closely associated to the model of compact city that prevails in Spain. Under those premises, this manuscript becomes relevant in the field of urban planning to be coupled with sustainability. Sixteen indicators were defined by tailoring legal and non-binding Spanish guidelines to the proximity trade context around five areas of action such as urban morphology, urban complexity, sustainable mobility, urban metabolism and social cohesion. The main limitation of the study is the dearth of joint research on sustainability, local trade and urban planning which hindered a further elaboration of the topic.

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Table 1. Indicators that liaise proximity trade with urban planning

Field of Action	Indicator	Description	Unit
Urban morphology	Proximity to basic supplies	% of population with access to basic goods within 500 m from home	% (population)
	Commercial compacity	% of commercial area in use with respect to the total available commercial area	% (sales area)
Urban complexity	Shannon-Wiener	$H = (-\sum_{i=1}^n (P_i \log_2 P_i))$ * number of legal persons	Bit of information
	Activity-dwelling balance	Ratio between built commercial area and the total of inhabitants	Built Sqm per inhabitant
	Proximity activity	Area of lucrative non-residential use for proximity trade purpose	Built Sqm
	Shop size	Average area of a proximity shop unit	Built Sqm
Sustainable mobility	Vicinity to collective public transportation	Walking distance from gravity centre of proximity trade areas to the nearest public transport stop (any)	Meters /minutes
	Proximity to bicycle lane	Biking distance from gravity centre of proximity trade areas to the nearest bicycle lane	Meters /minutes
	Closeness to parking for bicycles and electric personal mobility vehicles	Walking distance from gravity centre of proximity trade areas to the nearest parking space with a recharging point for electric personal mobility vehicles	Meters /minutes
	Loading docks	Walking distance from gravity centre of proximity trade to the nearest loading dock	Meters /minutes
Urban metabolism	Energy self-sufficiency	% of energy consumption produced by renewable sources located in urban areas	% (energy consumption)
	Selective waste collection	% of separate waste deposited in the system of selective collection of urban waste (organic material, glass, paper, plastics, etc.)	% (waste by type)
	CO ₂ equivalent emissions	Tonnes of CO ₂ equivalent from commercial activities	Ton CO ₂ equivalent
	Acoustic pollution	Noise level produced by proximity shops that is perceived by residents at any time of the day (or night)	dB(A)
Social cohesion	Local workforce retention	% of population employed in proximity shops located in their area of residence	% (population)
	Associationism rate	% of proximity shops as members of a registered association	% (proximity shops)