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Pablo Coquillat Mora

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Specialisation of retail streets as a result of an evolutionary process

Pablo Coquillat Mora ^{a,b}

^aDepartment of Urban Planning, Santo Tomas University, Bucaramanga, Colombia; ^bDepartment of Urban Planning, Technical University of Valencia, Valencia, Spain

ABSTRACT

This article analyses the historical formation of the specialised retail street Santa Ifigênia (São Paulo, Brazil), and links it with concepts based on an evolutionary framework. Testing of the theory is based on historical data of firms from 1857 to 2010. The research has found that the current specialisation in the electro-electronic sector (from the 1940s onwards) is the third one that has taken place in the street, replacing the previous fashion sector (between the 1910s and the 1940s), which in turn outcompeted the original specialisation of the food sector (from the 1870s to the 1910s). It also highlights the historical and contingent events that changed the trajectories of the retail evolution of the street.

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Introduction

The formation of retail streets is an ubiquitous phenomenon in cities (Davis 2012; Venturi, Brown, and Izenour 1977; Minner and Shi 2017). Its specialisation, however, is less frequent, though still abundant. By the last third of the nineteenth-century, new districts were rapidly growing in São Paulo, Brazil in response to the arrival of the railway (1867). These districts would absorb the new European migrants called to work in the coffee agroindustry. The massive arrival of migrants produced a local development of economic activities (Gandhi and Minner 2017), based on retail services from a few specific sectors. After some years, original residential streets of the new districts began to gradually transform residential spaces into commercial ones. Soon, some of these streets became specialised in different retail sectors. Most of these streets have lasted until the current period, and in 2016 São Paulo counted 56 specialised retail streets of different categories. Rua Santa Ifigênia is the oldest of this street system outside the downtown area. From the 1980s onwards, the street has been the greatest retail district in Brazil for electronic goods, with products and services including electro-electronics, computing, lighting, telephony and communication, electrical appliances, audio and video articles, musical instruments and accessories (Parente, Miotto, and Barki 2007).

Although cases of specialised retail streets are easily noticeable in cities, many other situations of economic specialisation can be ascribed to the same kind of phenomena. Disentangling the causes and dynamics of the process of specialisation in the electro-

CONTACT Pablo Coquillat Mora  pablocomo@gmail.com

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electronics sector in Rua Santa Ifigênia thus seems to illuminate one key question on urban-economic theory, namely what evolutionary features can be identified in the formation of economic areas. Along this process, we might expect to see forces of agglomeration, cluster formation through the convergence of activities and functional persistence acting during long periods of time in which specialisation is not interrupted. Many authors, mainly from the fields of economics and geography, have long discussed agglomeration externalities (Arthur 1994; Marshall 1920) and the clustering of related economic sectors (Boschma and Fornahl 2011). From an evolutionary perspective, agglomeration can be interpreted as the mechanism by which existing organisations breed new ones founded by entrepreneurs (Dahl, Østergaard, and Dalum 2010). As increasing demand allows growth to be sustained (Glaeser and Gottlieb 2009), clustering facilitates the exchange of market knowledge (Goman and Klepper 2016; Narvaez Zertuche and Davis 2019; Brenner and André 2007) and comparison shopping (Nelson 1958), and diversification (intra-sectorial) create differential advantages over existing retail institutions (Nelson 1991; Anderson 1957), the specialized retail street emerges as a canonical urban unit where convergence pressures end up eliminating diversity (inter-sectorial) from the street. Specialisation, therefore, does not respond to a more advanced stage in the development of retail streets, but to an intensification of its commercial process.

The purpose of this paper is to specify and test an evolutionary explanation for the specialisation in the electro-electronic and related sectors in Rua Santa Ifigênia. The approach used here is largely based on supply-side analysis of the changes which occurred in the composition of retail sectors of the street firms. The main hypothesis states that for a retail specialisation to occur in a street, long periods of time are needed in which the original retail diversity is suppressed by competing forces, and that process of emergence and market selection of retail varieties can be adequately explained using concepts from evolutionary theory. An evolutionary process implies that the survival of the firms is reinforced through *hereditary* strategies. There are several ways in which this hereditary feature can be expressed. First of all, by an imitation behaviour that copies successful business strategies (Boyd and Richerson 2005; Nelson and Winter 1982); secondly, by a process in which incumbent firms spawn abundant spinoffs that tend to locate close to their geographic roots (Klepper 2007); thirdly, by reducing market environmental uncertainty by a process of trial and error, with the trials being provided by firm's variations, and the errors being removed by market selection (Steadman 2008); and finally, by the historical process that creates path dependencies over selected retail alternatives and restricts firms' future variation, thus producing retail convergence (Martin and Simmie 2008). Another evolutionary property is related to the common inflation of retail variation before the specialisation occurs. This typical feature identifies with *drift* patterns, where market selective mechanisms are not yet very strong, and retail activities tend to increase their diversity.

Although its beginning dates back at least to the end of the nineteenth century (Veblen 1898), evolutionary economic theory has been established today as an expansion of a Schumpeterian programme (Boschma and Frenken 2011), in which innovation, competition, and entrepreneurialism occupy the central core of the proposal (Kirzner 1997). An evolutionary framework to study economics has been developed since then (Nelson and Winter 1982; Dosi and Nelson 2010; Boschma and Martin 2010b; Metcalfe 1994) and seems to offer a wider perspective on retail evolution than the fragmented

models derived from retail theory. Certainly, these models – mainly the wheel of retailing, the retail life cycle, the conflict theory, and several combinations of them – are appropriate in distinguishing key elements of retail dynamics and evolution. In our case study, for instance, we detect some components of conflict theory and also a restricted version of the retail life cycle applied only to one street¹. However, none of them provides an entirely satisfactory picture of the processes involved in retail evolution (Brown 1987). Environmental factors are, undoubtedly, determinant in promoting managerial changes, institutional growth, or sectorial deviations in the established retail paths. The same can be said for institutional innovation (Bliss 1967). However, these factors only confront a fraction of the process of street specialisation. Bid rent theory (Haig 1926), for instance, offers an excessively simplistic vision of the economic behaviour of the city. It cannot deal with several factors like the emergence of new central polarities, historical and cumulative trends, or with the pattern of low prices often showed by retail street rentals until the streets acquire a symbolic value (Roca Cladera 1983; Coquillat Mora 2018), even if they occupy central locations. Neither does it provide an explanation of why this and no other specialisation on different sectors took place where it happened² and changed over time following different patterns. Evolutionary theory, on the other hand, includes models of explanation mainly based on microeconomics about the origin, formation, maturation and substitution of economic functions using ecological factors and decision-making processes (Hodgson 2002). Theories of evolutionary economics satisfy three basic requirements that suit the behaviour of retail change (Boschma and Martin 2010a). Firstly, they are *dynamical*, ruling out any kind of static or comparative-static analysis, so focusing attention on change. Secondly, evolutionary economics deals with *irreversible* processes. The past cannot be recovered and it imparts legacies that condition the behaviour of economic agents in the present and the future. In the context of evolutionary economics, 'dynamical' refers to such features as emergence, convergence, divergence, and other patterns and trajectories that are rooted in real historical time. Thirdly, theories on economic evolution must explain the generation and impact of *novelty* as the ultimate source of self-transformation. It is the creative capacity of economic agents (individuals and firms), and the creative functions of markets, that drive economic evolution and adaptation. A canonical model derived from evolutionary economic theory, the path dependence model (Martin and Simmie ; Melosi), fits better the dynamical behaviour found for the case shown in this paper than retail theories mentioned earlier. Therefore, the proposed theoretical framework used here seeks to widen the straitjacket conceptualizations into a more comprehensive framework in which not only the mentioned theories, but also other concepts and approaches, could apply without outcompeting each other.

The implications of the proposed theory framework are studied using historical data on firms' records in Rua Santa Ifigênia from 1857 to 2010. The findings suggest that land uses tend to persist in time and space; decline in one specialised or semi-specialised retail sector over an urban fabric will be followed by the replacement by other alternative sectors favoured by functional continuity. Furthermore, it shows that, during the life cycle of any retail-street sector, contingent and unplanned events are highly influential as indirect causes of positive or negative feedback over the activity that can completely change the retail trajectories. Other implications suggest that, once a retail sector is highly

specialised, market selection forces will prevent and remove alternative activities wanting to establish themselves in the same retail system of the street.

The paper is organised as follows. In the first section, we briefly present the commonalities found in specialised retail streets in São Paulo. Then, we discuss the theoretical evolutionary approach adopted in this research. In the next section, we describe in detail the historical process of specialisation in Rua Santa Ifigênia, remarking on its previous specialisations in two distinct sectors (the food and fashion sectors). Finally, we summarise in theoretical terms the evolutionary behaviour observed in the previous section.

Specialised retail streets in São Paulo

In general terms, retail specialisation self-organises spatially on linear geometries that go beyond strict planning ordinances. Our research of 56 specialised retail streets in São Paulo (Figure 1) has shown that centrality is a recurrent, but not exclusive, feature of these streets. New retail vectors arise in areas distant from the downtown favoured by conditions of proximity to new centres, accessibility or other highly unpredictable factors (Coquillat Mora 2018). Since retail growth has proceeded gradually through the remodelling from original residential buildings, it usually takes several decades to occur, thus favouring its emergence in old urban fabrics³. For the case of São Paulo, specialised streets are born out of urban expansions that took place between the last third of the nineteenth century and the beginning of the twentieth century, despite low-intensity specialisations have also been found in recent districts.⁴

As an emerging phenomenon, retail specialisation shows a characteristic process of building transformation. There is no way of predicting the success of a new firm, neither the direction of specialisation when the trends are still not consolidated. Given that unpredictability, uncertainty dominates firm survival. Uncertainty causes the transition from non-commercial to commercial activities to occur gradually and the gradual and incremental change of activities implies an equal gradualness in building transformation. These transformations, not always circumscribed to the scope of legal ordinances, pass through multiple operations that expands the commercial stock, such as the enlargement of openings and shop windows, interior remodelling, or extensions of the built-up area for instance (Coquillat Mora 2018). This adaptive process provides the streets with an abundant retail floorspace that is the base for the recycling of new retail-varieties when the dominant sector enters a recessive trend⁵.

Another consequence of the emergent property of street specialisation concerns the innocuity of planning ordinances. Favouring factors in the formation of specialised streets relate to situations of adequate location (Constantinou and Krafta 2015), proximity to public transport facilities, morphological stability of the urban fabric and the built-up area, or historical contingencies. In very few cases we found situations where planning ordinances impose commercial activities on the urban fabric, and in no case is retail specialisation a goal in itself.⁶



Figure 1. Specialised retail streets in São Paulo and enlargement of Santa Ifigênia's District in 2016.

Evolutionary concepts for the analysis of specialised streets

A process in which the market defines a selective environment, where firms compete for preferential locations and economic activities, and where knowledge inheritance improves the adaptation to the environment by increasing firm survival can be identified as an evolutionary process. Evolutionary theories have shown to be appropriate in explaining emerging phenomena, where the object of study focuses on the formation of ordered macrostructures arising from micro-level dynamics.

The first implication of considering retail specialisation as an evolutionary process is that *copying* successful firms constitutes an adaptive strategy to market pressures (Thomas 1970; Bliss 1967). Following Nelson and Winter (1982) and Boyd and Richerson (2005), imitation strategies between firms is a perpetual force in economic evolution, in which firm survival increases by using similar strategies from that of successful firms. This process is evolutionary in the sense that there is a persistent transmission of effective information between

firms that maintains a convergent knowledge base in the market. Therefore, in the history of retail streets, we might expect to see an inflation of firms' variation in the initial stages followed by a progressive reduction due to imitational processes stimulated by success. The competition will force firms to rapidly converge to adapted solutions in order to survive, and proximity might facilitate the process of acquiring costly information (Boschma 2005). Looking for proximity advantages, a shop established close to another may offer products and services almost analogous to the first shop. The spatial propinquity emerged here properly explains the principle of minimum differentiation stated by Hotelling (1929). Proximity to individuals with great skills or knowledge facilitates skills acquisition and the exchange and diffusion of knowledge by imitation processes (Jovanovic and Rob 1989; Glaeser 1999). Because of this advantageous interaction, the accumulation of nearby spatial and sectoral retailers generates complementary business networks with little variation of market solutions among them. This confirms not only the tendency of firms and industries to agglomerate spatially and to homogenise, but also that firm competitiveness depends on both their intra-organisational strategies and their extra-organisational assets derived from their economic environment (Boschma 2004). The cost of using a specific commercial process diminishes as more local firms use the same type of process because they can share intermediate suppliers. Therefore, the combination of localisation economies with congestion costs creates competitive advantages to urban specialisation (Duranton and Puga 2004).

Another evolutionary implication is that an important force of agglomeration comes from spinoff spawning from incumbent firms that tend to locate close to their geographic roots (Klepper 2007). The reason stated by Klepper is that employees of incumbent firms with severe disagreements will leave to fund spinoffs that agglomerate in space even without economies of agglomeration. Klepper shows that firms founded by employees that had inherited great skills from incumbent firms with high performance have a superior survival rate than those who inherited no prior knowledge. Both mentioned processes of firm reproduction – by imitation and by spinoff formation –, tend to offer related products at nearby locations, but firms will be forced to slightly diversify to occupy competitive market niches.

In order to specialise an area of the urban fabric, the variation of its firm environment must converge, both in function and form. The consolidation in time of a convergence process defines a particular commercial path in the urban area. History is then incorporated into evolutionary dynamics. The historical path, represented by the local cumulative nature of retailers' past selections, restricts and guides future retail variation by a sort of inertial force. As firms belonging to the same sector grow and accumulate, an intrinsic *resistance* to their replacement is generated. So once a particular path of commercial development is established, it becomes self-reinforcing via various forms of feedback processes, especially positive externalities and increasing returns effects⁷ (Martin and Simmie 2008). Converging is thus an adequate survival strategy because it reduces market risk by repeating what others successfully did in the past.

However, as more retailers converge in their offer in a specific retail sector, competitive pressures increase. The limited space of a street is an urban selective factor that favours the most lucrative firms to dispute the available built-up area. It is noteworthy that competing for a retail space is a costly process. It takes time, effort and risk for a firm to establish itself in an urban area. Although clustering of firms pertaining to the same retail

sector increases their survival as a result of the niche effect, any equilibrium achieved would be constantly threatened by the entry of new firms with different and more lucrative strategies (Kirzner 1973) that might alter the composition of activities.

Finally, for the purpose of retail specialisation, the influence of a retail product's life cycle must be considered (Fujita, Krugman, and Mori 1999). The life cycle decline from a specific sector will indicate the stagnation of those establishments depending on it, promoting their transformation towards other sectors, as we will see in the history of Rua Santa Ifigênia. The replacement between different product life cycles in this street implies the transformation over existing retail spaces, so the evolutionary dynamics will show sectoral domination over different length periods and after exhausting its cycle, it will alternate to another sector. This behaviour reinforces the presence of the place as the locus of historic and economic persistence.

History of retail in Rua Santa Ifigênia

Rua Santa Ifigênia is the oldest specialised retail street in São Paulo outside its downtown area. It dates from the eighteenth century, although its origin is vague, as it arose from a slow occupation with small buildings. It was only after the decade of 1880 that retail activity began to accelerate and which remains active until today. Its primary economic activity is currently based on the commerce of electro-electronic items, computing, lighting, telephony and communication, electrical appliances, audio and video articles, musical instruments and accessories. All these retail categories can be officially grouped into the same sector type⁸.

Throughout its history, there have been three main retail sectors in Rua Santa Ifigênia. The oldest one was the food sector (1870–1940 approx.), followed by the fashion sector (1870–2000 approx.), and finally the technology sector (1940– present). These have been complemented with minority sectors with different shares in the total composition of the street, such as the home products sector, second-hand mechanical parts, or technical products among others.

Data

Two primary data sources were used to compile the street's retail history. The first and oldest is based on the Paulistan almanacs (for the years 1857, 1873, 1878, 1888, 1891 and 1896) and the federal almanacs (for the years 1910, 1921, 1931 and 1940). The almanacs were publications from the states describing most of the existing businesses in the city, their exact location and the professional sector to which they belong.

The second source of retail data was the digital repository from the Commercial Board of São Paulo State⁹ (JUCESP), compiled for the period between the mid-twentieth century and year 2010. The Commercial Board is the institution responsible for maintaining an updated record of businesses for each Brazilian state. The JUCESP has a database organised according to the type of activity that is recorded by the CNAE, but the digital updating of the oldest business records has not been completed in this repository yet, and therefore, for the first decades consulted the records are scarce, though significant.

The percentages shown in Figures 2 and 3 corresponds to the composition of the number of retail establishments in Rua Santa Ifigênia for the period considered. The calculation has been obtained from the official records of the databases mentioned, assuming that each

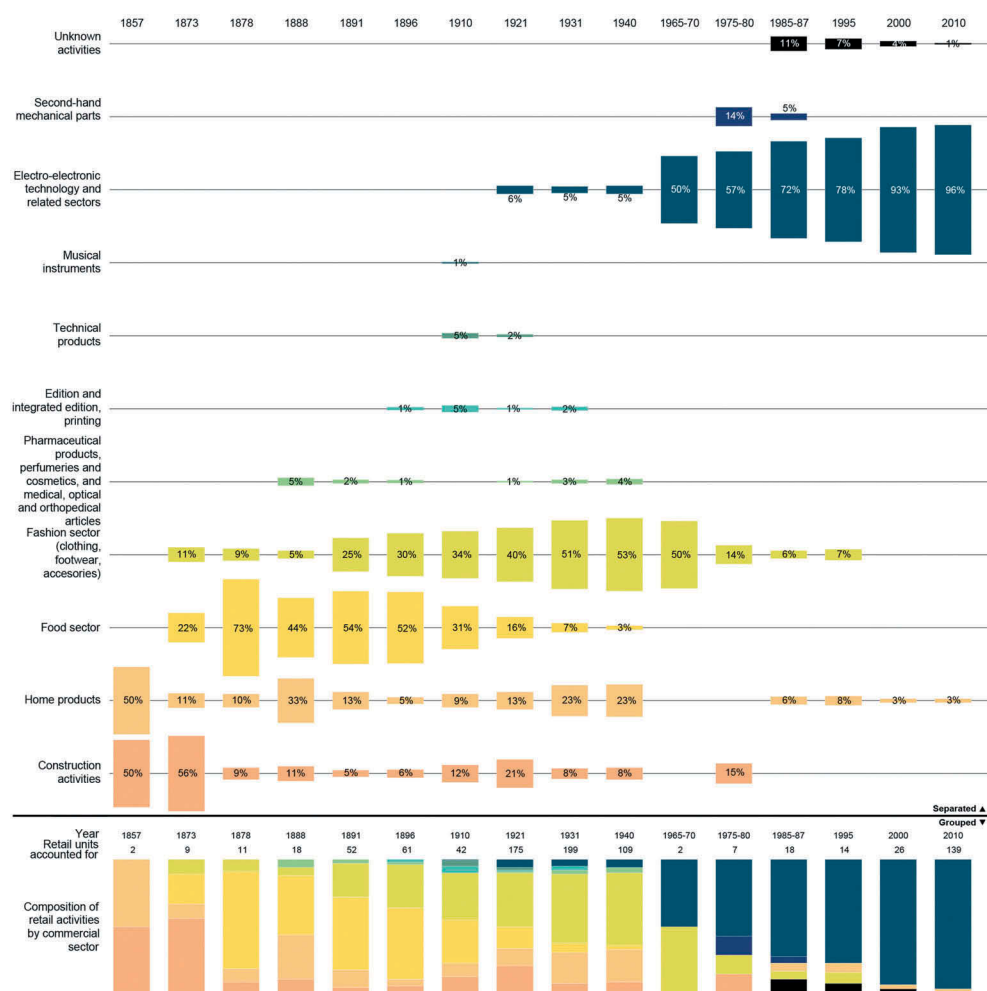


Figure 2. Composition of Rua Santa Ifigênia's retail activity between 1857 and 2010.

record belongs to only one organisation. Despite the valuable data that could constitute the analysis of retail floorspace over time, the official records consulted are silent about this information, so it has not been possible to correlate its fluctuation with the dynamics of retail, especially during the transitional phases between the recession of a sector and the growth of the next. However, following the building records analysed somewhere else (Coquillat Mora 2018), we can expect that retail floorspace has been growing through numerous building extensions of the original buildings from the 1880s onwards, at least, until the almost complete colonisation of the floorspace of the street that exists today.

The slow beginning

In the years corresponding to the district's formation period, retail in Rua Santa Ifigênia grew at a slow pace, going from 2 establishments in 1857 to 12 in 1878. Figure 2 shows an irregular pattern of the retail activities' composition for the years 1857, 1873 and 1878, reflecting the

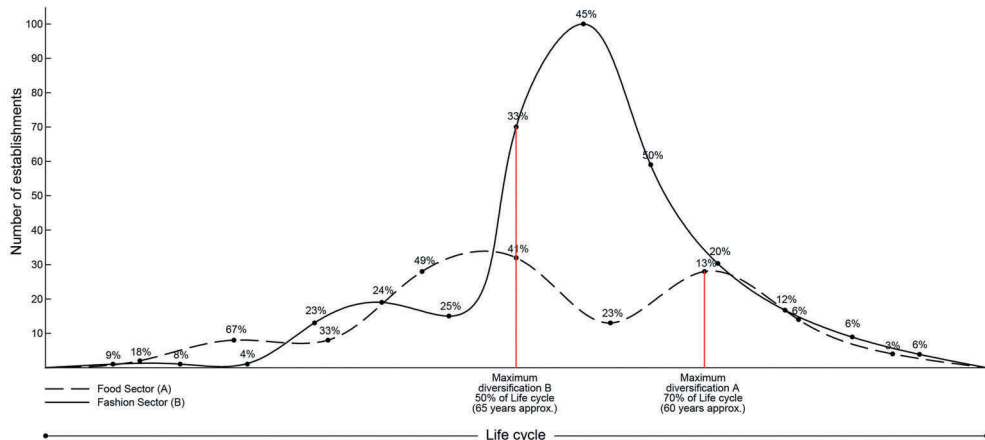


Figure 3. Life cycle of the food and fashion retail sectors in Rua Santa Ifigênia.

* The percentages indicate the share of each sector in relation to the total composition of activities.

small universe of existing firms in that period and, consequently, the relative sensitivity of changing any of the activities. During the period 1873–78, the street was still being extended to reach its current length, in so doing creating new built-up areas for retailers to set-up, which could reflect – in addition with the arrival of the railway in 1867 –, the increase of establishments experienced during the next decade.

The first specialisation: the food sector

From 1878 onwards, retail growth accelerated, from an occupation of 23% of the number of total buildings in the street to 40% in 1891 – given that during this period the one-storey building was the only type of edifice used in the street –, and 226% in 1931, which indicates that the activity propagated to the upper floors of the new several-storey buildings that entered the street mainly from the 1910s on¹⁰. Until the 1910s, much of this growth corresponded to retail activities with low-added value related to food categories, which were developed by former slaves and new migrants¹¹ established in the surroundings of the train station, nearby Santa Ifigênia.

For about five decades (1870–1920), the food sector was the driving force of retail activities in the new districts of São Paulo, as in Rua Santa Ifigênia. Butchers, bakeries, groceries, pasta shops, coffee mills, sugar refineries, and thus a long and diverse list of activities relative to food items filled up the built-up area just created. The town hall supported this expansion by defining in the Act XXIX from 2/19/1836 a reduced taxation perimeter for food establishments located at the urban peripheral belt. Along with the food sector, others such as home products or fashion had a non-negligible retail share¹². The largest diversification of activities in the food sector was reached in 1921, i.e. in its mature stage, corresponding to the 70% of its life cycle in the street (the ‘street life cycle’ considered here refers only to the life cycle of a specific retail sector that has one or more retail establishments in the Rua Santa Ifigênia; this meaning moves away from the conventional ‘retail life cycle’ concept, that takes into account an entire retail sector or institution), showing a recessive growth trend from then. This diversity is manifested in

a wide variety of shops selling meat (1), rice (1), crops (1), coffee (1), vegetables (1), alcohol (1), confectioneries (4), bread (2) and grocer's shops (17).

In absolute terms, from the year 1891 onwards, this sector diminished its share in the street, despite showing a slight increase in the number of establishments around 1921, a date which saw the beginning of the recession period with the sector disappearing in the 1950s. Its street life cycle has lasted for about 80 years, peaking during the third decade, between 1890 and 1900. The disappearance of the food sector from Rua Santa Ifigênia indicates its migration to the new food distribution centres promoted in the 1950s, generally located at the municipal markets and their surroundings. But it was also affected by mid-century import policy changes, which promoted higher value-added activities (Lima Filho 1975).

The second specialisation: fashion sector

The fashion sector, mainly based in segments like clothing, footwear and accessories, had a longer lifespan of about 130 years. The first records appear in 1873 and the last ones in 1995, with a maximum share of 53% in 1940 and the highest number of fashion shops in 1931, with 102 units. Along its street life cycle, it has shared retail space with other sectors, as also happened in the food sector.

The presence of tailors and shoemakers as part of the retail system of the street was important from the beginning, given that these activities shared the floorspace of the establishment for production and trade tasks. The attraction generated by these establishments caused new retailers from the same and related segments to gradually set their stores up in Santa Ifigênia¹³, at an increase of 9.85% per year between 1888 and 1931. The introduction of women as a new market target for the non-subsistence type of sale was decisive in the growth experienced during these years (Vargas 2000). From the 1910s onwards, prior manufacturing activities were progressively replaced by sales activities, such as clothing and footwear shops. Footwear would become one of the most relevant segments in this sector since its beginning and until the 1950s, when firms selling luxury goods began to disappear. But also, other items like hats and sewn articles would become significant. Both categories had an important share of this sector during its decisive years, between 1921 and 1940.

New shops of watchmaking, jewellery, leather, gloves and silks entered the fashion sector from 1921 onwards, confirming the rise of consumers' social status in the street. The social and hygienic programmes promoted by the municipality in the late nineteenth century allowed a rising bourgeoisie to renew Rua Santa Ifigênia with sumptuous buildings. This fact attracted retailers from the luxury spectrum of the market, and in so doing, defined the period of greatest social and commercial 'glamour' of the street in its history, with 102 fashion establishments for a total of 100 buildings in the street – retail colonisation was taking place in the upper floors of the buildings. However, its greater diversification occurred around the year 1921. The growth of the sector has thus implied a reduction of its diversity.

The period of decline in this sector began in the 1950s. The arrival of prostitution, which was moved in 1953 from the Bom Retiro District and rapidly accommodated in Santa Ifigênia (Cordeiro 1980), produced a deterrent effect in the booming luxury market of fashion, promoting its flight and the entry of alternative activities in the vacant floor-space that was freed up.

During more than 80 years of retail activity portrayed by the almanacs (1857–1940), other sectors have participated in the economic life of the street. Their share was variable and generally less than 20%. The construction sector – which also played a role in retail sales – was one of them, with a lifespan of about 130 years (1857–1980); there was also the home products sector, with a life cycle covering the whole period, and with an increase towards the year 1931, where the most outstanding activity was the manufacturing and sale of furniture. The rest of the activity segments (musical instruments, technical products, publishing and pharmaceutical products), participated usually in marginal proportions and sometimes for very short periods.

As we see in [Figure 3](#) – showing the variation of establishments of the food and fashion sectors along their life cycle in the street –, the second specialisation was remarkably greater in number than the first one. This increment, coupled with the greater size occupied by the fashion shops, implied that larger proportions of floorspace in the built-up area had to be transferred to the fashion shops, which could be possible by three main operations: constructing new and larger buildings, remodelling the existing ones, and gradually changing former residential space into commercial uses. Despite the fact that each sector shows different moments of maximum diversification of activities – at 70% of the food sector's life cycle and at 50% of the fashion one –, in which retail variation of products for the sector life cycle is higher, both almost coincide in the period in which it happens, after 60–65 years of existence, that could be related to an intrinsic mode of retail-variety creation in specialised urban fabrics.

The third specialisation: the electro-electronics sector and related activities

The third specialisation of the street began the same decade in which the public transport system – the tramway – disappeared from the street. From 1890, this was the busiest tram line in the city, with a share of 40% of the total passengers transported (Freire 1911). With its relocation into another street in the 1940s, Rua Santa Ifigênia lost its priority in the transport system, but in contrast did not reduce its retail intensity¹⁴.

We looked for the activities that could promote the more recent specialisation on Rua Santa Ifigênia – electricity, photography, lighting, radio telephony, telegraphy –, but their presence on the street between 1910 and 1940 was marginal and cannot be considered to be precursors of the current electro-electronic sector¹⁵. On the contrary, in 1921 there was a considerable presence of cinematographic shops in Rua Santa Ifigênia (8 in total) that moved to nearby streets in the following years. This fact is at the roots of the most important low-cost cinematographic industry of Brazil in the 1970s, producing 80% of the national feature films in the district of Santa Ifigênia. But in 1940 just one cinematographic establishment was located in the street.

Therefore, explaining the specialisation of electro-electronics in Santa Ifigênia, alludes to a highly contingent event: the establishment of the *Instituto Rádio Técnico Monitor* in the district. Founded in São Paulo in October 1939, Hungarian immigrant Nicholas Goldberger opened a distance learning course in electronics. This course, a pioneer in that subject, was a remarkable success, and only eight years later the Institute reached a million students. In 1950, the Institute was established a few meters from Rua Santa Ifigênia, at nearby Rua Timbiras, and thanks to it, electronics demand in the district shot up. Electronic equipment suppliers settled in the vacant floorspace freed up by the

departure of the luxurious fashion firms, turning the area into the largest pole of electronic sales in the whole country (*Saber Eletrônica* 1993).

Once the appropriate conditions for a good retail exploitation are created, land uses will tend to persist over time. In this respect, we can conclude that the gradual replacement of the previous fashion sector and the initial start-up of the electro-electronic sector are justified partly by historical factors (by the pull of the cinematographic sector already established in the district) that reinforce existing retail trajectories, and partly by contingent factors (the Institute's establishment and its subsequent success and the arrival of prostitution) that open up new ones.

Throughout its history, the electro-electronic boom was punctuated by the evolution of electronics in the twentieth century. The commercialisation of pieces, components and electronic-valve kits was followed by the transistor technology which appeared in the late 1950s. The 1940s radio and film equipment diversified into TVs and electrical appliances in the next decade. In the late 1970s, the first shops with computer products appeared in a very discreet way. Communication and office equipment shops (printers, fax, telephony, scanners, computers) grew during the 1980s, and the mobile phone segment made its appearance in the 1990s. In the same decade, the original sales, which mainly focused on domestic parts and components, was replaced by finished product sales, mostly supported by federal policy taxes favouring the importation from global market places (Parente, Miotto, and Barki 2007). The Asian trade of electronic and computer products had an important impact on Rua Santa Ifigênia, with an increase during the decades of the 1990s and 2000s, making good use of some low tax import centres, such as the city of Ciudad del Este, in Paraguay. Retail in recent years has amplified the existing activities with more and better technology, such as sound, electronic devices, mobile phones, video games, telecommunications, and the recent LED lighting technology, which has boomed since 2012.

Discussion

As shown for Rua Santa Ifigênia, in the emergence of the first retail establishments of an urban fabric there can be neither specialisation nor economies of agglomeration. Retail activities will diversify to a great extent because there are still no competitive forces favouring any sector, and the urban fabric will lack commercial 'character', since this is given by its historical past which is absent at that time. This relaxation of the historical and competitive initial conditions in an urban area causes retail to diversify further in the early stages of its evolution rather than in the later ones. This can be seen as an inflation of the trial and error process of firm entry and exit in the early stages of an unspecialised street, because at that time there is more market space for the experiment (Baptista and Karaöz 2011). Therefore, in new urban areas, retail emergence will reflect a *drift*-like pattern, by which retail variance will grow without being strongly correlated to previous stages. Commercial drift reflects in a sense the tendency of urban economic activities to vary in the absence of strong market and urban selective forces that would restrict further variation. As we said, with this initial drift process in mind, it is neither possible to expect specialisation nor economies of agglomeration in the retail formation stage of the street.

Drift variation will increase until market forces select successful retail variants and begin to reduce it, but note that they both act simultaneously with different intensities. As a result of market selective forces, retail variation will be strongly correlated with previous stages,

therefore intensifying sectors that are already established. Positive feedback and increasing returns to scale are mechanisms that support this market selection (Arthur 1994).

As inter-diversity is reduced due to the absorption by a sector of the available retail variation of the remainder, the selected sector will have to vary to occupy niches with a competitive advantage (Bliss 1967). Copying the neighbour is useful until the market saturates, being then necessary to introduce strategies of 'minimum differentiation' (Hotelling 1929) to take advantage of the proximity and interest of the same customer category (Gandhi and Minner 2017; Rankin and Delaney 2008). This will give rise to a network of retail complementarities, suitable for customers as for vendors themselves (Boschma 2009). By this process, a retail *ecology* will have been created.

According to these considerations, it is easy to understand the effects of *evolution by market selection*. On the one hand, it reduces *intersectoral* variation; on the other, it expands *intrasectoral* variation. Therefore, it will inevitably lead to the extinction of some sectors and their substitution by others. At the same time, the continuous market selection over a specific sector leads to its expansion. To the extent that a retail sector expands, new economic agents in a search for profit will come to participate in it, leading to an intrasectoral diversification and growth. Differences between retailers now will be slighter than for intersectoral variation. Retail category *vicinity* thus results from a spawning process in which sub-sectors or specialisations emerge in environments where their retail parents are already consolidated.

The current technology life cycle in electro-electronics seems to be in the greater expansion. It has a long lifespan, of about 70 or 80 years and, according to the previous dominant sectors, one could expect it to enter recession in the coming years and be replaced by another economic sector. However, this is unlikely to happen. For the previous dominant sectors their shares in total composition of retail were rarely over 50%, so their balances were very sensitive to the variation of other activities. For the current technological sector, however, the share in the retail composition is almost absolute (93%). Therefore, and following an evolutionary pattern of development, it is foreseeable that the next changes in activities will occur within the same sector as a result of technological development, but not by the replacement of the current one by non-related sectors, as happened in the past. This is not to say that big changes in the retail dynamics of the street cannot be considered in the future as a result of strong exogenous events – like political, economic, or urban changes, for instance, that could alter the conditions of the market selection environment from outside –, but to affirm that the current retail micro-dynamics will reinforce changes in their composition that are related with the inertial force underway.

Conclusion

As we have shown, it is not possible to understand retail specialisation in streets without considering their historical dimension. But an accurate modelling of such processes passes not only through the verification of the historical events that gave them origin, but mainly by characterising how these trigger evolutionary dynamics in the overall behaviour. Both historical and contingent factors affect retail evolution. For retail specialisation to occur there must be variation in the system, but this will be reduced by market selective mechanisms when its development reaches some inertia. Specifying this inertia

force in other research will be of great value. The evolutionary dynamics are manifested by the entry of new businesses that use hereditary strategies, consisting of (1) retailers copying preferentially the most successful strategies from their peers; (2) the tendency of agglomerate generated by 'descent' firms that use to locate proximate to their parents roots (Goman and Klepper 2016); (3) a trial and error process generated by firm entry and exit into the retail system considered; (4) channel variation produced by historical factors; and (5) the introduction of slightly diverse retail solutions in searching for differential advantages over competitors (Anderson 1957). All these mechanisms promote retail convergence and agglomeration of firms, but also sector expansion and intra-diversification in order to exploit competitive market niches. As retailers select repeatedly over a few lucrative segments of economic activity, market space is reduced, and the affected urban fabric creates a commercial history that restricts retail future variation¹⁶. This historical path dependence is at the base of the resilience property of specialised urban fabrics that will maintain retail activities even under situations of stress. The case of Rua Santa Ifigênia illuminates the robustness of established activities over urban fabrics that have been consolidated during long periods of time. These urban fabrics constitute the spatial support that maintains the inertia of ongoing retail trends.

Further research in comparative studies of specialised streets is needed to investigate the stages of development and change throughout their retail history, and their influence in the built-up environment. It would be of interest to understand the evolutionary commonalities in street specialisation that could help to formulate adequate planning ordinances, especially those relative to functional preservation against real estate pressures.

Notes

1. In our study, the 'street' determines the urban structural unit in which retail life cycles succeed indefinitely, changing the perspective of the cycle from the institutional retail type or the retail sector to one that incorporates by definition the spatial dimension.
2. For the case of São Paulo, numerous specialised streets occupy central places. However, their nature cannot be fully assigned to proximity factors to the CBD, but to *ecological* reasons that are partly historical and partly contingent. This ecological relation creates local links between retail activities developed in the specialised street and complementary activities within the district where it is located due to economic, political and urban factors.
3. Sung et al.'s statement (2015) that small firms fit better in old and small buildings is not accurate, considering that is precisely because of the continuity of commercial uses in old buildings that their life extends. Once a commercial activity establishes in a building, the use tends to persist in time, stretching on the life of the building due to its economic profit. The later election of an old and small building for small firm purposes is mainly a consequence of maintaining a good location and its commercial use continuity, but not for preferring old buildings that obviously implies a higher cost of retrofit.
4. As in the case of Avenida dos Bandeirantes, Professor Vicente Rao, or Leôncio de Magalhães, inserted in districts dating from decades 1940 and 1950.
5. As a matter of fact, owning the building space of one's business contributes to resisting pressures of substitution or gentrification in an urban area (Rankin and Delaney 2008).
6. In the city of São Paulo, the first ordinances of retail location appeared in the eighteenth and nineteenth century, seeking to defend hygienic standards, which restricted the sale of food-stuffs to specific areas of the city such as public squares (Bruno 1991). Later, the Act no. 127 of 1931 defined special criteria for the implementation of commercial centres in some main road crossings. The specialised street Avenida Europa arose under this ordinance, avoiding

nearby streets to have any retail establishment. The Basic Urban Plan of 1968 sought to disperse retail into shopping centres and shopping malls away from the downtown area, but it did not contribute to the formation of specialised streets. The zoning proposals of Law no. 8.001 of 1973 had no greater effect than ratifying the retail areas already existing in the city. While the Retail Ruas Programme of São Paulo of 2002 and 2003 barely improved the urban environment of some retail and hotel streets already consolidated.

7. We will see in our historical analysis the benefits gained by new firms who enter a retail sector where established firms have already created an attraction effect on demand.
8. Corresponding to 'Section G – Division 47 – group 47.5', according to the CNAE (National Classification of Economic Activities) Brazilian classification system – version 2.0. Brazilian Institute of Geography and Statistics (IBGE).
9. <https://www.jucesponline.sp.gov.br/BuscaAvancada.aspx>
10. For the period covered by the almanacs (1857–1940), this pattern of growth coincides with that predicted by the logistic model, confirming the findings from Maraschin (2009).
11. Mostly Italians, but also Portuguese, Spanish, Germans and migrants from Nordic countries.
12. Many of these activities were productive and were carried out in the shop or at the back of the shop.
13. Such as hat shops, stockings, sewing products, jewellery, watches and goldsmiths (in 1896), postcards (in 1910), berets, necklaces, belts, neckties, dressmakers, laundries and dry cleaners (in 1921), purses and handbags, embroideries and pleatings, leather products, suitcases and travel articles and white clothes (in 1931), and elastic tapes, fans, gloves, braids, leather, upholstery and silk fabrics (in 1940).
14. Historical cartographies have shown that the presence of public transport systems is a favourable condition for a retail establishment. Many of the current Paulistan specialised streets originally had public transport systems like trams or other means of locomotion. It is remarkable that, after several decades of operation, most of these streets have lost their road functionality, usually by moving the transport system line to nearby streets who have acquired a superior mobility hierarchy. This circumstance is indicating that the presence of public transport systems induces the occupation of streets with retail activities, but once reached a certain commercial inertia, it seems to be no longer necessary.
15. With a presence in 1940 of only one electrical shop, another of cinematography, two for photography, and another two for radio telephony.
16. Also, it creates a *signal* of the symbolic value of the street, which in turn reinforces the internal dynamics of the retail system.

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Notes on contributor

Pablo Coquillat Mora graduated in Architecture and Urban Planning at the Technical School of Architecture of the University of Alicante. He has a Ph.D. from the Technical University of Valencia, Department of Urban Planning. From 2010 to 2012 he participated in a scholarship programme at University of São Paulo (Brazil), which encouraged him to focus his Ph.D. research in the city of São Paulo. His main research interest is to contribute to a formulation of a rigorous theory of urban evolution. From 2005, he has worked as a freelance architect and for several firms from Spain and Brazil. Since 2016, he has developed an industrial project for ecological building heating.

ORCID

Pablo Coquillat Mora  <http://orcid.org/0000-0001-7298-7850>

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