



Gateways as Inter-Modal Nodes in Different Ages: The Venetian Region, Eighteenth to Twentieth Centuries

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0 This paper focuses on the theoretical implications of a regional case study
1 for the analysis of transportation networks and gateway functions. The
2 starting point is the result of a research on the changing role of gateways,
3 and on the relocation of the gateway function from one city to a series of
4 cities in the Venetian region from eighteenth to twentieth century. Against
5 this evolution, I test the validity and usefulness of a definition of the gateway
6 as a point of inter-modal exchange for its historical interpretation.

7 Changing transport technologies involve different organisations of inter-
8 modal exchanges, and imply more or less intense economic functions of
9 gateway cities. These changes intertwine with political events and deci-
10 sions, and more general economic changes: they could at the same time be
11 read as an effect of these transformations, and as a causal factor. From this

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G. Favero et al. (eds.), *The Urban Logistic Network*,
Palgrave Studies in Economic History,
https://doi.org/10.1007/978-3-030-27599-0_9

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12 perspective, a study of intermodality shows to be useful to shed some new
 13 light on specific changes in the structure of urban hierarchies.

14 A DEFINITION OF GATEWAY FROM A TRANSPORT-FOCUSED 15 PERSPECTIVE

16 Starting from the definition given in Hohenberg and Lees (1995), we could
 17 say that a city's gateway function is that of linking the region (for which it
 18 usually plays also the function of central place) with the world beyond. This
 19 could mean that a gateway city works as a bottleneck inside the network
 20 system for goods, humans and information passing from the region to the
 21 outside world and vice versa, but this is not enough: it implies also that
 22 through the gateway it is possible to shift from a local communication or
 23 transport infrastructure to a wider one. From this specific (and limited)
 24 point of view, inter-modality is a main characteristic function of gateways.

25 From a historical perspective, different kind of city functions can be iden-
 26 tified with this definition of gateways: trade fairs, port cities, border cities,
 27 rail junctions, airport hubs could all fit in this category, both as bottlenecks
 28 and as points of inter-modal exchange and stop. In these cases, trade formal
 29 and informal rules, international politics, and most of all transport tech-
 30 nology have a strong influence on the configuration of the network system
 31 and in the rise and fall of the gateway function of a city.

32 Using a model derived from the economic geography of trade (Krug-
 33 man, 1991), we could expect that the development of a gateway inter-
 34 modal function should foster the localisation of other functions making
 35 them more convenient: intermediation and transportation costs implied in
 36 the inter-modal exchange could in fact favour the growth not only of eco-
 37 nomic activities directly linked with transportation or communication, but
 38 also of other services and of the manufacturing transformation of goods to
 39 be shipped. This in turn should imply a growth of the urban population,
 40 attracted to the city by these activities, allowing us to use population as a
 41 proxy of the growth of urban functions.

42 We should notice that these assumptions suggest also that a reduction in
 43 intermediation and transportation costs (and stops) would imply a reallo-
 44 cation of economic activities and a reduction in the importance of gateway
 45 cities. What is more, a definition of gateway focused on inter-modality
 46 implies that there could exist major and minor gateways, the latter some-
 47 how overlapping with the central-place function.

48 In the following paragraphs, a tentative reconstruction of the evolution
 49 of the Venetian urban network will be given, to test the hypothesis drafted
 50 above against the changes in political borders and transport technology
 51 that the area experienced from the eighteenth to the twentieth century.

52 *From a Weak Centralism to Polycentrism and Back Again*

53 The long-period weakness of the Venetian regional structure, dating back
 54 from the sixteenth century, came to its results in the first half of the nine-
 55 teenth century, not in fragmentation, but in a network-like reorganisation
 56 of regional functions. The loss of the capital city position of Venice left a
 57 void, which was gradually filled by means of a more complex spatial organ-
 58 isation, centred on mainland cities and their hinterland. The resulting eco-
 59 nomic polycentrism bent on the east–west corridor (Magrini & Martellato,
 60 2000), ending up by orienting regional interests towards Lombardy and in
 61 general Italian territories. Many different factors favoured this evolution.

62 *A Republic, Not an Economic Region*

63 The mainland territory of the Venetian Republic before its fall in 1797 was
 64 not a unitary economic region, or better, it was so only from some points
 65 of view and in some areas. Venice was actually the main trade gateway just
 66 for the Brenta and Piave basins, while the Adige river, together with the
 67 Adda and Mincio, both tributaries of the Po, allowed an easy route to the
 68 Southern border avoiding the obligation to pass by the port of Rialto in
 69 Venice. If the Eastern rural area of Friuli was excluded from direct trade with
 70 the Hapsburgic territories, Vicenza and Verona were instead able to manage
 71 their autonomous trade relationships towards the Adriatic and Alpine fairs,
 72 while Brescia and Bergamo were virtually part of the Milanese economic
 73 space (Lanaro, 1999, pp. 35–39).

74 *A Capital City Levelled*

75 The Napoleonic wars cut off the former capital city from the mainland and
 76 reorganised economic relationships on different foundations, subordinat-
 77 ing trade policy to the interests of French mercantilism and fiscalism. The
 78 crisis of the Venetian nobility (Derosas, 1990) and the sale of church and
 79 state property redistributed land rent towards mainland cities, taking it away
 80 from Venice (Berengo, 1963, p. 172). The city seemed incapable of react-
 81 ing to a long-period decline, which political changes emphasised with the

82 loss of maritime territories in 1798, the reduction of its mainland domin-
 83 ion, and after 1806 the administrative subordination to Milan as the capital
 84 of the Napoleonic Kingdom of Italy, levelling Venice to the rank of other
 85 departmental centres (Zaghi, 1986, pp. 365–377). In the early quarter of
 86 the nineteenth century, the city lost 30% of its inhabitants (from 140,000
 87 in 1800 to 100,000 in 1826: Bertoli & Tramontin, 1971, pp. LI–LIII)
 88 and trade and manufacturing were in fact paralysed (Monteleone, 1969).

89 *Hapsburg Infrastructures*

90 After the Vienna Congress, Venice was formally restored as a secondary
 91 regional capital, but it never recovered its role of financial and economic
 92 centre (Berengo, 1963). Even the institution of the free port in the city in
 93 1830 did not make of Venice a trade centre again. The regional hinterland
 94 did not find in the Venetian port a market for its victuals, as the actual
 95 outlet for the Hapsburgic Empire in the Mediterranean was now Trieste,
 96 whose population had almost doubled from 23,000 inhabitants in 1792
 97 to 40,000 in 1821 (Balbi, 1833, pp. 131–132). But the ongoing decay
 98 of Venice was not paralleled by mainland major and minor cities, which
 99 pursued an independent path of development, experiencing a growth of
 100 their service functions linked to the amelioration of the main roads passing
 101 by them, and in a subsequent phase to the construction of the railway from
 102 Venice to Milan (Mancuso, 1984, pp. 64–67).

103 Those changes, together with the abolition of communal properties in
 104 1839, had different effects on the local economy, fostering proto-industrial
 105 and agricultural development in some areas and altering the traditional eco-
 106 nomic structure of others (Zalin, 1969, pp. 154–159). Aside from reim-
 107 posing tariffs on the Southern border, the Hapsburgs restored internal
 108 customs on the Mincio river towards Lombardy and maintained customs
 109 at the northern borders with Tyrol and Carylthia, on request of the Venetian
 110 representatives. The specialisation of the Venetian region in agriculture
 111 was strategic to Austrian and Bohemian industrial exports in the Italian
 112 territories, and internal protectionism seemed the only option to avoid the
 113 disruption of local agriculture (Berengo, 1963).

114 Favoured by protection, the fertile plain areas and piedmont hills,
 115 located closer to main roads and cities, were able to develop a more effi-
 116 cient farming, exploiting the enlarged outlets to expand wine and raw silk
 117 exports. The workforce expelled from the agricultural sector following the
 118 abolition of communal properties could be employed in proto-industrial

119 activities, which expanded exploiting the same amelioration of transports
120 (Roverato, 1996, pp. 29–46).

121 In the mountains of Carnia and of Belluno, as in the swampy areas
122 along the Adriatic coast, instead, the abolition of communal properties
123 did not cause a reorganisation of agriculture, but simply destroyed the
124 means of subsistence their inhabitants found in gathering, hunting and
125 fishing. Where no proto-industrial traditions were available, temporary or
126 permanent emigration became a widespread solution. In the Eastern Tre-
127 viso province and Southern Friuli, conflicts and resistances aroused by the
128 explicit opposition of the Church to the abolition of communal proper-
129 ties prevented the modernisation of agriculture that the central part of the
130 region was experiencing. This meant an enfeeblement of the areas between
131 Venice and Trieste, compared with the strengthening of those pivoting on
132 the Venice-Milan corridor.

133 *An Appendix of the Empire*

134 This slow process of specialisation and growth was suspended by the 1848
135 war and revolution: the following fiscal and political stiffening of the Hab-
136 sburgic rule was going to make worse the consequences of the war. The
137 abolition of Venice's free port until 1851, and the following crisis of transit
138 trade because of the Crimea War, made the port activity stagnating until
139 1855 (Luzzatto, 1961, pp. 101–105). At the same time, the extraordi-
140 nary taxes imposed during and after the conflict were enough to bring the
141 regional economy to its knees. But the early 1850s coincided also with
142 the spreading of two diseases, grape phylloxera (leaf louse) and silkworms
143 pebrine, affecting the main market and export activities: wine production in
144 the late 1850s was reduced to one-tenth of what it was in the 1840s, and raw
145 silk was one-third (Berengo, 1963, p. 303; Romani, 1982, pp. 154–156).
146 This crisis choked the rising agricultural market economy draining liquidity.
147 The Hapsburgs did not support farmers, diverting fiscal resources towards
148 the military effort against Piedmont and applying tax discrimination in
149 favour of Northern Imperial provinces (Zalin, 1969). At the same time,
150 the 1854 customs agreements with the Duchies of Parma and Modena
151 favoured the growing exports of wool and cotton clothes, wares and tanned
152 leather from the foothill manufacturing areas.

153 In 1859 the second Italian independence war reduced Hapsburgic
154 dominions in Italy to Venetian provinces, Mantua and Peschiera, cutting
155 the economic connections with Lombardy, which was annexed to Pied-
156 mont. The Venetian region was for some years in the uncomfortable and

157 uncertain position of a southern appendix of the Empire, which fortified
158 its military presence, using it to justify heavier taxes.

159 What is important to point out is that the structure of the region annexed
160 to Italy in 1866, with the third independence war, was roughly the same
161 looming up before 1848. The following years were dominated by exoge-
162 nous elements, such as the agricultural crisis and Hapsburgic repression,
163 which only partially affected a going process.

164 *Water Power Industrialisation*

165 After the unification of Venetian provinces to Italy, in 1866, the exten-
166 sion of the railway network reinforced the administrative urban hierarchy,
167 which had been confirmed in the passage from the Hapsburgic to Italian
168 rule. It was also the main engine of urban transformations both in big and
169 smaller cities, with the rail-station boulevard opening the way for building
170 expansion and attracting industries.

171 Despite the strengthening of the urban hierarchy centred on provin-
172 cial cities, the regional industrial development of the last three decades of
173 nineteenth century followed a different path, privileging minor centres or
174 new company towns. Its localisation seemed still determined, in the times
175 of the first industrial revolution but in a country where coal was almost
176 totally imported, by the availability of a pre-industrial source of energy as
177 water-power was.

178 As a consequence, the main industrial concentrations were developing in
179 little towns such as Schio (Fontana, 1985) and Valdagno (Roverato, 1986)
180 for wool textiles, Piazzola sul Brenta (Fumian, 2010), Crocetta del Mon-
181 tello, Montagnana, Monticello, Dueville and Cavazzale for hemp factories
182 (Celetti, 2009, pp. 50–59), Lugo for paper industries (Fontana, 1993).
183 Though investing in urban commercial or sometimes productive exten-
184 sions of their firms, these industrialists put a strong attention to the social
185 impact of factory system, and were eager to avoid the kind of social con-
186 flicts involved by labour-force concentration. They built up a network of
187 welfare institutions for workers and their families, inserted in a paternalistic
188 framework of social initiatives. In some cases, they expanded their business
189 operations by means of functional and territorial de-centralisation, settling
190 factories in the rural villages surrounding the industrial town centre. This
191 was usually connected to the rail network for raw-materials supply, but
192 other specific transportation systems were developed allowing rural labour
193 force to commute, connecting main provincial cities and other industrial
194 centres to their labour basin.

195 *Electric Power and the Industrial Port*

196 In the first decades of the twentieth century, a tramway network com-
 197 plemented the regional railway system, exploiting the changes brought
 198 about by second-industrial-revolution innovations, in particular by elec-
 199 tricity. The construction of long power lines connecting the hydroelectric
 200 stations on the Prealps to main provincial cities, and passing by foothill
 201 industrial centres, generated an energy and capital surplus which found an
 202 outlet during WWI in the building of the new Venetian industrial port at
 203 Marghera (Chinello, 1979), where productive concentration allowed the
 204 birth of a big urban agglomeration in the immediate Venetian hinterland
 205 (Piva & Tattara, 1983), together with a functional reorganisation of the
 206 ancient regional capital. Greater Venice became then the main regional
 207 industrial pole, producing semi-finished industrial goods for Lombard and
 208 Piedmont manufactures. Yet its activities had no direct connection with the
 209 still polycentric and rural regional framework, which only in the 1960s will
 210 experience a boom of diffusive industrialisation and urbanisation, coincid-
 211 ing with the shift to automotive as the dominant transportation technology.

212 **THE ROLE OF CHANGES IN TRANSPORT MODALITY**
 213 **ON THE URBAN HIERARCHY**

214 The history outlined above shows a complex interaction between local
 215 and international policy, business strategies, and geographic and economic
 216 constraints, which contrasts with the simplified model of gateways as inter-
 217 modal junctions proposed in the first paragraph. When confronted with his-
 218 torical complexity, the role transportation played in structuring the urban
 219 hierarchy becomes less determinant. It would be possible to say that the
 220 evolution of transport networks is in its turn a result of investment choices
 221 responding to structural conditions and technological changes. Still, once
 222 undertaken, these investments do have a crucial influence on urban devel-
 223 opment, and it is worth inquiring how this influence was exerted.

224 What is more interesting in the focus on intermodality I propose in this
 225 paper, is the odd relationship it highlights between the growth of urban
 226 gateway functions and the presence of bottlenecks and discontinuities in
 227 the transport network. Investments aimed at easing the flow of goods and
 228 persons by means of an integration of local and wider transport networks
 229 could result in a decline of gateway functions and sometimes in shifting
 230 their location.

231 Is it possible to test this hypothesis in the case I presented above? During
 232 the century and more dealt with in this story, we could point out three or
 233 four overlapping waves of investment in transport: roads (1815–1830) and
 234 railways (1840–1860) building in the Austrian period, then a resumption
 235 of rail-works in the Italian period (1870–1915), paralleled by investments
 236 in local tramlines (1880–1940). How did they change the distribution of
 237 major and minor gateway functions in the area?

238 *The Crisis of the Venetian Gateway*

239 Before the fall of the Venetian Republic, the main urban gateway was
 240 obviously Venice, which port was still the main international gateway con-
 241 necting the river waterways with sea routes. Some provincial cities such as
 242 Verona, Padua and Vicenza performed also minor gateway functions thanks
 243 to the yearly trade fairs where customs exemptions were allowed, and to
 244 their role of river ports of shipment to Venice (or directly abroad) serving a
 245 wide hinterland or connecting land routes coming from the North or from
 246 the Venetian Lombardy. This situation changed in the first decades of the
 247 nineteenth century, with the decline of the trade functions of Venice and
 248 a consequent enfeeblement of the dependent junction of Padua; Verona
 249 became for a while a border city, still maintaining its junction function
 250 towards Lombardy; a minor provincial city as Udine enjoyed a new role
 251 after 1815, becoming the Friuli hinterland gateway to the Austrian port of
 252 Trieste.

253 *Austrian Roads*

254 The roadworks undertaken under the Austrian rule after the end of the
 255 Napoleonic wars provided a cartway (Strada Maestra) connecting lon-
 256 gitudinally the main provincial cities with Venice, which port recovered
 257 some functions as a minor shipping point to the Trieste hub. Some of the
 258 main cities in the mainland developed also a role as inter-modal junctions
 259 between river and road transportation: it is the case of Padua, but also Tre-
 260 viso (with the Sile waterway) and Vicenza (with the Bacchiglione). Minor
 261 river ports were also Legnago on the Adige river, Belluno on the Piave
 262 river and Bassano as the shipment point for the carts arriving through the
 263 Valsugana road from Trento. Renovated roads following river flows (the
 264 Valsugana along the Brenta from Padua to Trento, the road along the
 265 Adige from Verona to Bolzano, and the Strada d'Alemagna) allowed an

266 easier upward connection to the North (Mancuso, 1984, pp. 69–70). The
 267 Strada di Vallarsa made of Vicenza a road junction to the North, cutting
 268 off Verona from the transit trade between the Venetian plain and the Ger-
 269 man area: despite the building of military roads to Legnago, Peschiera and
 270 Mantua, Verona evidently suffered from this.

271

The Austrian Railway

272 The construction of the Ferdinanda railway connecting Venice to Milan
 273 following the path of the Strada Maestra was started in 1840, and in 1842
 274 the connection from Padua to Mestre was opened (Bernardello, 1996). In
 275 1846 a longer stretch of the railway was inaugurated, connecting the insu-
 276 lar city with a bridge on the lagoon to Mestre and from there to Padua and
 277 Vicenza. Another branch was built on the other side, going from Milan to
 278 Treviglio. The revolution interrupted rail construction works, which how-
 279 ever restarted even before the end of the siege to Venice, connecting Verona
 280 to Marghera in 1849, and eventually restoring the bridge connection to
 281 Venice in 1850. The line then connected Verona to Brescia (via Peschiera)
 282 in 1854 continuing until Coccaglio towards Treviglio, which was finally
 283 reached through a long deviation passing by Bergamo in 1857. Since 1851
 284 a line from Verona to Mantua and a secondary connection from Mestre to
 285 Treviso were opened. The latter was extended to Pordenone and Casarsa
 286 in 1855, and finally connected to Udine and the line to Trieste in 1860.

287 The unification of Lombardy to Italy following the 1859 war stopped
 288 further investments in the rail sector by the Austrian government: mili-
 289 tary needs were satisfied by the connections to Peschiera and Mantua, and
 290 the Ferdinanda strategic function of attracting the Milanese international
 291 trade to Venice as a complementary port to Trieste in alternative to the
 292 Savoy port of Genoa resulted impaired (Bernardello, 1996). Only after
 293 1866 new rail works were started under the Italian rule.

294 For some years, temporary rail terminal cities (Treviglio for almost ten
 295 years, but in turn also Padua, Vicenza, Verona and Coccaglio, and Tre-
 296 viso and Casarsa at the end of the period) enjoyed the role of inter-modal
 297 gateways for the carts and coaches connecting the ending points of the
 298 rail road. Once this was finished, it emphasised the inter-modal function
 299 of rail stop provincial cities which were also road junctions, and their role
 300 of minor gateways for their hinterlands. The role of river ports was instead
 301 weakened, as the railway offered an alternative direct connection to the
 302 Venice seaport.

Italian Railways

After the unification of the Venetian provinces and Mantua to Italy, the railway line already connecting Treviso to Milan with a ramification to Mantua was extended southward, with a line going from Padua to Bologna via Rovigo and Ferrara already in 1866, but also northward finally connecting Verona via Ala to Trento and the railway to Bozen and Innsbruck in 1867. However, the higher cost of imported technology and materials following the discontinuation of currency convertibility with the 1866 war implied an interruption of rail works for almost one decade (Merger, 1989, pp. 339–342). The lack of secondary connections explains the lasting importance of waterways until the late 1870s, and the stagnation in the volume of rail freight traffic from the Venice station despite the increase in the port movement of goods (Schram, 1997, pp. 133–136).

Only in 1872 the State financed a strategic line connecting Udine to the railway from Lubjana to Vienna via Gemona, Pontebba and Tarvisio, which should decrease the cost of wood, coal and iron imports from Carinthia and Styria: the line was open to traffic in 1878. In the meanwhile, many local connections were added by initiative of provincial governments, building up an actual rail network connecting medium centres (in particular industrial towns) to provincial cities or minor joints placed on the main lines by means of State co-financing.

It is possible to follow the growth of such a network by using the data collected by Crispo (1940, pp. 135–236). In 1876 the provincial government of Rovigo built a railway running South of the Ferdinanda from Dossobuono (on the line from Verona to Mantua) to Legnago, Rovigo and Adria; the Vicenza government connected the city to Schio through Thiene; the Treviso one shifted funds from the maintenance of the Strada d'Alemagna to the construction of a rail line from Conegliano to Ceneda, which should be extended up to Belluno. The provincial government of Venice, instead, could not realise at the time the project of a railway from Mestre to Castelfranco, Bassano and Trento (which would increase the freight accessibility of the port from Germany as an alternative to Trieste) because of the priority assigned by Padua, Treviso and Vicenza to a direct connection between the latter two cities through Cittadella and Castelfranco, and from Padua to Camposampiero, Cittadella and Bassano: both lines were financed in consortium by the three provinces (Crispo, 1940, pp. 164–166).

Such a situation brought to a revision of railway regulation in 1879, reducing the State contribution to non-strategic lines. As a consequence, rail works stagnated until the 1884 stabilisation of the Lira allowed cheaper imports of construction materials, and the subsequent 1885 law regulated the concession to private companies of the construction, management and maintenance of rail lines, subsidising the hiring of Italian suppliers for new construction works (Merger, 1997). The new wave of railway building modified in part the projected connections, as in the case of the line opened in 1886 from Treviso to Belluno, which for military reasons followed the river Piave through Montebelluna and Feltre, instead of extending the line from Ceneda as planned in the 1870s (Crispo, 1940, p. 193). The same year, the new line was connected from Montebelluna through Castelfranco and Camposampiero to Padua, on the initiative of the latter provincial government, which at the same time financed also the extension of the railway from Rovigo to Adria up to Loreo in 1884 and to the port of Chioggia in 1887. Along the Adriatic coast, the State financed the line from Mestre to San Donà di Piave (opened in 1885) and Portogruaro (in 1886), which in 1888 was extended to Casarsa, San Giorgio di Nogaro and Palmanova on the initiative of the province of Udine, which financed also a secondary line to Cividale in 1886. The province of Treviso in its turn financed a connection from the city to Motta di Livenza, which was opened in 1885 and should be connected to Portogruaro on the coastal line. A local committee including the municipalities of the Valpolicella obtained State subsidies and private investments for the construction of a railway from Verona to Caprino, which was opened in 1889.

The two waves of growth of the local railway network offer an occasion to test in detail the idea of a direct relationship between inter-modal exchanges, gateway functions, and the economic and demographic growth of urban centres. It is in fact possible to compare directly the figures of the decennial population censuses with the timing of the extension of the railway network, distinguishing its terminals, stops and junctions (see Table 9.1).

Interestingly, the connection of a centre to the railway network had an almost immediate impact on its growth, with a jump in population size followed by a long stagnation, interrupted only in the case of new connections being added to the first: the Rovigo case is perhaps the best example, but many other centres follow this pattern. In short, a change in the connectivity of a centre can change its size but has no permanent effects on its growth.

Table 9.1 Inhabitants in urban centres (more than 10,000) in the Venetian provinces, 1766–1921

	1766	1826	1846	1871	1881	1901	1911	1921
Venice	140,000	100,000	127,925	128,901	129,851	146,682	154,642	156,899
Padua	41,000	35,000	54,195	64,862	70,753	81,242	96,118	108,912
Verona	47,000	48,000	52,208	86,443	89,784	99,579	116,518	131,711
Vicenza	28,000	19,000	31,178	37,473	38,713	43,703	53,107	59,611
Udine	14,000	17,000	23,763	29,425	31,954	36,899	46,916	53,635
Treviso	10,000	13,000	19,484	29,074	31,249	33,848	41,552	47,804
Belluno	4000	4000	12,850	15,971	15,935	19,050	22,342	27,119
Rovigo	5000	6000	9556	23,633	24,628	23,821	27,123	30,953
Adria			11,217	17,732	19,697	20,396	24,187	27,792
Ariano nel P.				4377	5465	6688	9311	10,911
Arzignano				8264	8939	10,426	11,483	12,165
Aviano				7922	8405	9988	11,613	12,405
Azzano Dec.				5121	5567	6976	9750	10,826
Badia Pol.				9303	10,162	10,291	10,817	11,948
Bassano			11,857	15,284	15,640	16,369	18,690	21,068
Buja				5606	6184	8581	10,415	11,373
Castelfranco				10,719	11,512	12,440	14,825	16,206
Cavarzere			10,455	15,038	17,280	16,388	18,709	21,224
Ceneda – S.			13,131	16,268	16,681	19,113	21,946	24,157
Chioggia			27,702	28,051	29,236	31,218	35,061	36,427
Cittadella				8570	9032	9685	11,332	12,511
Cividale				8413	8118	9041	10,031	11,622
Codroipo				8360	8688	9633	10,999	12,401
Cologna				7435	7770	8440	9608	10,369
Concigliano				7872	8209	10,252	13,007	15,072

	1766	1826	1846	1871	1881	1901	1911	1921
Este				10,037	10,475	10,779	11,635	12,662
Feltre				13,064	13,258	15,243	18,248	20,127
Gemona				7895	7953	9067	10,855	12,339
Legnago		10,357		13,403	14,383	14,535	16,973	18,680
Lendinara				9523	9923	10,093	11,868	13,255
Lonigo				9299	9839	10,390	11,293	12,419
Mestre				9931	9950	11,625	17,045	22,090
Mira				8603	9189	11,144	14,248	17,014
Mirano				7367	8015	9384	11,359	12,962
Mogliano				5703	6362	7643	9635	11,366
Monseice				9802	10,428	11,571	13,250	14,233
Montagnana				9262	9900	10,323	11,554	12,467
Montebelluna				8091	9008	10,284	12,364	15,016
Oderzo				8207	8199	8643	10,585	12,256
Piove di S.			6282	8242	8606	10,021	11,522	12,894
Pordenone				9561	11,152	13,642	18,141	21,927
Portogruaro				9180	9386	9636	12,374	14,147
Porto Tolle				5192	6283	7347	10,651	10,728
Roncade				6359	6960	7088	9184	10,823
San Donà d.P.				8010	8736	10,121	13,468	15,502
San Vito al T.				8853	9136	10,160	12,265	12,345
Schio				13,525	16,472	19,755	22,131	23,255
Spilimbergo				5406	5760	7074	8916	9957
Tarcento				8259	8820	10,478	13,381	13,814
Valdagno				8782	9618	12,818	14,323	15,811
Valdobbiad.				7931	8488	9017	9976	9624
Vedelago				6129	6834	7971	9656	11,038
Villafraanca				8377	8729	9635	11,483	12,296

Note: Railway stops, junctions and terminals; tramway stops; railway/tramway only, junctions

Source: The author's elaboration from official statistical data (Istat)

Tramways as a Complementary Modality

The introduction in 1887 of a protectionist tariff and the start of a commercial war between Italy and France made again the investment in rail works more expensive and less profitable than expected (Bodio, 1891, pp. 69–72; Crispo, 1940, p. 237), at the same time reorienting Italian trade connections towards the German area.

On the one hand, this implied that in the two decades at the turn of the century the connections between the Venetian region and the Hapsburgic Empire were finally completed. The construction of the international line from Gorizia to Trieste, Monfalcone and Cervignano was completed in 1894, and connected to San Giorgio di Nogaro and hence to Mestre in 1897. In 1908 also the projected line from Mestre to Castelfranco and Bassano was eventually realised, and connected to the border station in Primolano and the line to Trento in 1910.

On the other hand, while the railway network was finally nationalised in 1905 (Castronovo, 2005), from 1890 private railway construction companies (first of all the Società Veneta; Cornolò, 2005) gradually shifted most of their investments into tramway lines, which ran on different tracks from ordinary railways, and were employed only for passenger transport. Tramways allowed rural labour force to commute towards industrial cities and towns, and connected some provincial cities and other industrial centres to their labour basin, sometimes paralleling railway lines. In 1910 three different systems, in the Paduan-Venetian area, in the Vicenza province and in the eastern Veronese area had emerged. After WWI, this polycentric constellation was finally expanded and integrated into a regional network.

It is possible to interpret the relationship between tramway and railway in terms of a translation into different transport modality of the central-place and network-system (gateway) functions: working commuters used tramways, travellers and goods used railways, even if some exceptions existed. What is interesting is observing if there exist also some kind of inter-modal exchange between the two networks, and if it had some impact on population growth.

We could indeed expect that a transportation means conceived for commuters had negative effects on urban concentration, and this is true for cities and main centres: in fact, the building of tramway extra-urban systems seems one of the causal factors involved in the rapid exhaustion of the growth of urban population propelled by the railway connection of cities. This implies that the use of population growth as a proxy for economic

417 development is directly impaired by the construction of a new transporta-
 418 tion network that contrasts migration; or to say it better, it implies that the
 419 relevant area affected by the gateway effect of railway becomes as wider as
 420 the tramway network (reasonably) allows.

421 But what is true for the central place of labour-force commuting net-
 422 works is not true for their terminations, which in turn could attract migra-
 423 tion as the access point to the commuting network: it was the case for Piove
 424 di Sacco (Favero, 2011) and other minor towns. Also minor inter-modal
 425 junctions between tram and railways such as Bassano, Schio and Montag-
 426 nana, which urban size was not so big, seem to have enjoyed the benefits
 427 of entering a more integrated network.

428 A distinction should indeed be made between first-generation tramways,
 429 usually steampowered, and second-generation, electric-powered trams,
 430 which in some cases could also be used to ship goods and raw materials:
 431 but in fact tramways and urban growth were both a result of the availabil-
 432 ity of electric power connections, fostering urban industrialisation in the
 433 region in an unprecedented way. Again, transport dynamics alone seem
 434 not enough to explain the dynamics of urban growth, but it interacts with
 435 other factors generating unexpected outcomes.

436 A LARGER REGION: NORTHERN ITALY

437 Looking back in perspective at the century-long evolution of the urban
 438 system in the Venetian region, it appears evident that the development of
 439 transport infrastructures favoured a better and more efficient connection
 440 between Milan and the port of Venice. The rising costs of the intermodal
 441 exchange made however of Genoa the favourite port of access to Milan
 442 after WWI, and only the establishment of the industrial area in Marghera
 443 restored the role of Venice as an important secondary gateway, focusing on
 444 the import of raw materials and their transformation in semi-finished indus-
 445 trial inputs for Lombardy manufacturing industry. At the same time, along
 446 the railway corridor an integrated logistics network had been built, allow-
 447 ing the permanence of a polycentric constellation of smaller centres, where
 448 manufacturing activities finally flourished when domestic demand started
 449 expanding in the 1960s. The growth of an industrial periphery (with refer-
 450 ence to Milan, Turin and Genoa as the core area of Italian industrialisation)
 451 where manufacturing activities clustered into local systems of specialisation
 452 was in part the result of the evolution of the corridor logistics.

The causal relation is highlighted by the similarity with the parallel evolution of transport networks and manufacturing specialisations all along the other main corridor connecting Milan to the Central Adriatic coast and to the port of Ancona, running through the main cities of Emilia. In both cases, the connection to Milan was crucial to offer an access to domestic and foreign market outlets, but also to capitals and services which were not available in the peripheries. In both cases again, the terminal port was gradually declining in importance, the coastal line was extended beyond it, and intermediate junctions with North–South connections as Verona and Bologna saw their position rise in the urban hierarchy as secondary nodes in the larger regional system of Northern Italy.

The interplay among different scales, from the regional to the provincial to the local level, shows how logistics interacts with social and economic constraints in explaining at the same time the resilience of urban hierarchies and the irreversibility of their change processes.

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