INDUSTRY – AN URBAN DEVELOPER. CASE STUDY: IRON AND STEEL INDUSTRY IN ROMANIA

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Abstract

The profound economic and social changes that took place during the period of transition from a central-based economy to the market system have deeply marked the evolution of industrial towns, particularly those targeted for heavy industry development between 1950 and 1989. The present paper analyses this model of urban evolution affected by the interference of the political-ideological factor. Three towns, Galaţi, Târgovişte and Oţelu Roşu, in which a strong iron-and-steel industry was planted, have been taken into the study. Galaţi – a large town with complex functions, a regional and cross-border polarization center, was singled out for this type of industry by political decision within the context of the industrialization drive of the 1950s; Târgovişte – an old middle urban center, was pushed into the iron-and-steel route in the 1970-1980 decade. Oţelu Roşu – a small town, has a traditional iron-and-steel industry based on local raw material resources. Relying on historical documents, bibliographical sources and field work, the author correlates urban development evolutions with the industrialization policies, highlighting the causes that have led to the present decline of these towns and the challenges facing the local authorities in revitalizing them in a sustainable manner.

Keywords: industrialization, urbanization, urban space organization, iron-and-steel industry, Romania.

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1. Introduction. Conceptual Framework and Methods

1.1. Ideological Industrialization and Urbanization in Central and Eastern Europe after 1945. Regional Differences

Looking at the structure and organization of the Central and East-European space, one finds traces of the Soviet-based model of planning, which in 1945 had already been experimented in the USSR for 25 years. That model was deemed appropriate for the states just fallen under Soviet influence after the Yalta Conference. The model relied essentially on economic growth through hypertrophic industrial development, with highlight on industry, on the heavy industry in particular, the promotion of the working class and on defense-related investment, within an autarchic framework connected with the then global economic constraints. This was the substrate of Valev's theory of super-state complexes advanced in the early 1960s. According to that theory, economic integration was to be achieved by having the countries specialized in certain branches and by bringing them together into macro-territorial complexes. One such complex was the Lower Danube, which was conceived to include the former socialist states with the Soviet Union playing the leading role (Fourcher *et al*., 1993, p. 71).

The Romanian and the Bulgarian economies were to specialize in the production of raw materials and semi-fabricated, and become major outlets for the high-processed items of East Germany, Czechoslovakia, Poland and Hungary, the "first-liners", forming kind of a buffer zone to Western Europe. Their integration, economic (CMEA-based), political and military (under the Warsaw Treaty), massively backed by the presence of Soviet troops in most of these countries, was to make this superstate complex viable, a nucleus open to other states and tempting them to adhere to it. But, the steadily depleting living standard and growing interference of the politicians into the social life triggered a chain of revendicative actions both on the social and the political levels. The beginning was made in June 1956, when Polish workers from Poznan rose under the slogan of "bread and freedom", followed by similar events in Hungary in the Fall of 1956, and the "Spring of Prague" in 1968. Noteworthy is the Romanian political Declaration of April 1964, claiming the country's right to find its own domestic development road. Other notable events were the split in the Soviet-Albanian relations and the consequences of the crisis affecting Soviet-Chinese relations at the beginning of the 6th decade of the 20th century. Against that unstable background, the Soviet leaders tried desperately to reform the system, illustrated by Krushchev's weak attempts at destalinization made at the 22nd Congress of the Soviet Communist Party (October 1961), or the Kosygin Reform of 1966. But, failing to attain the desired goal, at the July 1968 Warsaw Pact Meeting Brezhnev put forward the limited sovereignty concept for the Eastern countries, the real substrate of their aggregation into the "superstate complex" of the Lower Danube and cooperation within the CMEA or Warsaw Treaty schemes.

What shaped a new, original geographical configuration for the East-European states was planned development subordinated to the political factor, state control over the means of production and of exchange, the trend towards an equalitarian deve-

lopment irrespective of their different potential and industrial specificity, restrictive migration to large cities impeding their advancement, the collective-based development of agriculture, a close correlation between the production of these states and the economic and military needs of the USSR, autarchy and split with the West, and the ambitious programs of economic and social development and modernization. That policy differentiated the East European countries and its effects are felt to this day.

Against the background of the disparities existing between Northern Central Europe, industrialized since the 18th – 19th century (Saxony-Anhalt and Berlin in Germany, Silesia and Lodz-Poznan in Poland and Czechia – holding the 8th place in the world's industrial hierarchy in 1968), the Soviet period brought about fundamental changes that are still visible today. The general tendency was to create industrial uniformity. In view of it, two types of industrial regions emerged:

- the industrial regions created before 1945, localized in the three states of Northern Central Europe and forming a triangle between Lodz and Warsaw on the one hand, and Halle, Prague and Bratislava, on the other, as well as several national and regional urban centers (Zagreb, Braşov, Ploieşti, Brno, Gyor, Poznan, Upper Silesia and the periphery of Budapest).
- the new industrial regions, localized close to the Soviet border, or in the Eastern parts of the former communist states, with a little developed industry at that time: the Ekostahl steel complex from Eisenhüttenstadt was sat on the left-hand side of the Oder River, as a symbol of the new relations between the DDR and Poland; Kosice, near the Slovakia/USSR frontier; or Galaţi, a city port on the Lower Danube assigned defense tasks, and imports of raw materials from the Soviet Union. Other industrial centers were Kremtchikovi in the vicinity of Sofia, Nowa Huta in the neighborhood of Krakow, or Dunajujvaros on the right bank of the Danube downstream Budapest (see Figure 1).

Although the Soviet-Yugoslavian and Soviet-Albanian political split did maintain the general line of autarchic and centralized industrial development in the two countries, it nevertheless stamped its mark on the Balkan space. Thus, that time defensive concerns had anti-Soviet undertones, which would explain the establishment of some industrial centers in Bosnia and Hertzegovina (Zenica, Sarajevo), Macedonia (Skopje), Montenegro (Titograd, Niksik), or the military-industrial complex at Elbasan (Albania). Also, as a result of an economic autarchic policy, several industrial estates were located in the proximity of raw materials resources: Lauchhammer and Hoyerswerda (near the lignite deposits at Cottbus, copper at Legnica-Glocow (Silesia) and natural gas at Pulawy-Lublin (Poland), or the case of the towns of Most, Litvinov and Ostrov (NW Czechia) developed due to coal resources (von Hirschhausen, 1996, p. 12).

Integration with the Soviet system of production showed up in the railway transport net, in electric power distribution, in the network of oil and gas pipes associated with refineries and petrochemical units, e.g. Leuna and Schwedt in the DDR, Plock (North of Warsaw) in Poland, Zaluzi (North of Prague) in Czechia, Bratislava (on the Danube) in Slovakia, Leninvaros in the NW of Hungary, and Szazhalombata South of Budapest.

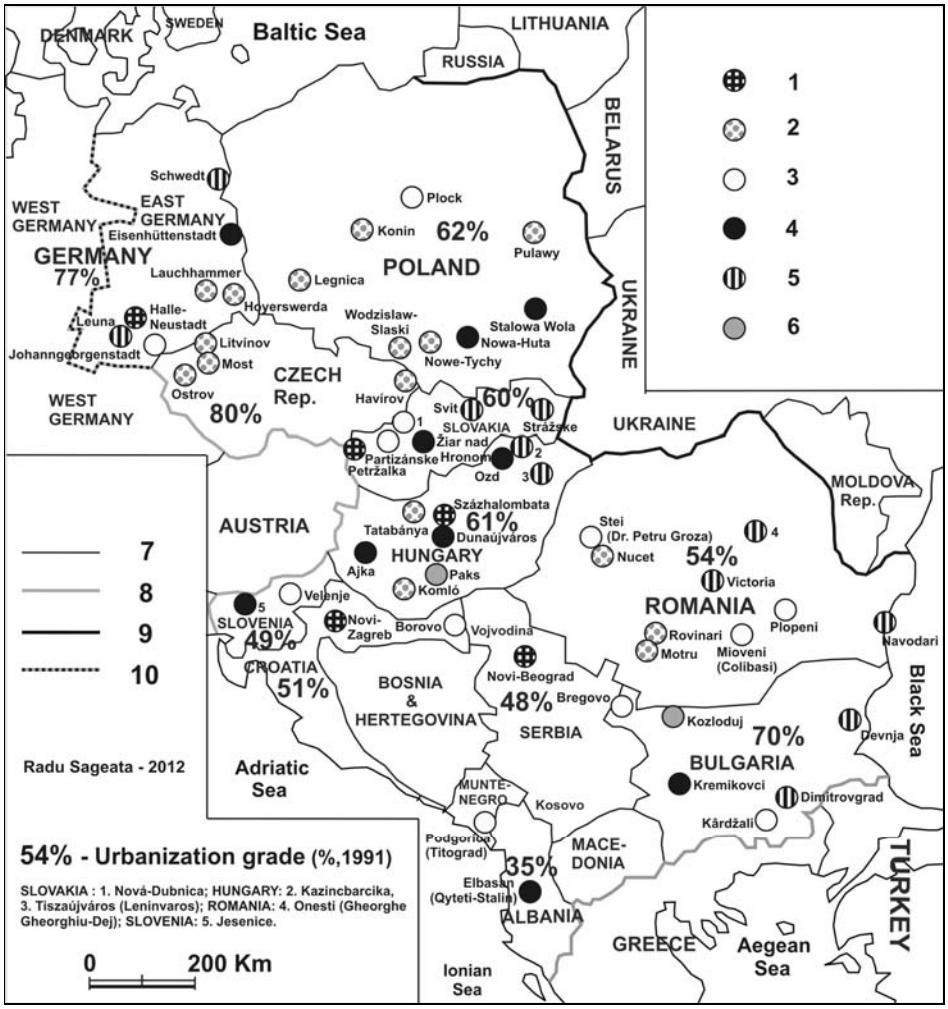

Figure 1: Socialist Towns in Central and Eastern Europe (1945-1989)

Note: 1. Towns falling within the polarizing perimeter of national or regional metropolises, 2. Towns developed due to their raw-material resources, 3. Towns developed due to planting of processing industries, 4. Metallurgical centers, 5. Centers of the chemical and petrochemical industries, 6. Nuclear electrical power centers, 7. State borders, 8. Iron Curtain, 9. Borders of the Ex-USSR, 10. State borders erased after 1990.

Urbanization got momentum after 1945, when nearly 60 new towns were built either in the proximity of existing industrial centers, or on empty terrain relating to the opening of fresh industrial sites. In the majority of cases, investments were put into small, dominantly agricultural or commercial towns (market-places), or rural settlements even, which thus witnessed explosive growths by attracting fluxes of migrants. Other settlements represent a working-class replica of some "aristocratic towns", old cultural-historical or religious centers. The aim of building them was mainly a change of image in the inhabitants' mind. It is the case of duplicate towns like Nowa Huta –

the "proletarian facet" of Krakow, Poland's old historical and religious center, or of Halle-Neustadt (DDR), Nowe Tychy (Czechia), Novi-Zagreb (Croatia), Novi-Beograde (Yugoslavia), Petržalka (near Bratislava – Slovakia), or Szazhalombata (Hungary). They are actually "towns within towns", working-class districts in some traditional urban centers. The outcome is a uniform and monotonous town landscape with tall, prefab buildings inspired from the Soviet town model. These industrial and workers' structures were considered the "show window" of the communist regime and "laboratories" for the molding of new social relationships.

On the other hand, Central Europe's geostrategical regions held over 50 garrison-towns with scores of military training fields. Their maximum density was in DDR, around Berlin, in Brandemburg, Meklemburg and in Sachsen.

Another category of towns emerged due to their political-administrative functions. Once assigned the role of administrative centers, industrial units would be automatically planted there. It is the case of Galați, Târgovişte and Călaraşi, to mention only three Romanian towns that had experienced explosive developments in the 6th-7th decades of the 20th century, after becoming regional centers (in 1950) and county-seats in (1968); their rank-status was one of the decisive arguments in setting up big industrial units there. What is common to all of them is the intense degradation of the urban patrimony, scarcity of services and places of recreation, uniform peripheries and high upkeep costs. So, in point of infrastructure, of the technical-constructional endowment and urban lifestyle in general, many of these towns are far from meeting the minimal admissible EU standards, or the recent stipulations of the Romanian legislation (Law on the approval of the National Territorial Planning Scheme, Section IV – Settlement Network).

The Soviet space model has certainly produced poorly developed and dependent economic territorial structures, but it also created a framework for the real modernization of these states that had no industrial tradition, nor an evolved urban infrastructure either. The main economic and social indicators of the former socialist countries on the eve of the revolutionary year 1989, list Romania at the bottom of the table, with GDP stagnant values.

As previously discussed, the urban category seriously marked by rural features, as far as quality is concerned, are the settlements turned into towns during the 20th century, mainly after 1945, when the forcible industrialization drive entailed big migratory fluxes from the countryside. This politically maneuvered oversized urbanization was not correlated with the urban centers absorption capacity. Fast-going development, associated with permanent austerity programs, triggered serious dysfunctions of the built-in structures materialized in the discordance between built area and infrastructure. The question is, whether changing the status of rural settlements for a town rank does really have a major impact on their evolution, whether turning a commune into town means faster development than if left at the rural level.

Proceeding from these considerations, the present analysis is aimed primarily at outlining the evolution of Romanian towns developed through oversized industrialization and subordination to the political ideology of the time, correlated with regional and national policies, the impact of industrialization on spatial organization, the cau-

ses behind current imbalances and ways and means to correct them in order to attain sustainable industrial and urban development.

Historical and bibliographical documents and sources, alongside direct observations on the ground, have enabled me to reconstruct the phases of urbanization in these towns in close correlation with their industrial development, related policies and motivations. I also tried to emphasize the connection between the momentous political-ideological context and industrial and urban development, as well as the dysfunctions that have emerged in time as a result of oversized industrial and urban development in terms of the real possibilities for raw materials and labor supply from neighboring areas. The challenges facing the local authorities in trying to correct these dysfunctions and optimize industrial and urban development are also discussed.

1.2. Iron-and-Steel Industry – Related Towns in Romania

The towns engendered by Romania's iron-and-steel industry make no exception; they are fully matching the two types of industrial regions characteristic of Central and Eastern Europe. On the one hand, there are the towns of the Banat Mountain Region (Hunedoara, Reşiţa, Oţelu Roşu and Călan), developed largely in the second half of the 19th century on the basis of the local resources (iron ores in the Poiana Ruscă Mountains, bituminous coal in the Petroşani Basin and the Banat Mountains); on the other hand, new profile towns emerged (Galaţi, Călăraşi and Târgovişte) based on imports from the former Soviet space, their reason for development being the location on the lower course of the Danube (in the first two cases), and the relationship between the administrative and industrial functions (in the case of three of them), as they were given the administrative seat status also led to iron-and-steel estates being planted therein (see Figure 2).

As a result, industrial investments had a considerable impact on the urban structures given that migratory fluxes (see Table 1) generated explosive demographic growth, and hence also a housing boom.

Table 1: Demographic evolution in the iron-and-steel industry-related towns in Romania

Towns	Constr. Year*	Populations Censuses									
		1910	1930	1941	1948	1956	1966	1977	1992	2002	2011
Galaţi	1961	72,499	100,611	95,545	80,411	95,646	151,412	238,292	327,928	298,861	241,776
Hunedoara	1884	5,401	4,600	6,024	7,018	36,498	69,085	76,451	81,337	71,257	57,524
Reşiţa	1721	17,384	19,868	25,062	24,895	41,234	55,752	84,786	96,918	84,026	72,856
Călăraşi	1979	14,673	18,053	24,345	24,448	25,555	35,684	49,727	76,952	70,039	57,129
Târgovişte	1973	18,719	22,298	26,144	26,038	24,360	29,763	60,459	98,117	89,930	77,800
Călan	1863	188	179	197	Md.	3,754	7,542	12,397	31,877	13,030	11,200
Câmpia Turzii	1920	2,519	4,124	5,759	6,310	11,514	17,457	22,409	29,307	26,823	22,157
Oţelu Roşu	1795	1,694	1,413	2,133	2,247	2,993	8,568	10,416	13,056	11,749	8,097
Vlăhiţa	1825	2,289	2,628	Md.	2,703	3,039	5,060	6,307	7,667	7,042	6,780
Cugir	1803	4,866	4,674	7,712	Md.	9,366	14,791	23,206	31,877	25,977	22,762

Constr. Year * – Construction Year of the Iron-and-Steel Unit. Md. – Missing Data.

Note: Censuses of Population from 1930, 1941 (mss.), 1948, 1956, 1966, 1977, 1992, 2002 and 2011

Figure 2: Iron-and-Steel Industry-Related Towns in Romania

Note: 1. Iron-and-steel industry-based towns development, 2. Towns in which iron-and-steel completed the industrial structure, 3. Iron-and-steel industry using local resources, 4. Iron-and-steel industry using import resources, 5. Iron-and-steel industry located in port-cities, 6. Iron-and-steel plants closed after 1990, 7. Heritage industrial buildings.

Post-1990 evolutions caused dramatic changes in supply-marketing production relations specific to a centralized economic system. The traditional supplies from the former Soviet space (iron ore from Krivoj Rog and coke coal from the Donetz Basin) ceased and prices had to be renegotiated and increases accepted, or the respective products had to be brought from Venezuela or Mauritania, which was much more costly.

The solution found was to turn the huge iron-and-still works from Galați, for instance, into smaller, more cost-efficient companies, easier to manage and more readily adjustable to recession situation. Successions of failed privatizations (at Călăraşi, Hunedoara and Călan) were followed by massive redundancies and the degradation of the existing production units.

The most dramatic situation was at Donasid works in Călăraşi, a train rail producer at European standards in 1989, having cost 2 billion US dollars until that data, and 80 million more right after that (Moldovan, 2007, p. 2), never reached more than 20% of the capacity it had been designed for. In 1999, work was stopped and bankruptcy formalities were filed. In 1989 when the unit was still in construction it employed 15,000 workers; what remained 10 years later were 170 workers engaged in the maintenance of the equipment and 400 guards. Guard and maintenance costs amounted

at 8 billion lei/month. Restructuring was tantamount to bankruptcy and bankruptcy resulted in liquidation; the number of guards was reduced for lack of money, so equipment (some of them new) were stolen and sold as scrap iron. Thus, this integrated iron-and-steel works, conceived to bring development to the whole town, ended up in ruining it. This mammoth unit, planned to produce 10 million tons of steel/year and to help a town with some 200,000 inhabitants to progress, numbered a maximum population of 77,000 people in 1992. After 1990, the majority of unemployed people were males, and only unskilled laborers could still find a job in town. The economic recession entailed a financial crisis, the degradation of urban life and of the town's technical-urbanism heritage (only 10% of the residences remained connected to the central heating system).

A similar evolution experienced Sidermet Călan. Before 1990, "Victoria" iron-and-steel works in Călan had four furnaces in operation and employed a workforce of some 5,000 people, the majority living in town and in the surrounding communes. In 1998, this iron-and-still works was divided in 12 juridical companies and privatized. Things went from bad to worse, so that by 2009 only three trading companies with some 300 employees were still functioning. Being located in a mono-industrial area, those were the main jobs providing units for the local population. In Călan unemployment reached over 50% of the total active population, much more than the all-country average. The town became part of Hunedoara disadvantaged zone for a five-year period (2000-2005) (Government Decision no. 1078/2000). The only section which is still in operation is the former foundry, privatized in 2003 as Cilindrul Călan Trading Company, which produces cost iron pressure pipes and employs about 200 workers. Having accumulated huge debts to the state budget and leaving the unit in distress, in fall 2003 parts of its assets were sold and others were discarded as scrap iron. Lack of money to secure adequate protection, left whole sections (e.g. coke chemistry) to be pillaged and sold as scrap iron.

2. Case-Studies

2.1. Case-Study 1: "Mittal-Steel" Works and the Evolution of Galați City

In 1961 it started the construction of the biggest iron-and-steel works in Romania, in line with the most modern ones in Europe at that time. It was a typical Soviet-type specimen of industrial mammoth, belonging to the second generation of profile works built on empty space like Nowa Huta (Poland), or some of the Ukrainian ones. Just like the one at Nowa Huta, its technology dates to the 1960s-1970s, employing 427,000 people in 2001 and 16,500 in 2008. Similar industrial units were at Košice (Slovakia), Eisenhüttenstadt (the former GDR) and Kremcikovi, West of Sofia (Bulgaria), of much lower capacity than the Galați one.

As political and economic subordination to Moscow was growing, the Romanian leadership decided to build a big iron-and-steel works in order to supply the Romanian machine-building industry with raw materials and to also have export availabilities. The new investment had to be located in a port-city having the infrastructure and conditions to convey huge quantities of raw materials and semifabs. In addition, relations

with the COMECOM implied massive long-term imports of iron ore from Krivoj Rog and coke coal from the Donetz Basin (Ukraine). So the location had to be as far as possible in a big port-city at the maritime Danube. Since the town already had an industrial profile (a big shipyard and some rolling stock repair shops, as well as other machine building units which required great quantities of plate and other structural shapes, Galați was considered an optimal site for this investment, and moreover, because it was a regional center, it could polarize a large geographical area, belonging to the present counties of Galați (see Figure 3 below), Brăila, Vrancea and the Eastern half of Tulcea.

Thus, the building of the biggest industrial unit in Romania was really a turning point in the history of Galați, a town with 107,248 inhabitants in 1961 (rank 12 in the Romanian urban hierarchy). The steady enlargement of the works, with a 40,000 workforce in 1989-1990, had an overriding importance for the town's demographic evolution and the dynamics of its housing stock (see Table 2).

As the population of the town trebled in a lapse of only 30 years, its built-up perimeter suffered major disturbances especially the Western half of the town (Mazepa, Țiglina, Aeroport, Dunărea, Siderurgiştilor, Micro 17, Aurel Vlaicu, etc.) where new apartment-block districts were built.

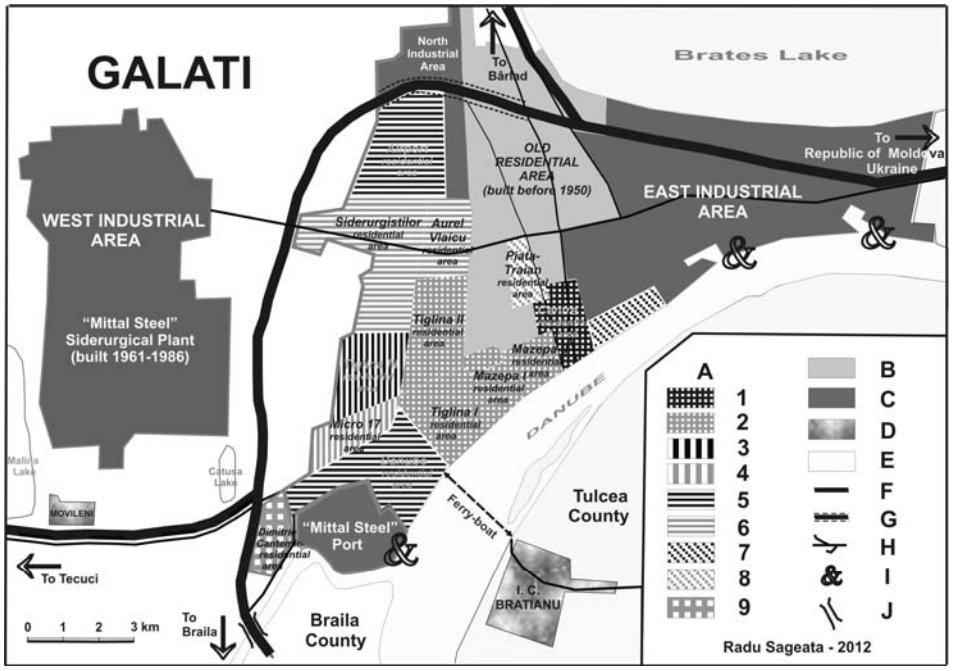

Figure 3: Galaţi Iron-and-Steel Works and its impact on the residential area

Note: A. New residential area built between: 1. 1955-1960, 2. 1961-1970, 3. 1963-1966, 4. 1964-1970, 5. 1965-1988, 6. 1967-1980, 7. 1975-1979, 8. 1982-1994, 9. 1990-2000. B. Old residential area, C. Industrial areas, D. Rural settlements, E. Agricultural terrains, F. Railway, G. Railway tunnel, H. Street network, I. Harbors, J. Bridge.

Table 2: Demographic evolution of Galaţi at the time of building and extending the Iron-and-Steel Works

Year	Population (inh.)	Rank	"Mittal Steel" Works building dynamics
1961	107,248	12	Construction of the first production capacities of the Works
1966	151,412	6	
1969	179,399	6	Enlargement and modernisation of the Works 1966 – Massive plate rolling mills 1968 – Furnace I (1,700 cm.) 1969 – Furnace II (1,700 cm.) 1969 – Heating central 1978 – Furnace IV (2,700 cm.) 1986 – Welded pipes Dpt.
1973	191,111	6	
1974	197,853	6	
1975	201,607	6	
1977	239,306	7	
1981	239,201	7	
1983	254,636	7	
1989	275,096	7	
1990	326,139	7	Massive employment: a 37,800 workforce
1992	326,141	6	Repeating the interdiction for people to settle in town (legal attestation of town residence)
1993	324,234	5	
1994	326,728	5	Contradictory evolution at the "Sidex SA" Company
1997	331,360	6	
1999	328,596	6	Lay-offs Order 98 (3,500 employees)
2002	298,861	6	Privatization Sidex brought by the LNM-Ispat Anglo-Indian Group
2007	293,523	7	Redundancies : 18,500 (2004); 16,500 (2008); 12,500 (2009) 11,000 scheduled for 2012
2011	241,776	8	

Source: Calculated based on Censuses and Yearbooks Data

Against the background of an economic slowdown at national scale and the steep demographic decline of large cities like Braşov and Cluj-Napoca, Galați mounted two seats in the urban hierarchy in 1990-1993. The first massive lay-offs took place in 1999 (Government Order no. 98), redundancies affecting 3,456 workers, the majority being skilled laborers with little of retraining opportunities, e.g.: locksmiths – 22.3% out of all layoffs, electricians – 10.2%, carbon producers – 7.7%, cutters, welders – 5.8%, crane operators – 5.1%, whereas lay-offs in the administrative and financial-accountancy sectors were really insignificant. At the same time, the closing down of some inefficient units (battery 8 of the cock-chemical unit) and the imminent prospect of the spare parts and Iron-and-Steel Repair Plant (UPSRS) to be segregated from the Works production flux made most of the workforce of these two units redundant. As a result, the flow of commuters from the country's rural area was diminished.

In November 2001 the privatization contract was signed, the buyer being LNM Holdings BV, a Company of the LNM Anglo-Indian group, the fourth steel producer in the world (including the Galați Siderurgical Combine). When privatized, "Mittal-Steel" Siderurgical Combine had a workforce of 27,000 people and a steel production capacity of 5 million metric tons. The company delivered also massive plate products (3 mill. steel tons) (Nann, 2001, p. 4). Striving to make the activity efficient and in the

wake of EU negotiations on the competition chapter, redundancies went on. In 2004, the company continued to be the leader among top private companies in Romania, with a turnover of 1.08 billion USD. The production increased from 3.7 million tons of steel in 2001 to 4.6 million in 2004, and the company exported about 66% of its output. In 2007 the Iron-and-Steel Works in Galați produced 4.4 million tons of fluid steel. It contributed with 1.33% to the GDP and was the country's major exporter (3.8% of the overall export volume).

The economic-financial recession which began in mid-2008 had severely affected Romania's iron-and-steel sector. Parts of the installations were disconnected (coke-chemical plant – the only one in Romania, steel works 3 and Foundry 3) (Laurențiu, 2008) as the demand in Europe's markets fell and technological unemployment hit, by rotation, all its 12,500 employees.

The Iron-and-Steel Works plays a major role in the activity of the other industrial units from Galați. For example, the Damen Shipyard and the Massive Plate Rolling Mill depend directly on the "Mittal-Steel", the Sorting Station being their main supplier. This shows that the industrial evolution of the Eastern city zone (port activities and shipyard) is intimately related to the "Mittal-Steel" raw material supply.

As of April 1994, the existing infrastructure allowed for the Galați Free Zone (commercial and warehouse profile) with two platforms totaling 135.98 hectares (Caraiani and Cazacu, 1995, p. 517) to come into being.

2.2. Case-Study 2: A New Investment in an Old Urban Center – Târgovişte

In the 1970s, iron-and-steel metallurgy opted for medium and small-size units capable to adjust more readily and efficiently to the use of modern and less polluting technologies and manufacture superior alloy steels. This economic context, associated with a policy of relative detachment from the Soviet Union prompted the construction of a modern and superior alloy steel works in Târgovişte.

Choosing Târgovişte, the old capital of Wallachia, was not a random option; because of all the new country-seats (re-established in 1968) Târgovişte had one of the poorest industrial and demographic development levels. Therefore, turning this predominantly historical and cultural town into a powerful industrial center, liable to polarizing the whole zone, was meant to justify its administrative center status. And indeed, this goal was attained; the 1977 census figures show twice as many inhabitants (62.4% more) than in 1966, due largely to immigration. This trend, which went on until 1994, was a confirmation of the fact that the Special Steels Works had a good economic-financial situation, without any financial blockage, banking credits, debts to the state budget or to other suppliers.

The demographic increase, often at explosive rates, was obvious also in the residential sector. So, nearly 225 out of all the apartment-blocks registered in 1992 had been built in the 1971-1980 period. Most of the new buildings, rose in a hurry and at as low costs as possible, fall short of modern comfort and safety norms. Since these constructions were of the residential type, services spaces were neglected and planned for the second enlargement phase of the new districts. But, many times this program was

abandoned for lack of money. In this way, specialized services could be found mainly in the central city zone (where the necessary infrastructure was in place, while the new districts - Micro III, V, VI, XI, XII, which were the most heavily populated ones, had to do without them (see Figure 4).

The year 1995, marked a downturn in the economic-financial situation of the Works, materialized in ever greater financial blockage and an ever lower possibility to meet its payment obligations.

One-third of its employees were laid off, especially under a succession of Government-issued Emergency Ordinances, so that on June 1998 only 31% out of the overall employees (2,098) had remained in the production sectors. The unsatisfactory productive and economic activity was the consequence of substantial reduction in the use of production capacities (under 50%) because of fewer orders coming from domestic users, whose production was also depleted, and from foreign users, who opted for other markets; in addition, production technologies and labor failed to be updated.

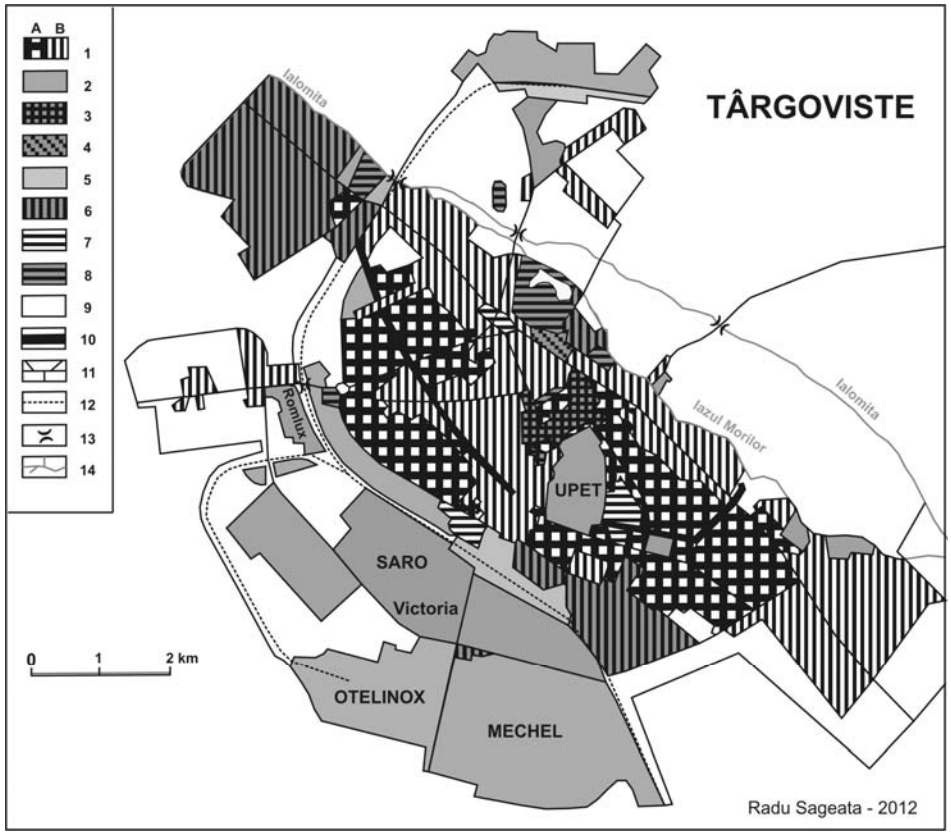

Figure 4: Târgovişte. Functional areas

Note: 1. Residential area: 1 a. New blocks-of-flats, 1 b. Old (one-family) dwellings, 2. Industrial areas, 3. Administrative and services area, 4. Historical area (Princely Court), 5. Transport areas, 6. Areas of special destinations, 7. Commercial areas, 8. Agreement and verdure areas, 9. Empty terrains, 10. City wall, 11. Street network, 12. Railways, 13. Bridges, 14. Water courses.

Privatized in 2002, the Works enjoyed massive investments, with positive results in turnover, production volume, and especially in productivity which doubled in a lapse of three years of privatization. Since 2006, Mechel Târgovişte Works have been producing and gaining profit, which afforded modernization to go on (Moldovan, 2007, p. 2). In 2007, the Works had 4,000 employees, one-fourth of which were directly involved in updating the enterprise.

Since early 2009 the economic recession hit this sector too, and the employees have been facing technological unemployment by turns. The Mechel Târgovişte Works is currently functioning again.

2.3. Case-Study 3: Tradition and Continuity. The "Oţelu Roşu" Iron-and-Steel Works

The "Oţelu Roşu" Works belongs to the first generation of industrial nuclei, its construction being connected both with existing raw materials (iron in the Poiana Ruscă Mountains and coke in the Banat Mountains) and with the German and Austro-Hungarian industrial traditions, outstanding in Banat and Transylvania rather than in the Extracarpathian space whose economic model was distinctively different. The iron-and-steel branch led to the development of a settlement that, in time, would develop into a town (1960). Like in other situations, the communist authorities invested heavily in the Works, also turning the settlement into town and changing its name into Oţelu Roşu (1948) to erase its "capitalist" past. The Oţelu Roşu settlement appeared after the Second World War when Ferdinand Village, founded by German colonists, merged with Ohaba-Ponor, a Romanian village. Until June 8, 1948 the name of the new locality was Ferdinand-Bistra (Ghinea, 1996, p. 149).

The first iron-processing shops, which German colonists from Reşiţa and Borşa were working in, appeared in 1795 in the Ohaba-Bistra Village area at the foot of the Ferdinandsberg Hill, forming the groundwork of Ferdinandsberg settlement (documented in 1806). Between 1924 and 1945 the settlement, known by the name of Ferdinand, was the only one situated in the Bistra Corridor to have been founded by German colonists; it is also their most recent foundation and the one that developed at the fastest pace. The expansion of production capacities at the Iron-and-Steel Works, as well as the location of the settlement in the center of the Bistra Corridor, stimulated the rural population to move in.

Oţelu Roşu is a one-industry town as the industrial zone itself shows: 77 out of the 79 hectares occupied by industrial buildings, used to belong to the siderurgical plant (currently known as Ductil Steel). In terms of population structure, out of an overall of 5,610 industrial workforce - 4,415 people (78.7%) were employed in the ferrous metallurgy (data cover the 1980-1990 interval, the peak period in the town's industrial development).

The industrial site, developed on one bank of the Bistra, and the residential site on the other bank, is a typical example of the parallel location of industrial zones (see Figure 5).

The post-1990 privatization (and a new name Socomet) led to fluctuating evolutions in the development of the Works. Thus, in 1996 investments were earmarked to

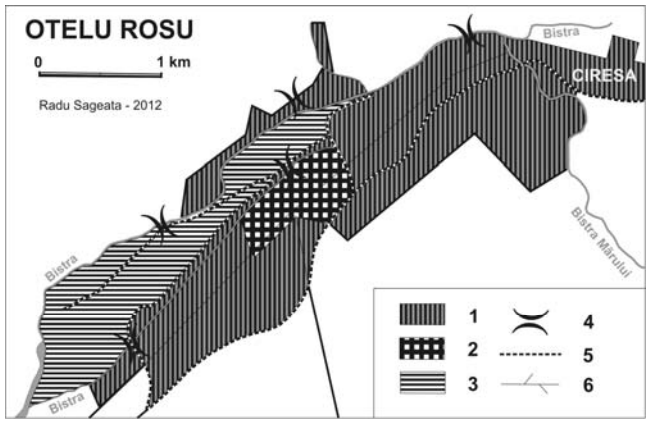

Figure 5: Oţelu Roşu. Functional areas

Note: 1. Residential area, 2. Administrative and services area, 3. Industrial area, 4. Bridges, 5. Railways, 6. Street network.

improving rolling technology; in 1999 70% of the stocks were bought up by an Italian investor (who changed the name Socomet into Gavazzi Steel). He had committed himself to paying the debts and investing 20 million USD. However, not meeting contract obligations had a negative impact on the activity of the Works; the number of employees dropping from 3,125 in 1998 to 3,050 in November 1999, and to only 614 in September 2002 (Antohe, 2009, p. 2), who remained only in the strictly necessary sectors. After two years in which all activities had ceased (2003-2005), the profitable sectors of the company (the rolling plant, the electrical steel-melting shop, the foundry and the utilities) filed for liquidation and their assets were sold off to Ductil Steel, a company located in Buzău (Romania), who succeeded in re-launching the production process in the steel-melting shop; prospectively, the rolling plant was to be reopened and the workforce planned to reach 800-900 persons.

What had contributed to the decline of the Works was also a slowdown in the mining sector, one of the main customers of the Oțelu Roşu Works. There is no doubt that the evolution of the Works will influence the future of the homonymous town, the urban ecosystem being particularly fragile. Thus, over 1997-2007, 115 of its dwellers chose to move elsewhere. Specialist crafts in the iron-and-steel area and the absence of a modern infrastructure make it difficult to retrain the workforce. Like in many other cases, a long-term alternative would be tourism, including industrial tourism, provided that the outdated industrial capacities can be put to account as they should.

3. Conclusions

3.1. Romanian siderurgy at the beginning of the third millennium. Evolution trends

According to Ministry of Industry and Resources, in 1989 the total capacity of the iron-and-steel sector was around 18 million tons of steel/year, and the equivalent annual output produced by its 33 units was of 13.4 million tons of steel. Out of a work-

force of some 150,000 people, one-fourth was employed by the Iron-and-Steel Works in Galați. Subsequent evolutions registered a steep decline, by far steeper than in other Central-European states embroiled in the economic difficulties of the transition-period, so that the 1995 output was less than half the 1989 one. That situation was engendered primarily by a reduction in the domestic demand for metal products. Concomitantly, the number of employees (see Table 3) dropped almost by 50% in 2000 (76,800 people) (35% of the Romanian iron-and-steel workforce is employed by the Galați profile industry), and to some 40,000 in 2006, entailing an overall productivity fall.

Conformable with the European labor productivity norms in the steel industry, each worker should produce around 500 tons of steel/year, instead, at the biggest iron-and-steel unit in Romania, in Galați, a worker produces only 263 tons of steel/year.

Table 3: Numerical evolution of the workforce in the main iron-and-steel centers of Romania

Iron-and-steel unit	EMPLOYEES	Year							
		1993	1998	1999	2001	2004	2006	2007	2008
Mittal Steel Galaţi		37,800			19,000		18,000	17,000	16,500
Mittal Steel Hunedoara		17,000				2,280	2,250		
Mechel Târgovişte			6,768		5,400			4,000	
Mechel Câmpia Turzii		9,000					5,300	4,800	4,700
TMK Reşiţa		5,200				1,520	1,450		1,350
Donasid Călăraşi		4,900				388			402
Ductil Steel Oţelu Roşu		4,100	3,125	3,050	614		350	700	

Note: We analyzed only the data availabe up until the beginning of 2012

A directly proportional correlation between the number of employees and the population of the country's main iron-and-steel centers over 1988-2008 has revealed substantial demographic decreases due largely to a negative migratory record (see Table 4).

Table 4: Population evolution of the main iron-and-steel centers in Romania (1988-2007)

Iron-and-Steel Center	Population [inh.]				Evolutions/inh. (1989-2011)
	1989	1992	2002	2011	
Galaţi	307,376	326,141	298,861	241,776	-65,600
Hunedoara	89,755	81,337	71,257	57,524	-32,231
Târgovişte	100,426	98,117	89,930	77,800	-22,626
Câmpia Turzii	29,949	29,307	26,823	22,157	-7,792
Reşiţa	110,260	96,918	84,026	72,856	-37,404
Călăraşi	76,240	76,952	70,039	57,129	-19,111
Oţelu Roşu	14,485	13,056	11,749	8,097	-6,388

Sources: Censuses of Population and Households (1992, 2002, 2011) and Statistical Yearbook (1990) National Institute of Statistics, Bucharest.

At present, Romanian siderurgy has seven integrated iron-and-steel works, out of which only one is based on converter flow and six on arc furnace (Mittal Steel Galați, Mittal Steel Hunedoara, Mechel Târgovişte, Mechel Câmpia Turzii, TMK Reşița,

Donasid Călăraşi and Ductil Steel Oţelu Roşu) (Source: www.cmnm.icem.ro/ indmet.html), plus four seamless pipes companies, welded pipes five, rolled steel thirteen, siderurgical equipment and castings two, ferro-alloys one, smaller units manufacturing nails, steel wire mashes and metal braids six, and R&D institutes four. Some of these enterprises are the property of big international metallurgy groups: Arcelor Mittal, the biggest steel producer in the world, owns the iron-and-steel works in Galaţi and Hunedoara, the pipe plants in Roman and Iaşi; Mechel – Russian group, holds the iron-and-steel works in Târgovişte and Câmpia Turzii; TMK – Russia, the Reşiţa Works and Artrom pipe plant in Slatina; Donasid – Spain, has the iron-and-steel works in Călăraşi and Silcotub pipe factory at Zalău.

While most of the steel manufacturing technology commonly used in the world relies on oxygen converters with low energy consumption, a similar technology in Romania exists only in Galaţi, but equipment corresponds to those in use elsewhere 15-20 years ago. Moreover, most installations have no safety pollution control devices.

The technology in use is characteristic of two types of production units:

1. with an integrated production cycle based on two technological steel production variants: by processing hot iron (Reşiţa, Hunedoara and Galaţi), and the processing of iron (Târgovişte, Călăraşi and Câmpia Turzii); and
2. with a production cycle based on the processing of semifabs and the manufacturing of finite goods (seamless pipes, long and flat rolled products) – Bucureşti, Focşani, Târgovişte, etc.

The main goals of restructuring the iron-and-steel sector (see the Strategy of restructuring the iron-and-steel industry in Romania elaborated by the Ministry of Industry and Resources) have in view the following:

1. to correlate the production capacities with the structure of products and semifabs on demand in the domestic and foreign markets (that is, produce more pipes, hot rolling metal-tapes and reduce the output destined to the mining and oil sectors);
2. to update the production capacities by using new, more efficient and less polluting technologies;
3. to reduce the specific consumption of raw materials and energy;
4. to increase labor productivity and improve working conditions;
5. to succeed in exporting iron-and-steel products efficiently by increasing the share of highly-processed items; and
6. to further reduce the workforce to 53,500 – 54,800 employees in 2013.

Bearing in mind domestic demand and export availabilities, the optimal structure of Romanian siderurgy would look as follows:

– two integrated iron-and-steel works (manufacturing a distinct set of products; location close to the Danube (which is the cheapest transport route for raw materials and processed items), basically in Galaţi (6.96 mill. tons/year) and Călăraşi (1.7 mill. tons/year) to cover 72.2% of Romania's overall steel production;

– an integrated works located in the center of the country, close to the only iron and coal resources: at Hunedoara (1.55 mill. tons/year) supposed to yield 12.9% of the national steel output; and
– four iron-and-steel works, kind of mini-plants, spread out in the territory: the Special Steels Plant in Târgovişte, the Wire Industry at Câmpia Turzii, the Iron-and-Steel Works at Reşița and the Oțelu Roşu Works, totaling 1.78 mill. tons/year and 14.9% of the overall output.

In addition, there would be six more plants dispersed in the territory and processing the semifabs supplied by the above-mentioned steel producers.

3.2. The Role of Local Public Authorities

Falling in line with the national policy and strategy for reforming the iron-and-steel industry, but at the same time, being under constant pressure from the local civil society and mass-media, local decision-makers did realize the necessity for viable alternatives to achieve sustainable development in the conditions of a declining local industry. While the program elaborated by the local public authorities did support government decision, the succession of electoral cycles explains why political decision-making wavered, thus contributing, among other things, to delaying the implementation of coherent local development programs.

On the other hand, the growing pressure exerted by the population and the NGOs, sustained by the mass-media, to have tax payment obligations reduced, a better quality of services, the elimination of corruption and more efficient local implementation of EU acquis provisions have led to major changes in the local public administration, obliging both authorities and elected representatives to take concrete action for putting in place functional restructuring and territorial planning programs.

The programs and projects have two main goals:

1. the professional conversion of the iron-and-steel industry lay-offs; and
2. the rehabilitation of the infrastructure and the restructuring of dismantled industrial areas.

The first category mediates job-finding, facilitates professional training or retraining, offers career counseling for jobs-seekers, or people willing to improve their professional performance.

The second category covers a wide range of actions among which the rehabilitation and modernization of the technical-urbanistic and access infrastructure, the consolidation of housing structures and the construction of social dwellings, commercial and agreement areas, and a modern health and education infrastructure.

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