TRADITION IN THE LANDSCAPE OF THE CONTEMPORARY CITY: A POLISH JAPANESE COMPARATIVE STUDY

Abstract

The article compares Polish and Japanese urban landscape, paying special attention to the traits of identity that stem from tradition. The comparison is difficult because the circumstances of development of the cities differ profoundly and do so in many aspects. However, this is a perfect opportunity to observe the features that would be difficult to notice without a contrastive background.

Traditional Japanese architecture and art have long fascinated Europeans. Contemporary Japanese architecture is the object of praise of enthusiasts of modernity. Yet the impact of the combination of ancient traditions and modern concepts, which can be seen in the cultural landscape of Japanese cities, is often a great surprise, as it is certainly not fascinating.

Keywords: urban landscape, tradition, comparison, Poland, Japan

1. Introduction

The proportion between what has survived from the past, and what is new in urban landscape is one of the clearest traits in city identity. At the same time, it is one of the most important controversies that cause contention between both professionals dealing with the shaping of space and city populations. There is no unambiguous answer to the question about the balance between the old and the new. There have always been, and there will always be supporters of both attitudes: conservative and innovative. The choice between the two (while making decisions) is one of the important elements of “the game of spaces”; at the same time, it is a significant aspect of pursuit for the sustainable development of the city.

The INTBAU conference devoted to the subject of tradition in architecture is held in Kraków, the city whose historical centre was placed on the original UNESCO World Heritage list. The discussion of “the old vs. the new” continued in the city in the 19th century. Since that time, the dispute about the proportions between tradition and modernity has not ceased. A particular illustration of the current state of balance in this area is Kraków’s contemporary cityscape. It is what attracts throngs of tourists from all over the world to the city, with the decided majority arriving to heed the heritage of the past, and not the achievements of the contemporary.

Much like in many other countries, a discussion and game of forces concerning the traditional attitude continues in Poland. It is not easy to assess especially when one participates in it. A perfect opportunity to verify our own judgements, however, is a look from outside, from another perspective: an assessment against a contrastive background. Such an opportunity was provided in a Polish Japanese research project entitled, A Comparative Study of the Preservation and Utilization of Historical Cities: Kyoto, Kanazawa, Krakow and Warsaw.¹

¹ The project was conducted in 2007–2010, and financed by the Japanese Society for the Promotion of Science and the Polish Academy of Sciences (PAN); coordinators: Hiroshi Yahagi (Japan) and Krystyna Pawłowska (Poland); publication: Pawłowska K. (Ed.): Krajobraz kulturowy Japonii, Czasopismo Techniczne, special issue, Wydawnictwo Politechniki Krakowskiej, Kraków 2010.

A popular representation of Japanese architecture in European countries, Poland included, includes, on the one hand, a fascination with the distinctiveness of traditional forms and an admiration for the achievements of contemporary technology on the other. The first wave of interest in Japanese art, notably architecture, occurred in the days of Art Nouveau. The second came as part of the modern movement, when Japanese architects joined the global spearhead.

When a European (for example, a Pole following such a representation of Japan) finds himself or herself for the first time in a huge Japanese metropolitan centre, he or she is surprised. The ugliness and chaos of urban landscape have nothing to do with the subtle finery of traditional Japanese houses and gardens, nor with the sterile perfectness of famous modern architectural products. The oppressive condensation and lack of spatial order are the dominant impression. This status quo provokes comparisons with the landscapes of European cities and questions about the reasons behind the phenomenon. The article is devoted to precisely this question.

2. The cultural landscape of Japanese cities

The cultural landscape of Japanese cities is naturally highly varied, therefore no generalisation can be fully true here (Pawłowska 2010). The research project covered the cities mentioned in its title, while the justification for the selection were their links with the subject of the project. Kraków and Kyoto are former capital cities, and both include areas recognised as UNESCO World Heritage. This is true also of Warsaw, although the reason for entering the “old city” (Starówka) of Warsaw is different than in the case of Kraków and Kyoto (Pawłowska, Walszczyk, 2008). Kanazawa is only aspiring to be entered on the list, yet the Japanese themselves consider it the best example of a traditional Japanese city. Besides these, the observations
Fig. 1. Street view in Tokyo. Photo by the Author

Fig. 2. Centre of Osaka. Photo by the Author

Fig. 3. Chaotic landscape of Osaka. Photo by the Author

Fig. 4. Wires cutting the sky. Photo by the Author
and studies of urban landscape encompassed many other Japanese and Polish cities.

The gigantic Japanese metropolises are polycentric organisms that combine what previously used to be separate urban centres. For example, the Tokyo Metropolitan Area (space: 2,000 km$^2$, population: 35 million) consists of a number of cities: Yokohama, Kawasaki, Chiba, Shinagawa, and others.

The chaotic landscape mentioned above stretches predominantly in a gigantic zone between the territories and district centres. Standing densely side by side are buildings that vary greatly in height, functions, standards, and forms. Visible in the street space are networks of criss-crossing electric cables. Any composition of a street face – compositional axes, dominance, and closings and openings – is out of question. This type of landscape is sufficiently dominant to provide a particular background, against which areas of beauty and order can be found and likened to isles. Those isles are on the one hand fragments of traditional landscape, and on the other – new high technology cityscapes.

More unification and order can be found in the periphery, in residential development zones. Standing here pressed together on diminutive plots are two-floor-high traditional houses covered with gable roofs. From a distance, these districts look like an undulating sea of roofs devoid of vertical accents. The landscape of the streets has a certain highly characteristic feature. The houses windows look as if blind. The blinds or curtains separate the space of the street from that of home. Ground-floor windows may be large and open, but only if there is a shop or a workshop behind them. It is a consequence of the traditional Japanese home, where residential interiors are focused on the central piece, which is a small and meticulously cultivated garden.

Another type of peripheral development are complexes of residential blocks. A certain spatial order can be found here, yet beauty would certainly be difficult to find. A frequent peculiarity of these areas is a surprising management of the spaces between the blocks. No flat space can be wasted, so if space is neither a street, a car park, nor a construction site, it is earmarked for rice paddies. At the time of vegetation, when farming requires an inundation of the fields, in the European imagination, such settlements bring to mind a landscape after a flood.

The district centres, for example Tokyo’s Shinjuku, Shibuya, and Ginza, stand out primarily due to their height. Here, land is too precious to allow preservation of low-rise buildings, yet any composition of the street is still out of question. There are exhibition-like places, where the most modern, luxurious buildings, headquarters of international corporations, and branded with the names of the most illustrious world architects illustrating the latest aesthetic trends, stand side-by-side in a row. Yet the tendency to respect the context of the place is not respected here. The landscape of these districts has much in common with the image of the “city” in American metropolises.

The urban landscape that is perhaps most frequently emphasised in reports on Japanese metropolises is the main street of one of the large urban centres. It is usually shown by night, when the dominant impression comes from the flickering of thousands of brightly lit commercials; the space of the street is filled with the roaring of motor engines, hubbub of human voices, and sound of electronic signals, such as the “Electric Town” shopping centre for household electronic goods in Akihabara, a district of Tokyo.

Products of modern architecture, for example, the train stations of Kyoto and Kanazawa, the 21st Century Museum of Contemporary Art in Kanazawa, the Tokyo National Art Center, Umeda Sky Building skyscraper, the Namba Parks commercial centre in Osaka, and Canal City in Hakata represent high aesthetic qualities. Sites of this type define new directions in aesthetics, achieved among others thanks to the vast creative freedom ensured by nearly unlimited technical means and great economic potential. In many cases, these are huge structures created as a whole and managing what is broadly construed as a neighbourhood. Each of them in a sense is a world for itself. Obviously, they are the

\footnote{All the rice that the Japanese need as their staple food is produced in Japan.}
parts of the urban landscape, yet their role in it seems to be a matter of secondary concern for their designers. Some of them have been the object of serious conflict between the followers of tradition and supporters of modernity in urban landscape (Baba 2010).

The islands of harmony and sophisticated beauty (in the ancient style) are the developments of Shinto sanctuaries and Buddhist temples consisting of pavilions, courtyards, and gardens (Pawłowska 2013a, 2013b). A high wall or other, non-transparent barrier separates them from the rest of the city. Sacred architecture is also a source of landscape marks characteristic of Japan. Standing in front of Shinto temples are five ori gates, situated on the axis of the main entrance into the complex that – together with the gate building – define the axis for the entire concept. The programmes of Buddhist temples may include a multi-story pagoda that dominates the local skyline. Other dominant forms are castles standing away from the city (shiro).

The famous historical Japanese Gardens (niwa) are parts of temple and castle designs. Taken together, their refined composition, lush and marvellous vegetation, water used in a variety of ways, rocks and gravel areas set
according to specific rules, and last but not least, the specific small architectural forms provide a captivating whole. Nearly every view in any direction seems to be carefully composed (Nitschke 2003, Zachariasz 2010). Their global fame is fully deserved, and the aesthetic contrast with what is happening beyond their perimeter is vast.

Districts of samurai houses (buke yashiki), streets developed with residential and commercial houses (machiya), and teahouse districts (chaya) are picturesque fragments of Japanese cities (Barucki 1988, Longstreet 2008). A particular type of street, very characteristic of the landscape of Japanese city is akedo – a commercial passage or an entire system of intersecting glass-roofed bazaar streets. Ground floors consist of shops exhibiting their goods on external stands. The merchant guilds operating within are the main sponsors of local festivals (matsuri), the most characteristic element in city customs. As the competition from the new, big American-style commercial centres questions the future existence of akedo, the tradition of the festivals is also in jeopardy.

New order is introduced into the cityscapes by the grand revival projects, for example the transformation of two areas in Roppongi (Homma 2006) – one of Tokyo’s central districts, managed by major developer companies. The goal of those impressive projects was the liquidation of the chaotic fragments of the city and their transformation into modern, multifunctional units of a highly functional, environmental, social, and landscape standard. Also built as part of the projects were gigantic skyscrapers, ones providing useful space during such a great demand when space is in short supply. This allowed for a significant increase of public spaces and greenery. Japan understands the notion of revival differently than Europe: although it means returning a place to life, it does not always refer to historical or traditional complexes; sometimes no trace of legacy developments is left. Two modern urban complexes, Roppongi Hills and Tokyo Midtown, each covering approximately 10 hectares, were developed in Roppongi. In both cases, the only forms preserved are historical gardens: tiny when compared to the scale of the project.

Developer companies that conducted these huge projects boast close cooperation both with public authorities and local communities. They claim that a fusion of the public and private sectors brings out the contemporary philosophy of the renaissance of urbanism. Social participation begins already at the phase of developing the concept of the project. Cooperation continues into the period of design and construction, and transforms into the foundation for
the societal ties between the residents after its completion. There are two residential towers in Roppongi Hills. One of them is entirely inhabited by the people who formerly resided in the transformed area (Pawłowska 2010).

Kyoto landscape, perceived as a complex, is of slightly different nature, yet not because of its saturation with heritage architecture (Kyoto Its Cityscape Traditions and Heritage 1994). Although 17 temple and garden complexes in the city and region found their way to UNESCO’s List, there is no single district here that could be compared to the city centres of Kraków, Prague, or Paris. This is true not only about the style of architecture, but also about the degree of preserving the historical substance. The oldest section of Kyoto is predominantly developed by post-war structures, and its distinctiveness from the rest of the city lies in the grid system legible within landscape, maintaining the moderate height of developments. The specific picturesque nature of Kyoto’s landscape consists of the fact that the city is situated in a valley surrounded by steep forested mountains, and its size makes it possible to confront many city views with the background of the mountains. For that reason, Kyoto can be construed as a single, huge landscape macro-interior. Unfortunately, much like other cities, it is internally dominated by a chaotic landscape.

How do these colossal urban organisms, whose cityscape gives off the impression of a boundless labyrinth of

![Fig. 15. The traditional shopping arcade in Kyoto. Photo by the Author](image1)

![Fig. 16. Mori Garden within the revitalized district of Roppongi Hills in Tokyo. Photo by A. Zachari](image2)

![Fig. 17. Kyoto panorama. Photo by the Author](image3)

![Fig. 18. Osaka panorama. Photo by the Author](image4)
chaotic development, function? The answer to this question can be found in the system of public transport that is the developed network of underground and assorted railway lines, most of them running under the ground. The sections conducted on or above the ground, unscrupulously transect the city tissue, and in a way ignore not only the city system but also the lay of the land and the courses of the rivers. All this is possible thanks to high technology. Mass public transport is so efficient that residents of large cities do not use private cars, and frequently own none. The underground stations, especially in major junctions, are an attractor that brings trade, catering, and other public services under the ground. This is how another, underground level of the city develops. Here you can use not only the services, but also gain direct access to many buildings by stairs or lifts. These, therefore, are underground public spaces for pedestrians, especially eagerly resorted to in rainy weather.

The underground is not only a means of transport but also a particular system of organising the space. The metro stations usually have names identical with the parts of the city where they are situated. Usually they serve as the starting point in the identification of a sought after place. In Japan, information about the area where a given place is situated, for instance, close to an underground station, is of greater significance than in Europe. As a result, with few exceptions (for example, Kyoto and Sapporo), the streets and squares in Japanese cities have no names.

The description of an urban landscape in Japan provided above concerns primarily the great metropolitan centres like Tokyo, Osaka, and Kyoto. This is a picture of a Japanese city that Europeans – tourists and visitors on business – become familiar with. It, obviously, does not exhaust the question of the Japanese urban landscape, yet a more spacious description would exceed the framework of this brief study.

2. Tradition in the landscape of Japanese and Polish cities: comparison

Polish and Japanese cities differ profoundly, and this in very many aspects. To understand the specific traits of contemporary Japanese cities well, one should probably reach deep into their history, at the same time accounting for a broad background of specific Japanese cultural traits as a whole (Benedict 2003). The task requires competencies in many fields. Here, the scope of explanations will be limited both in competence and time. It is an attempt made by an architect and urban planner, specialising in landscape architecture, focusing on the history of the development of Japanese cities after WWII (Pawłowska 2012). The work concentrates especially on the differences related to the question of the share that tradition holds in the image of the city.

Geographic circumstances of city development (Jackowski 1996) in Japan are much more difficult than in Poland. The deficit of space ready for investment\(^3\) enforces intensive economisation, hence the crowding of development, and surprising ways of using space (e.g. the farming of rice in residential settlements). Yet, furthermore, with the deficit of space, the exchange of old developments for new (ones more coherent with current needs), frequently becomes an absolute necessity. It is a circumstance that does not favour continuing the traditions.

An especially difficult circumstance are the frequent earthquakes that for centuries have strongly influenced the architecture and urban planning: low framework-based structures, fit for easy reconstruction, minimalist internal decoration, etc. Once the technique of building skyscrapers resilient to earthquakes was managed, high-rise buildings emerged. This was an extremely precious achievement among the general deficit of space.

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\(^3\) With its population of 120 million, Japan is slightly larger in size (377,835 km\(^2\)) than Poland. Approx. 80% of its area consists of steep mountains covered in forests and very difficult or impossible to settle.
Poland has never had, and will long have no such deficit of space, which has plenty of advantages. For example, in such conditions, there is no pressure to exchange old architecture for new. At the same time, however, freedom creates room for overspending or wastefulness and a smaller discipline of development. Especially in the period of a so-called “socialist economy”, when private ownership of land was disregarded, extravagance led to irrational territorial development of cities.

Cultural conditions are the basic reason for the differences between the Polish and Japanese cities, especially as far as the share of traditional forms is concerned. The basic types of traditional residential buildings are different: in Japan, these are low wooden houses, and in Poland – solid townhouses. (Due to earthquakes, there are no brick houses in Japan.) The sacred architecture is also entirely different due to the disparity between the religions (Shinto and Buddhism in Japan). Religious sites are also complexes that are separated from the urban tissue, while European churches are built in direct contact with the street or a square. While one or multiple towers are the crucial element of European churches, Japanese sacred architecture rarely features vertical accents (pagodas). Hence, church towers did not dominate the Japanese city skyline, which is a rule in Europe. The clear dominant is usually provided by castles of a characteristic model form which is universally similar. Juxtaposed against them, Polish castles feature a great variety of forms, styles, and locations.

A part of sacred and castle systems are gardens, also much unlike European ones. They must be counted among the peak achievements of world garden art, and their comparison to Polish ones is certainly to their advantage. In turn, Japan has no long-standing tradition of public parks. The ones currently functioning in the cities replicate American models.

Moreover, the traditional Japanese street plays a different role than in Europe. The centre of a house is its internal garden, and the space of the Japanese home is arranged around it; therefore the external walls, including the one adjacent to the street, are not an object of the owner’s interest and efforts. The high fencing from the side of the street, or walls with blinded windows are not treated as representative parts of the buildings, which is the case with front façades in European cities. A different principle is in operation only in commercial streets, with the ground floors of machiya merchant houses opening hospitably onto the street (Staniewska 2010). The most characteristic form of this type is the aforementioned akeido shopping malls.

Another important question is also a different understanding of the value of an object of historical heritage (Polish: zabytek). The Japanese wooden temples as a rule are copies of the original, which in many cases has been
repeatedly rebuilt. Lack of resilience of the construction to earthquakes is coupled here with wood’s lack of resistance to the hot and humid climate. Therefore, the authentic nature of historical heritage is construed differently (Nishimura 2007). If a site is faithfully rebuilt from the same material that the original was made of, with the same traditional tools, and in accordance with ancient technology, it is considered authentic. This manner of construing authenticity slowly gains understanding in the world heritage conservation and preservation circles (The Nara Document on Authenticity, 1994). Until recently, the subject was dominated by the European doctrine of conservation, awarding the status of heritage only to the sites whose material substance is authentic.

The watershed of the WWII had a significant bearing on the nature and quality of the present Japanese cityscape. In its aftermath, not only Hiroshima and Nagasaki were laid in ruin.

Catastrophic destruction covered many other cities, including Tokyo and Osaka. The reconstruction of the country after the war was a great achievement of the Japanese, and a success in many aspects. In a relatively short time, the country turned into an economic power. The cities were rebuilt to the dictates of the free market, to satisfy functional needs quickly, yet without respect for the quality of urban landscape. It seems that the strangely ugly landscape of Japanese cities is the price paid for that fast development. No traditional principles of urban development, precisely linked to the traditional social hierarchy and defence needs, were respected in the reconstructed cities. Kanazawa – a city that did not suffer much during the war, and developed more slowly than others after it – preserved fragments of traditional urban planning, for which reason it is currently considered a model Japanese city (Konopacki 2010).

The history of Kyoto, which was not bombed, as Americans decided to save it as a treasure trove of Japanese culture and art – was somewhat different. It was, however, covered by the quick post-war developments and the liberal principles of managing space it involved. What fell victim to the development were the basic resources of traditional residential architecture, as protection covered only the crucial historical buildings and complexes. What also survived was the ancient street system in the centre, yet it was filled up with non-traditional developments, with varied forms juxtaposed in quite a haphazard manner.

The first occupation of the country in the history of Japan – by Americans after the WWII – brought quite surprising effects. The Japanese recognised the US as a country worth following in many fields, notably forms of architecture and transport solutions. Besides Sapporo, which was built earlier on American models, between the two world wars, it is difficult to find the models of American urbanism in other Japanese cities.

In the same, post-war time, reconstruction started in those Polish cities that were bombed to a degree similar to the Japanese ones (Warsaw, Gdańsk, Wrocław). Yet it followed entirely different principles, which with time gained the name of the Polish art of conservation, although they belonged rather not to conservation but reconstruction of historical city centres (Pawlowska, Walaszczyk 2008). Juxtaposition of this concept with the Japanese way of treating built heritage is worth a thought. The principle that guided the reconstruction of the Old City of Warsaw (Starówka) is highly similar to that put forth by the Japanese in rebuilding their heritage (the same form, the same material, the same tools). The profound difference lies in the territorial scale of the projects. In the Polish case, the method was used to recreate entire districts, while in Japan, the principal concerns individual sites and small complexes. This difference also has a great bearing on the landscape of the city: for the sense of identity, significant both for the residents and the visiting tourists. It must also be noted that the influence of the way that historical heritage is construed in the Far East on the world conservation and preservation doctrine, and expanding the notion of authenticity of an object of heritage, contributed to the acceptance of the rebuilt Warsaw Starówka as a site worthy of being inscribed onto the UNESCO List (Destroyed but not Lost, 2006).

Many Polish cities, including Kraków (highly appreciated as a historical city) did not yield to total destruction during the war; therefore they experienced no issue with reconstruction, rather that of protection and preservation.

In the following 44 years, space economy in Poland did not follow the principles of the free market, neither as extremely liberal as in Japan nor limited by the rational spatial planning as was the case in Europe. Independent of all the major and significant drawbacks of the Communist system, the spatial planning of the time provided certain advantageous conditions favouring retention of traditional architecture and protection of heritage. No areas of chaos dominant in the cityscape were developed. Urban planning doctrine respected the principle of new constructions being harmonised with their context, while heritage protection did not have to respect the right of ownership and/or the strength of economic pressure.

The economic constitution of Poland in Communist times, gave no premises for the quick economic growth of civilizational development, which had plenty of negative bearings on the development of cities (as expressed in a residential crisis, insufficient services, and the underdevelopment of public transport.) No city in Poland built an underground rail system at the time, and only now one is present in Warsaw, and this in a very limited scope. Japanese standards of the underground level of public transport and public spaces seem unachievable.

Currently, after a profound systemic transformation, Poland is experiencing a period of intensive development. New principles of spatial management are an obvious must. Nevertheless, the tendency based on gradual resignation from successive rules of spatial planning for the benefit of lively development subjected only to the market game goes certainly much too far. After years of disregarding the right of land ownership, politicians who promise that people would be able to construct anything anywhere, provided they have sufficient funds, are certain to be successful among the electorate. This leads to such
a model of spatial economy that is responsible for the chaos in Japanese cities. Nevertheless, supporters of the fully free market “game of spaces” are still not in short supply, especially in Poland. They should find the Japanese example a warning.

At the same time, it is known that Japan is currently moving back from that path, and seeking models of management, leading to order and a better quality of life in the city. In this, it is making use of planning models that have passed the test in the countries where such a spatial order was successfully achieved, for example the German ones (Urban Planning System in Japan 2007, Bach-Głowinska 2010).

Ideas of the conservation of the traditional Japanese landscape gained an increasing number of supporters among the Japanese as part of the new urban concepts. Examples of this approach are the acute controversies concerning the forms of architecture in historical cities (Baba 2010). The dispute about the new station in Kyoto ended in a victory for the supporters of the international style, while the one in Kanazawa, went the other way round – with the victorious style being the traditional one (based on torii gate model).

A perfect example of a change in attitude is the civic movement of reviving machiya merchant houses in Kyoto (Staniewska 2010). Its objective is to stop the processes of their destruction linked to the acquisition of space for the new buildings. It is significant that – when made familiar with the issues in Polish cultural heritage – the Japanese subscribing to such an attitude are most keen on the reconstruction of Warsaw’s Starówka (Pawłowska, Walaszczyk 2008), and consider it a model worth following.

Currently, both Japanese and Polish cities undergo a powerful globalising tendency, although faced with the difference in the civilisation level, the scale of the phenomenon is different. Nevertheless, the architectural style of the skyscrapers dominating today’s Warsaw skyline is comparable with similar (although taller) ones in Tokyo and Osaka, but also in New York and London. Quite ironically, the chief landmark of Warsaw’s “City” is still the
designed by Stalin for the “brotherly” country – Poland. The socialist silhouette of the Palace of Culture and Science, built on the principles of socialist realism.

3. Conclusion

A comparison of cityscapes of Japan and Poland provokes thoughts about what should be recognised universal in culture and civilisation, and what was and is local. Going further: what does the future hold in store for us? Is there an opportunity for variety to survive, or will the tendency to unify triumph? A total isolation of the country from foreign influence seems impossible in our times. Even Japan, which followed the principle for many centuries, does something quite opposite today: it openly boasts following Western solutions (Filipowicz, 2004). In this context, the fact that these were the American admirers of everything Japanese gave rise to the aforementioned movement of protection of the machiya houses; this emerges as a peculiar symbol. They were the ones who perceived exaggeration in the Japanese tendencies to Americanise.

Similarly, the struggle between the supporters of everything Western and defenders of the Polish tradition continues in Poland. The discussion will probably never calm down, as recognising the absolute rights of one party is impossible. It is so as there must be a balance maintained between following foreign models and guarding one’s own uniqueness. This is one of the most important cultural aspects of what we call sustainable development.

Filipowicz, 2004. In this context, referring to them as “Western” carries a certain paradox.

realist character of its form, applied also in other countries, was a particular mark of the extent of Soviet influence. Although it long remained unaccepted by Poles, it provides a dominant in Warsaw’s skyline.  

The Japanese apply the term “Western style” to anything that follows European and/or American models. Due to their fascination with the United States, these are often American models, or European ones acquired via the US. In this context, referring to them as “Western” carries a certain paradox.
References
