TERRITORY OF RESEARCH ON SETTLEMENTS AND ENVIRONMENT
INTERNATIONAL JOURNAL OF URBAN PLANNING
34

Designing inclusive urban spaces 2

Federico II University Press
UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II
CENTRO INTERDIPARTIMENTALE L.U.P.T.
fedOA Press
Vol. 18 n. 1 (JUN. 2025)
e-ISSN 2281-4574

TERRITORIO DELLA RICERCA SU INSEDIAMENTI E AMBIENTE

TRIA TERRITORY OF RESEARCH ON SETTLEMENTS AND ENVIRONMENT
INTERNATIONAL JOURNAL OF URBAN PLANNING

WoS (Web of Science) indexed journal *http://www.tria.unina.it*

Responsible Editor in chief: Mario Coletta | electronic ISSN 2281-4574 | © 2008 | Registration: Cancelleria del Tribunale di Napoli, n° 46, 08/05/2008 | On line journal edited by Open Journal System and published by FedOA (Federico II Open Access) of the Federico II University of Naples

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Federico II University Press
fedOA Press

TRIA 34 (1/2025) 219-240/ e-ISSN 2281-4574
DOI 10.6093/2281-4574/12571
www.tria.unina.it - Web of Science (WoS) indexed journal

abstract

Structural Examining of Gentrification through Brownfields Regeneration in Downtown Areas: the Case Study of Old Transportation Sites in Tabriz City

Akbar Hamidi, Martina Bosone, Ana Peric

Abstract

The regeneration of brownfields in inner cities is a critical urban policy tool but often raises complex debates about gentrification, particularly in transforming downtown areas. This study investigates the drivers and key actors shaping gentrification dynamics associated with the redevelopment of former transportation sites in the central district of Tabriz city, Iran. Focusing on the Aysan Project - a flagship redevelopment plan transforming a disused inter-city transport hub into a 33-storey multifunctional complex—the research explores how regeneration processes may trigger socio-spatial changes and displacement risks. Methodologically, the study combines a Delphi survey of 19 local experts with structural analysis techniques (Micmac program and Mactor software) to identify and map key multidimensional variables and stakeholders. Results reveal that dominant forces - such as state-led investments, policy-making, and private-sector involvement - are central to regeneration dynamics, while community actors remain marginal. Approximately thirty institutions influence brownfield redevelopment, with semi-state organizations and public authorities emerging as the most powerful actors. The findings highlight a strong convergence among key actors around objectives like public-private partnerships, real estate value enhancement, and rent-oriented exploitation of urban spaces, while consensus on mitigating spatial segregation remains limited. From a broader perspective, brownfield gentrification in downtown Tabriz appears tightly linked to the political economy and state-led urban strategies

Keywords:
Gentrification, urban regeneration, brownfields, multidimensional evaluation, multi-stakeholder approach

Analisi strutturale della gentrificazione attraverso la rigenerazione delle aree dismesse nei centri urbani: il caso degli ex siti di trasporto nella città di Tabriz

La rigenerazione delle aree industriali dismesse nei centri urbani è uno strumento fondamentale della politica urbana, ma solleva spesso complesse discussioni sul fenomeno della gentrificazione, soprattutto nelle aree centrali in trasformazione. Questo studio analizza i fattori trainanti e gli attori chiave che modellano le dinamiche di gentrificazione associate alla riqualificazione di ex siti di trasporto nel distretto centrale della città di Tabriz, in Iran. Concentrandosi sull'Aysan Project - un piano fondamentale per la trasformazione di un ex snodo di trasporto interurbano in un complesso multifunzionale di 33 piani - la ricerca esplora come i processi di rigenerazione possano innescare cambiamenti socio-spaziali e rischi di espulsione degli abitanti.

Dal punto di vista metodologico, lo studio combina un'indagine Delphi con 19 esperti locali e tecniche di analisi strutturale (programma Micmac e software Mactor) per identificare e mappare le variabili chiave multidimensionali e gli attori più influenti. I risultati rivelano che le forze dominanti - come gli investimenti statali, la pianificazione politica e la partecipazione del settore privato - sono centrali nelle dinamiche di rigenerazione, mentre gli attori comunitari restano marginali. Circa trenta istituzioni influenzano la riqualificazione delle aree dismesse, con le organizzazioni semi-statali e le autorità pubbliche che emergono come attori più potenti.

I risultati evidenziano una forte convergenza tra gli attori principali su obiettivi come le partnership pubblico-private, l'aumento del valore immobiliare e lo sfruttamento redditizio degli spazi urbani, mentre il consenso sulle strategie di mitigazione della segregazione spaziale rimane limitato. In una prospettiva più ampia, la gentrificazione delle aree dismesse nel centro di Tabriz appare strettamente legata all'economia politica e alle strategie urbane guidate dallo Stato.

Parole Chiave:

Gentrificazione, Rigenerazione urbana, Aree dismesse, Valutazione multi-dimensionale, Approccio multi-stakeholder

Structural Examining of Gentrification through Brownfields Regeneration in Downtown Areas: the Case Study of Old Transportation Sites in Tabriz City

Akbar Hamidi, Martina Bosone, Ana Peric

1. Introduction

Most of the central parts of major cities, which generally have historical-cultural value, have been exposed to various regenerative interventions. Given this point, there is intense competition between multiple stakeholders and actors include private developers, civil sector, and municipal authorities to control and occupy the profitable urban spaces in downtowns. More broadly, national and local actors have tended to focus on market-driven regeneration rather than community-led initiatives (Holmes, 2024; Perić, 2019; Gray & Mooney; 2011). In this sense, community orientations are crucial manifestations of urban regeneration which lead to limit and non-gentrification, especially in brownfields sites (Earley, 2025; Toura, 2024). Conversely, market and government-promoted brownfield regeneration foster possibilities of gentrification development (Risager, 2022; Wernstedt & Hanson, 2009), and intensify its injustice consequences (Holmes, 2024). These arguments elucidate that many driving forces are active in brownfield regeneration (henceforth, BR) and they often prefer build luxurious and flagship projects instead of former affordable land uses. By focusing on these issues, the current research examines the regeneration milestones and key actors of the old transport sites as a typical brownfield in downtown Tabriz city.

There has been plethora of prior study on gentrification and regeneration relationship (Earley, 2025; Holmes, 2024; Butler, 2009; Porter & Shaw, 2009) whilst, there is nascent literature considering the role of brownfield regeneration in gentrification process. In this regard, Butler (2009) stated that gentrification is a sibling for urban regeneration and both of them are universal concepts. Similarly, regeneration is a euphemism for justifying gentrification (Porter & Shaw, 2009). Most common definition of gentrification has raised by Hackworth (2002, p. 815): “the production of urban space for progressively more affluent users”. All in all, gentrification has long been a staple of urban regeneration policies and threat of displacement is an inseparable consequence of this phenomenon (Holmes, 2024). Turning now to BR outline, urban regeneration projects are chiefly considered a tool for reforming the inner cities (Fisher, 2011; Lee et al., 2017; Lehmann, 2018). More precisely, the functional transformation in the vulnerable neighborhoods of the central fabrics is intensified through gentrification (Ozturk, 2020). Nevertheless, brownfields are potential resources for the implementation of urban redevelopment projects, and in advanced economies, the regeneration of unused and abandoned sites is considered an effecti-

ve strategy in urban planning (Ahmad et al., 2019). As in the initial stages, urban regeneration was developed based on revitalization of brownfields in areas with suitable public transportation facilities (Lehmann, 2018).

Brownfields including abandoned railway spaces and terminals in city centers, contain a wide range of potential economic and development capacities, which causes the involvement of several stakeholders in the acquisition, demolition, and renovation of these lands. Besides, BR within downtown areas is a means for reusing former derelict sites as well as shaping public spaces. This suggests that potential brownfields could be essential factors for successful regeneration (Frantál et al., 2015; Zheng et al., 2014), but under the various influential incentives, regeneration of these lands might bring many intricate challenges. It is necessary to assess brownfields as a fundamental prerequisite for sustainable urban regeneration (Liu et al., 2019).

Brownfields mostly are the direct output of mutual relations between places, and social and ecological processes (Bjelland, 2002). First of all, due to environmental concerns, the BR became the main tool in urban land policies (De Sousa et al., 2009). Even so, BR compensates for the ecological pressures and resolves the obvious contradiction between unused land and sprawl growth (Kang & Hua, 2007), but also regeneration projects often threaten the diversity and social mixing in the neighborhoods and old fabrics (Lehmann, 2018). However, the BR is considered a catalyst for social and spatial transformation through economic mobilization, healthcare protection, and housing renovation (Yeol et al., 2016; Greenberg et al., 2001). On the other hand, social justice is closely related to the phenomenon of brownfield gentrification (henceforth, BG) (Gegic & Husukic, 2017). Thus, BR might extend the influx of higher-income residents and the displacement of low-income residents (Fisher, 2011), which leads to forced displacement and social inequity in the surrounding areas (Gegic & Husukic, 2017). Briefly put, urban regeneration may support the interests of influential urban groups to displace the working class and obtain surplus through land use changes (Camerin, 2019). However, urban regeneration able to mitigate gentrification risk and benefit to community stakeholders (Earley, 2025).

Another line of thought on BR, the effect of tourist quantities, and the booming of real estate value on the resident's quality of life and affordable housing have been emphasized (Lestegás, 2019). Therefore, in urban regeneration policy, the issue of gentrification threats is vitally important (Lehmann, 2018). Correspondingly, social capital can disintegrate due to the lack of systematic urban investment and gentrification in the shadow of regeneration. Such adverse potentials can be associated with lower levels of sustainability and spatial justice (Stanley, 2009). However, gentrification does not occur for a single reason and cannot be explained by capital flows or government support alone.

With the previous in mind, the undertaking study aims to measure the drivers of regeneration and identify the key actors of the old terminal site of Tabriz city as a disused inter-city public transport hub, which according to the planning, will be used as a 33-story concrete skyscraper. It can be said that one of the biggest plans

for the redevelopment of transportation brownfields is in the central districts of Iranian cities (www.m8.tabriz.ir). At the same time, a collection of rundown parcels and unstable buildings can be seen in the functional radius and vicinity of this regeneration flagship project (Hamidi et al., 2024). Hence, the main questions addressed in this paper are: a) what are the most significant factors for gentrifying the study area brownfields? b) which actors and forces play a major role in these interventions? And c) what are the superior goals of the actors involved in BR?

This research is divided into five main sections. Section 2 addresses conceptual overview; Section 3 includes the research method and study area features; Section 4 describes findings; Section 5 elaborates discussion; and the last part focuses on conclusion.

2. Research conceptual overview: gentrification-oriented of brownfields regeneration

In urban regeneration literature, underused, abandoned, partially occupied, and often contaminated lands (Alker et al., 2000) called brownfields, are creating intense challenges for urban management (Frantal et al., 2015). In the same way, deteriorated sites and buildings are often neither visually attractive nor aesthetically valuable, which are considered multidimensional obstacles to the social, economic, and environmental development of neighborhood (Turecková et al., 2022). Additionally, many existing brownfields are remnants of former industrial, agricultural, military, transportation, religious and social activities that have recently lost economic importance (Krzysztofik et al., 2019; Turecková et al., 2019). After successful regeneration, these areas might become residential neighborhoods, retail centers, office blocks, industrial-style facilities, parks and green spaces, studios, recreational areas, etc. That is to say, the strategy of BR, which is the idea of urban land recycling and recovery, can bring previously developed barren lands back into the urban land use circulation system. In brief, BR is a vital tool for sustainable urbanization (Wei et al., 2025). Therefore, the redevelopment of these lands is a win-win strategy for both the economy and the environment and can improve the quality of the environment and mitigation of urban sprawl (Kang & Hua, 2007). The typical brownfields are divided into five main categories which include industrial, mining, military, transportation, and landfill (Wei et al., 2025).

In all, the UR toolkit involve a wide variety of stakeholders, combination of policies, regulations, public participation and different research issues (Perić, 2016; Krejčı et al., 2016; Wei et al., 2025). Likewise, the BR plays a crucial role in rejuvenating urban areas by fostering population growth and attracting fresh investments (Raco, 2003). Thus, to improve the residents' welfare in vulnerable neighborhoods and worn-out fabrics, more systematic support for the BR is undeniable (Turecková et al., 2022). In

contrast, BR will be a highly effective way to increase the value of adjacent properties (De Sousa et al., 2009), state-driven spatial segregation, and state-led gentrification (Lees & Ferreri, 2016). Correspondingly, it will lead to slum clearance (Mitchell & Heynen, 2009), and build up rentier megamalls (Rastad Borojni et al., 2022).

The simplest definition of gentrification is "the process by which working-class neighborhoods are revitalized by middle-class homebuyers, landlords, and professional developers" (Smith, 1982). However, since the beginning of the 20th century, rapid expansion of gentrification has taken place on a global scale (Smith, 2002; Slater 2009; Lees, 2012). So far, various types of this approach such as residential, commercial, and recently industrial gentrification have been proposed in urban studies (Pratt, 2009). Dominant accounts of gentrification refer to a combination of the "rental gap" theory (Smith, 1996), "cultural specificity" (Lees, 2003), tenancy patterns, and the period of built-up environment. Whereby affluent beneficiaries minimize their investment risks by delaying renovation as much as possible, and then capture the growing market (Pratt, 2009). More precisely, gentrification occurs when the rent gap is widely sufficient to make it profitable for investors to return to the central districts and create urban regeneration (Smith, 1996; Slater, 2017).

In some way, under property-led gentrification, the prevalent principle of "buy cheap and sell expensive" assets (Pratt, 2009) is implemented. Consequently, gentrification takes place in former working-class neighborhoods and cheap land. This dynamism may cause significant residential and employment displacement following the increase in rents and housing costs (Brenner & Keil, 2017). Another line of thought on BR demonstrates that the commercialization of neighborhoods is accelerated through speculative real estate factors (Kim, 2016). Thus, commercial gentrification often occurs in the abandoned land uses of old urban areas. In brief, the gentrification process does not begin with the migration of people, but it is formed by the capital flows toward the neighborhood, and these trends determine where and how the investment and displacement of the population takes place (Smith, 1979). In the 1970s and 1980s, there were intense political conflicts over gentrification displacement. For instance, Hartman (1974), focused on the resistance of disadvantaged groups to post-war urban revitalization, particularly the state-led gentrification of social housing (Lees & Ferreri, 2016).

Ultimately, the goals of BR with focusing on gentrification could divided from the establishment of new centers (for business) to the protection, reuse of former industrial areas, and cleaning of slums or rundown neighborhoods. Furthermore, the effects of urban regeneration are deeply varied and have different consequences for social groups. Similarly, a BR project may boost a neighborhood's economy through commercial activity and increased property values for the benefit of owners, while the poor groups may be subject to voluntary displacement (due to rising rents) or forced displacement (capital accumulation). More specifically, the large-scale BR projects have become routine features of urban regeneration policies and these sort of transformations able to push out longtime residents through gentrification (Wernstedt &

Hanson, 2009). By concentrating on discussed points, we have drawn the conceptual framework of the research (Fig. 1).

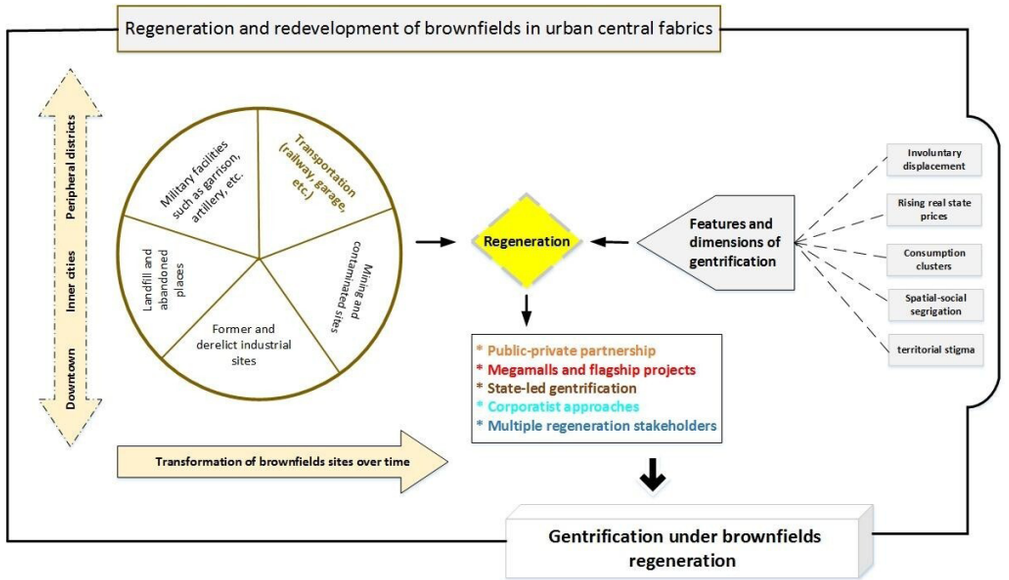


Fig. 1 - Conceptual framework of the research. Source: the Authors

In this framework, the relation between gentrification approaches, variables, regeneration components, and actors, as well as types of brownfields, have been specified holistically. In this view, brownfield regeneration and gentrification inextricably linked to vast forces involved in derelict districts. Furthermore, private sector and state forces are primarily persuading commodification and profitability in this context.

3. Research method

3.1 Study area

Tabriz is the capital city of East Azarbaijan province, located in the northwest of Iran. The geographical coordinates of Tabriz city is 46°18' east longitude and 38°,04' north latitude. The population of this city, according to last national census, was equal to 1,508,993 people. Moreover, Tabriz is the sixth largest city in Iran (Statistics Center of Iran, 2020). As a second-tier city with a significant industrial, cultural and historic heritage, it has been faced with completely deteriorated fabrics and regeneration actions (see Hamidi et al., 2024). Specifically, there are four major regeneration projects in the central district of Tabriz city such as the Atiq, Citadel, Miyarmiyar and Aysan projects which have been implemented, or are under construction. In view of this, redevelopment of the old transportation center, such as former bus terminal, (Aysan project) is considered the flagship urban brownfield regeneration in downtown Tabriz city and located between Golestan community garden and Tabriz Grand Bazaar (as a world legacy), being close to other regeneration schemes. Hence, as a regeneration project in the

Inner city, redevelopment of these brownfields was recognized as a main alternative for traditional business centers and advanced services that are looking for profitable spaces in the urban cores (Fig.2). This transport center was established in the early 1970s to manage daily inter-cities travels.

Then, this hub has been subjected to mass renewal interventions since the 2000s, which lead to considerable land use transformation, particularly regarding affordable housing properties, hand crafts enterprises and retail-based activities.

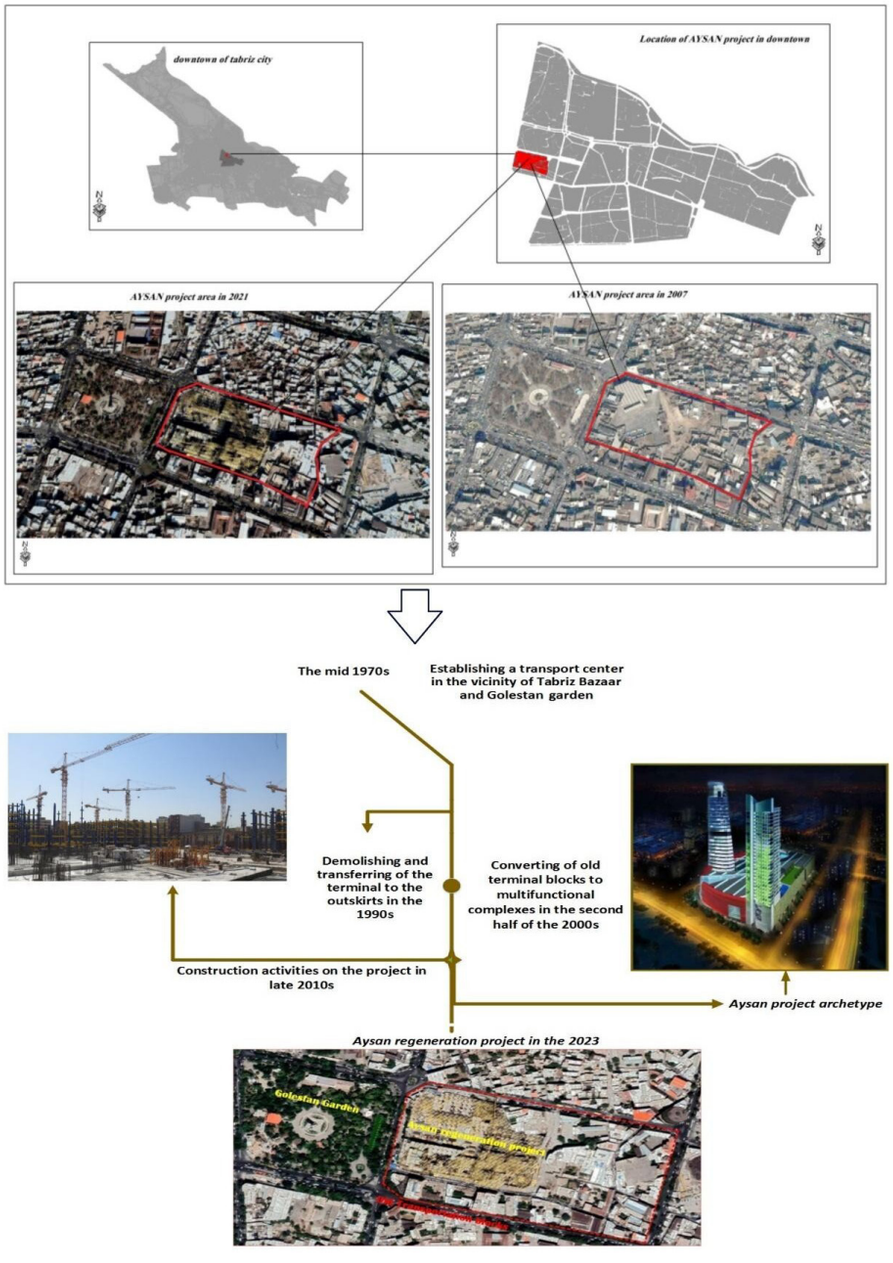


Fig. 2 - Location and key regeneration milestones of Aysan project. Source: the authors.

Consequently, a growing disparity in socioeconomic indicators between neighborhoods around this regeneration project (e.g., Gajil and Shanaz) has emerged during the 2010s. Thus, the primitive signs of gentrification are observing in surroundings (Hamidi, 2023). Notably, over the past two decades, the derelict transportation hub has undergone massive regeneration. More recently, community stakeholders launched a campaign against authorities and developers in order to save their investments and completion of the project. In addition, private and state sectors are in charge of project financing in all regeneration phases (demolition-construction-completion).

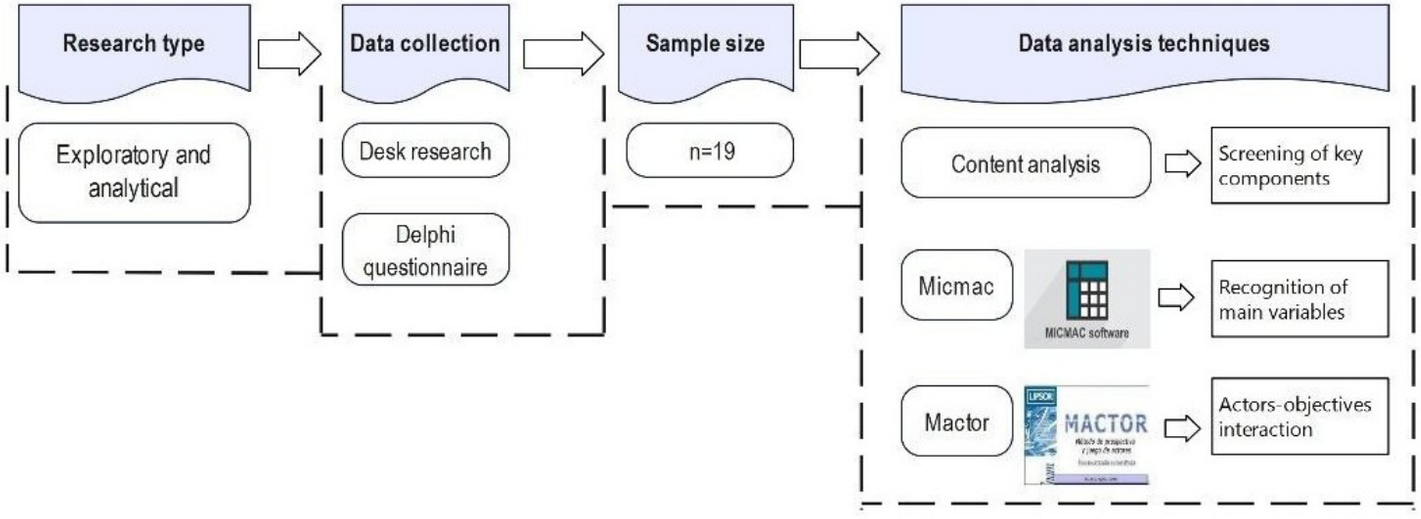
Generally speaking, the Aysan project is being built in an area of 450,000 m2 in the central district of the city to create a commercial-entertainment-office-service space in a particular way. In other words, this macro multi-functional complex with 1180 commercial units will be the largest shopping center in Iran. To elaborate, the 1st to 4th floors are allocated to commercial and retail uses, the 4th floor includes restaurants, a water park, and cultural stores, afterwards, the 25th to 27th floors are hotels and residential services. Then, the last floor will be a leisure unit and other floors will be office facilities. Based on underpin planning, the old transport core of Tabriz city will be converted into a 33-story concrete skyscraper (under construction), among the types of uses mentioned for it, only the number of commercial units is 1180. If each unit has only 10 visitors per day, at least 11,000 daily trips will be imposed by its business units alone in this busy district (http://tadbirsahel.com). Fig. (2) represents the process of demolishing and renovating of study area.

3.2. Data collection

The current study has an exploratory and analytical approach: it is focused on identifying which actors and catalyzers have a significant effect on the brownfields gentrification in the central districts of Tabriz cities. Initially, by implementing a holistic survey of both the brownfield regeneration and gentrification, then, conducting a content analysis we defined key components related to stakeholders and brownfields issues. The second stage of the research methodology process included the document collection and review of brownfields regeneration and gentrification sources in study area (formal statistics, technical reports, websites) to extract pertinent data. In the same way, the official government reports, statistics and censuses, real estate notebooks, and neighborhood studies documents of Tabriz city, especially its central fabrics, were reviewed. Resulting from the combination of these phases, we outlined a general framework and background discussion about the changes that have emerged in the downtown area and the prevailing actors and perspectives of regeneration policies that shaped the features and forms of brownfields transformation. Next, the Delphi questionnaire technique (Zhao et al., 2023) was used as another data collection tool. Afterward, research questionnaires were conducted in the second half of 2022 with 19 respondents (experts and specialists) who were directly or indirectly involved and affected by the "Aysan" project. The sampling

method was purposeful and snowballed, which was done based on respondents' availability and the introduction of other experts by them. The content of the questionnaire was discussed to emphasize the challenges that had occurred up to that time. Complementary to this, the main emphasis and the content of the questionnaire was on the driving forces of gentrification caused by regeneration, which was raised with respondents for taking and receiving constructive comments. Finally, the key actors and priority targets were classified according to the matrix of basic variables (Fig.3).

Fig.3 - Matrix sum and Variables Stability. Source: the authors.



3.2. Data analysis specification

Data processing was done through two prevalent futuristic techniques which are largely used to illustrate structural connection and network links of complex issues: Micmac (Matrix of cross-impact multiplications applied to a classification) and Mactor (Matrix of Alliances and Conflicts consists of Tactics, Objectives, and Recommendations). Both of these techniques consist of several interrelated steps to estimate input data. In many instances, scholars have identified these methods as a means to draw attainable, feasible and preferable scenarios in urban issues (Darmastuti et al., 2022). For doing this, creating a relevant cross-impact matrix is considered the first and foremost step. Furthermore, the divergence and convergence matrix are key phase which are done in different way. As we shall see, both of these technical programs adopting a classification pattern to calculate components rank and weight via binary comparison but variables rating and rely on patially different spectrum. As we shall see, both of these technical programs adopt a classification pattern to calculate components rank and weight via binary comparison but score rating and variable arrangement partially rely on a different spectrum (http://en.laprospective.fr/). In this view, the Micmac program was used to determine the impact and relationships of each gentrification variables in downtown Tabriz. Scoring in this method

is between 0 and 3; Thus, "0" means the least influence, and "3" means the most influence and role in the matrix of mutual influences (www.micmacprospective.com).

As well as, to recognize the key players and main goals of BR in the study area, Mctor program (Ahmed & Abdelkadir, 2009) as an appropriate foresight research type was applied. There are 5 spectrums in the actor-actor matrix (between 0 and 4): the score "0" means that two actors do not influence each other or the influence of one on the other is small. Next, a score of "1" indicates the ability of one actor to interfere even a little with another. In the third case (score 2), an actor may threaten or compromise the policies of another actor. The number "3" means that one actor can threaten the mission or strategies of another actor. As a result, a score of "4" evokes the most severe possible state, that is, an actor may endanger the existence of another actor (www.mactorprospective.com). In the actor-goals matrix, scoring is done between -4 and +4 In short, the higher assigned weight means that the target has a high priority for the actor and vice versa. Besides, the negative score indicates the actor's opposition to the target (Godet, 2006; Godet & Durance, 2011).

4. Findings

4.1 Key multidimensional variables of BR in downtown Tabriz city

This section provides detailed findings about the key multidimensional variables of brownfields gentrification in downtown Tabriz city, which act as the main driving forces, and were examined and analyzed through the matrix of mutual effects. Initially, the number of variables was estimated to be 21 based on the literature and research context. Then, the data related to each of the variables was entered into the Micmac software. Table (1) indicates descriptive information of the variables.

Tab 1 - Matrix sum and Variables Stability. Source: the authors.

		of rows	columns
1	Private sector investment	30	22
2	State-led planning and policy-making	40	19
3	The pressure of local elites	19	20
4	Conflict between regeneration stakeholders	23	24
5	Legalizing space commodification	19	22
6	Urban growth coalitions	20	22
7	Space production for affluent users	20	18
8	Land value and rent gap	21	25
9	Speculative investment in real estate	22	22
10	Cultural industry bourgeoisie	24	22
11	Migration of native residents	11	25
12	Social capital decline	25	28
13	Economic and housing mobilization	20	25
14	Improvement of urban infrastructure	16	25
15	Inefficient planning regulations	32	22
16	Sprawl growth adjustment	20	27
17	Supplying land shortage	21	23
18	Pollution of abandoned sites	24	26
19	Expanding of crime types	16	23
20	Cost and risk management	44	24
21	Temporary use	13	16
	Totals	**480**	**480**
	Iteration	Influence	Dependence
	1	99%	93%

The highly critical stage of the mutual effects matrix depends on the estimation of the distribution of the key multidimensional variables in the quadrant graph. In quarter I, the variable investment and government policy is considered the most influential case. Primary results highlight that the variables of inefficient planning rules and private sector investment have an intermediate state; not only seem to be an influential but also they can be called bilateral variables. By concentrating on quarter II, risk and costs management has a complete bimodal state; which means that it has both an influential and dependent role. Then, in the third segment, dependent and influencing variables are placed, which constitute the majority of the discussed variables. Therefore, quarter III has shown that the multitude of factors that impact BR are: social capital decline, pollution of brownfield sites, conflict between regeneration

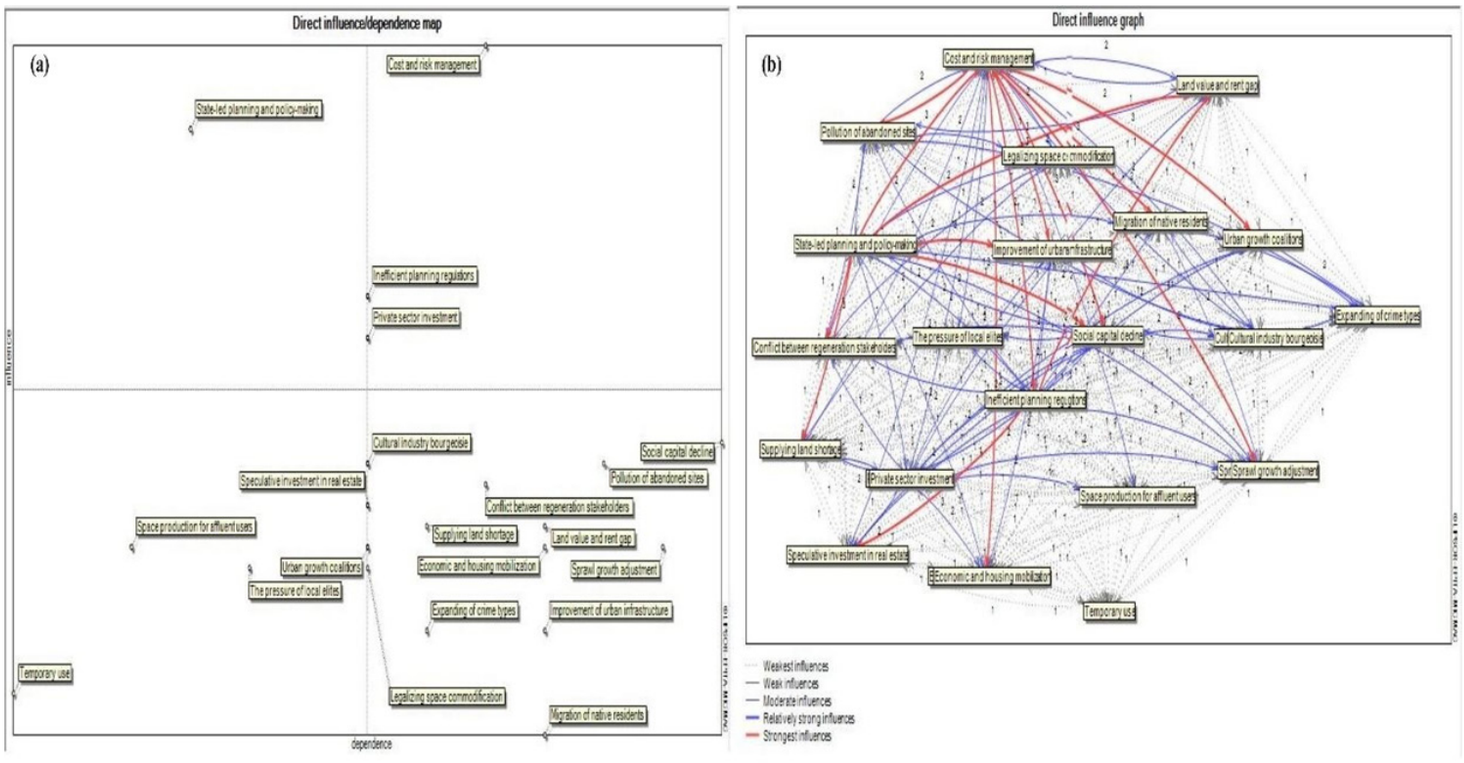


Fig.4 - Direct influence and dependence between variables: a) quadrant map; b) network graph.divergence between actors.

stakeholders, increase in land value and rent gap in deteriorated areas, lack of land supply, sprawl growth, quality of infrastructure in target areas, expansion of urban crime types, mobilizing of housing and migration of native residents from the central context. Lastly, in quarter IV, some autonomous or indifferent variables have been distributed, which include temporary uses, creating space for the affluent, and pressure on local elites. Regarding this, some variables such as cultural industry bourgeoisie, urban growth coalitions, speculative investment in real estate, and justifying of space commodification overlap in distribution and placement between the third and fourth part of the quadrant map (Fig. 4-a).

To be more precise, the scope and degree of interaction between 21 variables are shown in a comprehensive network (Fig. 4-b). In particular, the risk and cost management, state-driven investment and policies, rent gap, and private sector activities have been recognized to be more powerful and effective drivers in the brownfields gentrification of the study area. Afterward, variables such as inefficient planning mechanisms, levels of social capital, and the bourgeoisie of cultural industries visualize influential roles in the mentioned process. On the contrary, temporary uses and space production for the upper classes represent a minor and partial role in these trends.

4.2 Key players and objectives of BR in the central district of Tabriz city

This part has revealed the key players and objectives of the brownfield regeneration around the old transport zone of Tabriz city with the gentrification approach. First of

all, it should be said that six main actors can be identified in the process of BR in the study area: 1) urban governance institutions (city council and municipality), 2) private sector 3) public sector (state), 4) semi-state foundations, 5) civil institutions, 6) Residents (owners, tenants and other users). To begin with, the matrix of direct and indirect influences (MDII) is explained. Notably, two major indicators are taken into account in this matrix: a) Li indicates the degree of direct and indirect influence; b) Di shows the level of direct and indirect dependency. As the table in Fig.5 demonstrates, the quasi-state cooperatives (45 points), and the public sector (41 points) were the most effective actor.

MDII	Urban gov	Private	State	Semi-state	Civil	Residents	Li
Urban gov	6	6	6	6	7	7	32
Private	7	7	7	6	9	9	38
State	7	7	7	6	10	11	41
Semi-state	8	9	7	6	11	10	45
Civil	4	4	4	4	5	6	22
Residents	1	1	1	1	1	1	5
Di	27	27	25	23	38	43	183

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NS	Urban gov	Private	State	Semi-state	Civil	Residents	Sum
Urban gov		-1	-1	-2	3	6	5
Private	1		0	-3	5	8	11
State	1	0		-1	6	10	16
Semi-state	2	3	1		7	9	22
Civil	-3	-5	-6	-7		5	-16
Residents	-6	-8	-10	-9	-5		-38

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Fig.5 - Matrix of direct and indirect influences (MDII) and Net scale of influences (NS).

On the other hand, residents and owners were recognized as the least effective actors with 5 points. Regarding the effectiveness coefficient, the category of residents and civil organizations with 43, and 38 scores respectively show the highest level of dependency. Instead, the semi-governmental cooperatives are ranked last with 23 points in this context.

As mentioned previously, there are four segments in terms of influential and dependency figures among identified actors: the first quarter belongs to dominant or superior actors, which in this research includes quasi-governmental cooperatives, the public sector (state), the private sector, and urban governance institutions. The second quarter consists of twofold actors, even so, no actors are seen in this area. Then, the third quarter includes defeated and dependent actors, which are civil organizations and residents and owners in this category. Finally, the fourth quarter includes independent actors, and there is no remarkable activism in this arena (Fig. 6-a). Another important category to the key players and the goals of the brownfields gentrification is the degree of "convergence between actors". As Fig. (6-b) illustrates, the most convergence is observed between the three actors of the private sector, public sector and urban governance institutions, including municipality and city council. There is the least convergence between the actors related to the component of residents and quasi-state cooperatives with other actors. The objectives of research about the actors and according to key multidimensional variables are stressed: promotion of public-private partnership; rentier utilizing of urban fabrics; increasing the value of real estate; creating and intensifying spatial segregation; prioritizing the downtown specialization; enhance community development potential; eventually, reuse and adjustment of derelict brownfields. To a large extent, the intensification of socio-spatial segregation has been relatively agreed upon by most of the actors. As actors-goals relationship map depicts position of actors

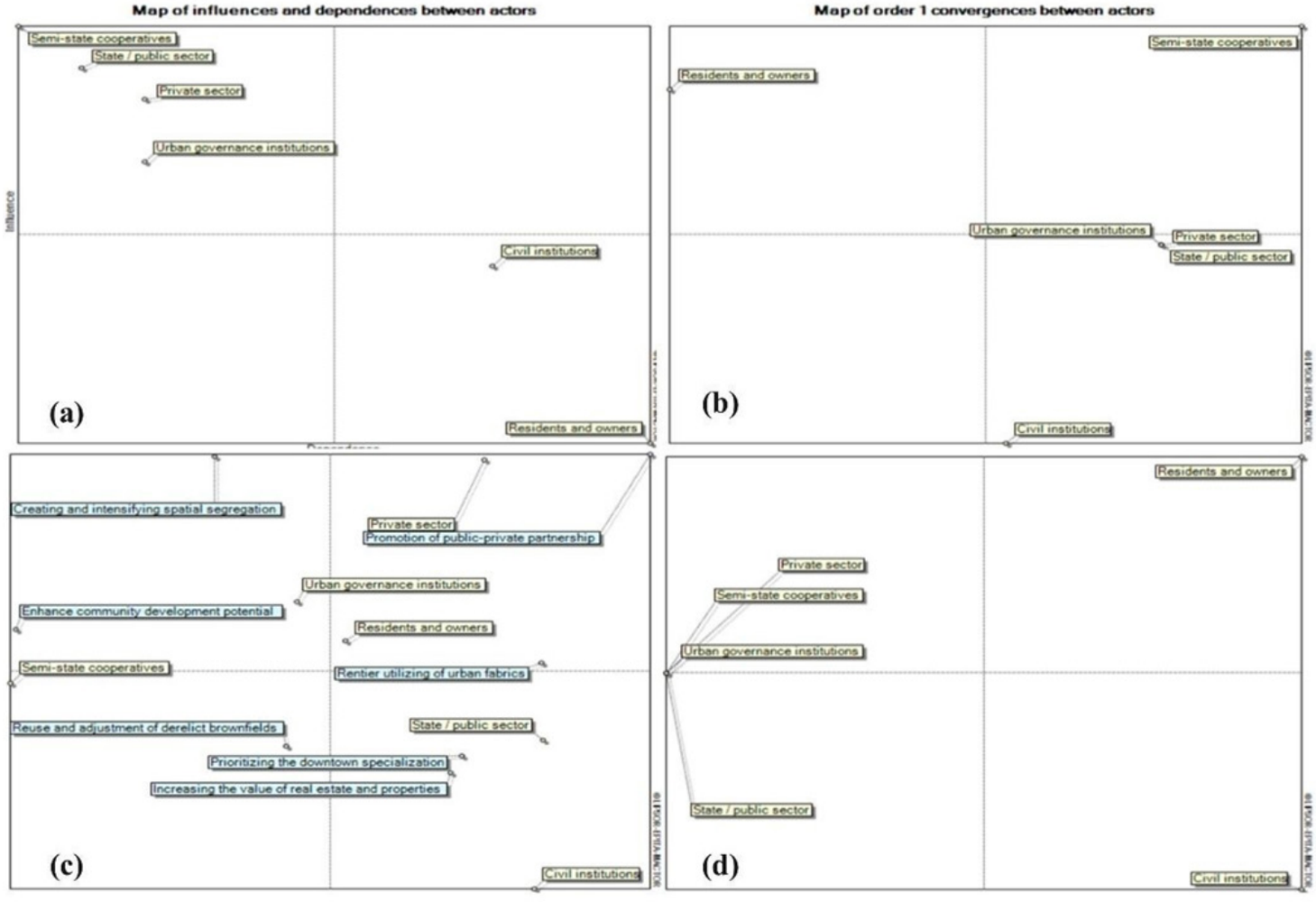

Fig. 6 - Structural network map: a) influences and dependences between actors; b) convergence between actors; c) actor's/objectives relationship; d) divergence between actors.

about the goals. Based on Figure (6-c), the goals of intensifying spatial separation and promoting local development potential are less distant from the component of local governance institutions and, therefore more affected by these actors.

Moreover, the issue of divergence between key players about goals is also considerable (Fig. 6-d). The spatial distribution of private sector actors, quasi cooperatives and urban governance has occurred in the same segment. Whereas, the actors of civil institutions and citizens demonstrate the greatest interval and divergence with other actors.

Besides, in figure (7-a), the histogram of maximum amount of direct and indirect influence matrix between actors or players is depicted. As in the previous graphs of current section, quasi-state cooperatives have a value equal to 1.9, which is at the top of the brownfields gentrification organizer in downtown Tabriz. Then, the public sector with a score of (1.8) can be seen in the graph that these two actors have acted very powerfully alongside each other and in parallel and seem undisputed. Afterwards, the private sector with a coefficient of 1, urban governing bodies (0.9), civil institutions (0.3) and residents and owners (0.2) were placed respectively. Following this, in Figure (7-b),

the yellow color indicates the actor's agreement and blue highlight means the actor's opposition to targeted goals. Notably, the category of rentier utilizing urban fabrics has received more attention from actors (score. 18). To explain more simply the level of opposition and agreement of the actors to each of the goals, the "scale and measurement of competitiveness" tool can be used (Fig. 7-c). For instance, applying this tool for the objective of "promoting public-private partnership" indicates that the whole actors are agreement with this goal, and no activist has had a negative reaction to the promotion of mixed partnership in regeneration of old transport brownfields (currently, "Aysan" project).

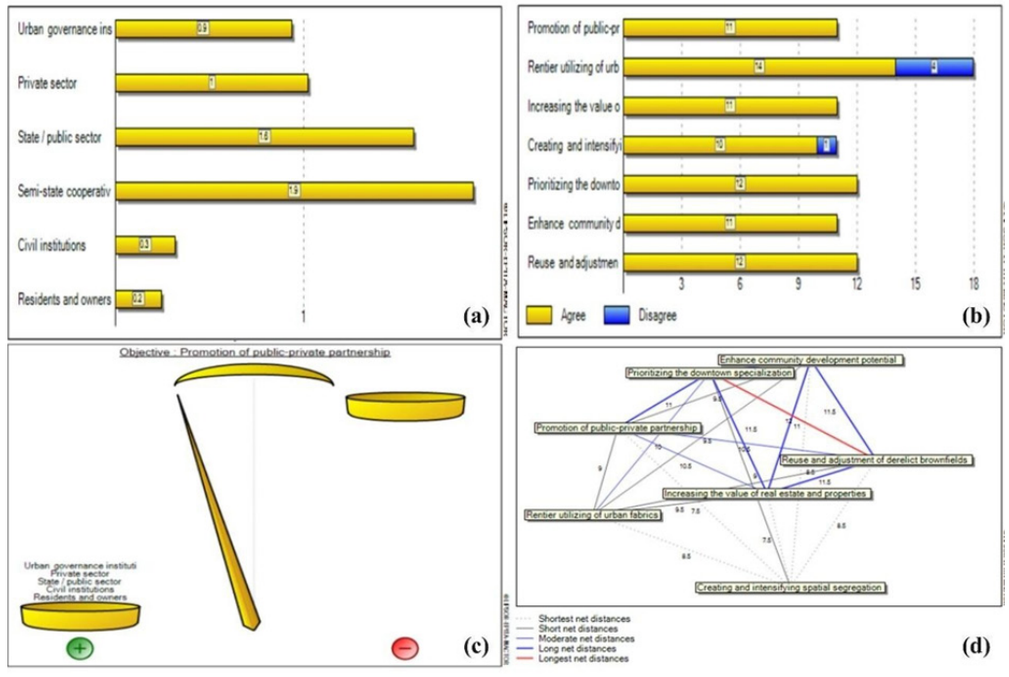

Fig. 7 - Weighted graphs; a) histogram of MMDII's competitiveness; b) histogram of actor's implication towards its objectives 2MAO; c) MDII competitiveness scale; d) net distances between objectives.

5. Discussion

Above all, the relationship between key players of brownfields gentrification and actor's opposition to each of the goals is strictly complicated. Indeed, different views are relatively seen behind key factors/actors of BR in the study area. For instance, civil groups have represented strong disagreement with space commodification goals as a tangible pattern of BG in the study area. These approaches and influential actors make brownfields regeneration benefits become more unaffordable, inaccessible and exclusive for low-income stakeholders and other disadvantaged social groups (e.g., immigrants, working glass). Similarly, this idea has been extended by Camerin (2019), who implied to utilization of urban spaces for production of surplus and displacement of

working class under revitalization projects. As discussed earlier, the issue of reusing derelict brownfields besides the specialization of central cores has also appeared most invariably among the actors. In other words, merely intensifying spatial separation and rentier exploitation of the urban space are challenged by the actors. At the same time, the lowest weighted value is assigned to the same goal (spatial separation). However, another angle on this debate in prior literature depicts that resistance movements to injustice objectives of brownfields gentrification have emerged in deprived neighborhoods (Uysal, 2012; Lees & Ferreri, 2016).Moreover, the promotion of public-private partnerships is strongly emphasized by citizen and the private sector. The findings demonstrate the complexities of relationships between key actors in the gentrification process. In this scenario, stakeholders chiefly indicate more inequitable intervention power in the BR process. In addition, the goals that are placed in the radius of direct and indirect influence of public sector are: a) rentier exploitation of urban context; b) increasing the value of real estate, and c) prioritizing the specialization of downtown. In the same way, Tan & Altrock (2016) stated that real estate-oriented redevelopment strategies are widely adopted in the inner contexts and brownfields by private and public sector due to their superior location and high commercial value. Whitman also (2006), stated that achieving maximum investment profits is followed by the beneficiaries, particularly the private sector. Needless to say that the adjustment of abandoned sites has been considered a crucial goal among most of the involved actors. On the whole, there is a significant convergence between state-private sector-local governance and, they have completely formed a triangle of key preeminent forces for the BG in study area (Fig. 5). As Perić (2019) point out that ignorance of public-based values, powerless planning professionals, state and private sector superiority are significant issues in BR regarding stakeholder's relationship.

To clarify and better understand the distances between the goals derived from the results, it can be referred to Figure (7-d). To simplify, there is a distinctive interval between the goals of downtown specialization and adjustment of derelict brownfields (reverse importance). Then, the changes direction of goals has not converged and aligned. Likewise, there is a significant gap between the goals of promoting public-private partnerships, increasing the value of real estate, and local development capacity. In fact, the shortest observed distance between the intensification of spatial segregation and rent-oriented exploitation of brownfields in study area. Complementary to these interpretations, most of previous studies revealed homogeneous issues in terms of Inner city regeneration (Lees, 2003; De Sousa et al., 2009; Kim, 2016; Brenner & Keil, 2017; Gegic & Husukic, 2017).

In principle, the public sector, private, local governance institutions, and to some extent, quasi-governmental cooperatives have little distance from each other. Consequently, they follow similar goals and the objectives that have high convergence with each other are more likely to occur in the future. On the other hand, civil institutions are focused on a separate area, and citizen activists and residents are also placed in a distinct segment, which indicates that they are obviously different from other actors. In

this regard, Earley (2025) has emphasized that the community-led factors could limit gentrification under regeneration policies. On the contrary, Gebremariam et al. (2019), considered traditional land use planning, legal instability, lack of eco-friendly measures, insufficient infrastructure, and market restrictions as the most prevalent obstacles to the brownfields regeneration without gentrification.

6. Conclusion

Several conclusions chiefly emerge from this research analysis; first of all, the brownfields have been transformed under the influence of various political, economic and institutional catalyzers, and traces of gentrification can be seen in the regeneration measures carried out on the old transport site of Tabriz city. Following this, the recognized drivers in BG process represent the existence of a deep connection between political economy and the ruling system in the form of state-oriented gentrification. To simplify, the BG of study area is under the comprehensive monopoly of major indicators such as investment, policy-making and management mechanisms. From the above, it is clear that regeneration projects for regenerating brownfields are dependent on the mentioned elements. In contrast, the variables that are based on citizens' participation, non-governmental decision-making, and civil organizations' roles have had little effectiveness, hence they have a secondary priority among gentrification players. In other words, the effect of civil and residents' involvement is considered less meaningful during BR actions.

Secondly, it has been established that some of the components reveal a dual and intermediate reaction in transforming old transport hub into luxurious and magnificent complexes in downtown Tabriz. Additionally, most of the components that have socio-cultural basis are in a dependent state. In this regard, the conflict between multiple stakeholders and how to guide them determines the urgent need to change of current approach, and on the other hand, specifically how to adjust the collapse of social capital – it is considered to be an indispensable social component– depicts the partial importance of social issues in regeneration process of the study area. Furthermore, physical components such as the quality and form of brownfield sites, infrastructure and physical characteristics of the land are mainly dependent and considered the output of dominant political-economic factors. Thirdly, the evidence presented has shown that more than 20 key multidimensional variables in interaction with each other directly and indirectly organized the brownfields in study area under current perspectives. Besides, there is some overlap and interdependence between the variables. Nevertheless, most of the identified variables have played a secondary role in BG of old transport sites.

Finally, it can be concluded that almost thirty actors and institutions are involved in the regeneration of each large-scale dilapidated site in study area. With a concentration

on the type of activities performed by the discussed earlier actors taken into account, the large number of influential interveners can be examined in six major categories, which are explained in detail in the previous section. Concerning semi-governmental cooperatives and the public sector have been placed at the top of the pyramid of key actors and have been introduced as the most powerful actors. More precisely, if the actors of brownfields gentrification are placed in a vector, on one side of it there will appear powerful actors and on the other side, weak actors with a limited role (citizens). In addition, most of actors were unanimous in emphasizing public-private partnership, rentier utilizing of brownfields and raising the value of real estate through the "Aysan" regeneration project. Indeed, government-promoted brownfield regeneration foster possibilities of gentrification development in this area. Conversely, there has been a poor consensus to adjust the spatial separation of regenerative measures. To put sum, BG actors placed a strong emphasis on profitable objectives in downtown Tabriz city.

Regarding research outputs, the main innovation of this paper is the structural and multi-dimensional analysis of a critical regeneration project in downtown Tabriz, which could be considered as a practical case in the whole of Iran. Moreover, in this research, a set of actors, goals, strategies and key multidimensional variables affecting the process of BG were identified and analyzed by relying on foresight methods. Thus, this paper widely explained a valuable method for examining of the contradictable interventions based on uncertain occasions and holistic attitudes, which might be developed worldwide, particularly nationwide. Moreover, there are limited studies conducted to resolve the complexities of interdependences and relations between BG actors, variables, goals and regeneration process. Given the domains of actors effects and stakeholders relationship in this research, future studies need to address the potential spillovers from uneven brownfields regeneration in a broader context.

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Akbar Hamidi
University of Tehran, Department of Planning and Geography
akbarhamidi70@ut.ac.ir

Akbar Hamidi is a research associate at the University of Tehran. Prior to this, he was a visiting scholar at the science faculty, Helsinki University, Finland. He completed his PhD entitled "Examining of Sustainable Urban Regeneration Policy and Land Use Transformation in Central District of Tabriz City, Iran" at the Department of Planning and Geography, University of Tehran in 2023. His research interests include urban regeneration; land use planning, gentrification; housing studies and critical geography. He has published over twenty research papers in Persian journals and several peer-reviewed academic articles

Martina Bosone
University of Naples Federico II, Department of Architecture
martina.bosone@unina.it

Martina Bosone is Ph.D. in Sustainable Technologies, Recovery and Representation of the Architecture and the Environment and Researcher in Evaluation at the Department of Architecture of University of Naples Federico II. She worked in european and national research projects (Horizon 2020 and PRIN) on the topics of multidimensional impact evaluation of the circular economy model implementation in the fields of cultural heritage and urban regeneration, sustainable cultural tourism and climate change management in multi-risk urban and metropolitan contexts, with particular attention to participatory evaluation models and tools for innovative governance, business and financing models. She is co-coordinating the National Scientific Committee of International Scientific Committee on Economics of Conservation and member of international organizations for valorising tangible and intangible cultural heritage.

Ana Peric
University College Dublin , School of Architecture, Planning and Environmental Policy
aperic@ethz.ch

Ana Peric holds a PhD in Urban Planning from the University of Belgrade and works as an Assistant Professor in the School of Architecture, Planning and Environmental Policy, University College Dublin. Revolving the research around the domain of comparative studies, she explores various topics across scales of institutional landscapes and lanning cultures with a specific focus on collaborative and participatory planning instruments, methods, and theory. Dedicated to combining research with practical assignments, she has been active in several policy and professional working groups, including the Western Balkan Network on Territorial Governance, ISOCARP (International Society of City and Regional Planners), serving as a Board Member (2016-2022), and UN-Habitat/ISOCARP Community of Practice on Urban Innovation.