

Identification, Dimension and Evaluation of Catalytic Projects in Tehran, Iran

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Abstract

Since the 1980s, a wide range of physical and non-physical interventions, including megaprojects and flagships to small-scale projects and temporary usage, are prescribed as catalysts for urban regeneration. The strategy of utilizing urban catalysts as a tool for urban renewal has been encouraging by many city authorities through specific subsidization and privileges. However, there is no correct and precise definition of the tools and the qualities they should provide as their impacts. Besides, some criticize the catalytic projects due to their unsustainable, unjust, and destructive consequences. This paper intends to provide a more comprehensive definition of urban catalysts by reviewing the existing literature. The research has been done through a deductive and inductive approach to reach the principal dimensions and criteria for catalytic projects. It uses a series of potential projects and interventions in the City of Tehran (16 projects and practices) as case studies to check the dimensions and criteria and the quality of each project as catalysts. The quality of the selected case studies was ranked through expert judgment and checklist method. The findings show the cases' rank on how their catalytic impacts comply with sustainable development goals. According to the results, seven criteria (environmental sustainability, context-based development, pattern making, branding, social quality of life, economic prosperity, and market adaptability) are essential to ensure the sustainability of catalytic impacts of catalyst projects.

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Keywords

Urban Catalyst, Urban Regeneration, Sustainable Catalyst, Tehran

1. Introduction and Problem Statement

Among urban regeneration-related debates, many practitioners and scholars tend to see some physical and non-physical interventions as stimuli or catalysts. Thus, the projects having broader effects than their specified sites have strategically been designed to regenerate the urban decay in an area. The concepts of *prestige projects*, *flagships*, and *pioneer projects* have been mainly raised with this prime purpose (Smyth, 1994). The concept, developed under catalytic theory, implies that one or a series of elements can impel and guide subsequent developments and lead to the incremental, continuous regeneration of the urban fabric (Attou, Logan, 1989:45). More recently, a new related term, *urban acupuncture*, has been introduced as small interventions replacing grand plans and redevelopment schemes (Madeddu, 2016: 533) and positively affect social, ecological, and even economic and physical dimensions of the surrounding environment (Daugėlaitė, Gražulevičiūtė-Vilenišké, 2018: 5).

A wide range of physical and non-physical interventions are considered as stimuli or catalysts in the related literature. From those notable large-scale and expensive physical developments called *megaprojects* and *prestige projects* to the smaller ones called *flagships* and further to the trivial physical and non-physical changes leading to a gradual transformation of an urban area can be called catalysts. Undoubtedly, there are different views on each type of catalyst. Many scholars have addressed the success and failure stories of the relevant experiences (Attoe, Logan, 1989; Loftman & Nevin, 1995). However, the main idea of catalysts has remained attractive and valuable. Who is not attracted to the anecdote of the positive metamorphosis of a left, decayed, and undesirable urban area as a result of the development of a museum or the installation of a fountain only?

It is noteworthy to say that the idea of utilizing urban catalysts refers to the existence of a situation of need to change and a call for transformation stemming from the abandoned, decayed, poor, unsafe, unstable, and undesirable urban areas. In short, the catalysts encounter the problematic urban regions, which already relate to several tensions, service and infrastructure lack, social discontent, and poor quality. However, some of the projects could not create values and regenerate their peripheral areas and even have led to negative consequences and empty promises (Loftman & Nevin, 1995: 307). The critics matter more when the projects and their developers have gotten a considerable amount of public budget, funds, loans, privileges supporting a project with catalytic benefits for a larger group of people.

Nearly all projects, especially the large-scale and index ones, lead to broad impacts on their surroundings in terms of physical aspect (changing the main structure of the city or neighborhood), landscape, traffic (increasing the vehicle and pedestrian trips demands), social and economic status of an area. So, the idea of catalyst projects wants to emphasize the positive and long-term impacts. Therefore, to have suitable catalytic projects, it is crucial to ensure and boost the value of the project's results and control their negative consequences.

According to the Statistical Center of Iran, the City of Tehran, the capital and the most populated city of Iran (over 8 million population in 2017, according to the Statistical Center of Iran), has experienced rapid population growth and physical expansion over the last decades (after the 1970s). The growth is accompanied by the dilapidation or rundown of neighborhoods suffering from poor physical, functional, infrastructure, transportation services, environmental, and health conditions (Abbaszadegan, 2010; Assadpour, Melles, 2018).

According to the *Urban Renewal Organization of Tehran* (2016), 5% (3268 hectares) and 24% (14792 hectares) of the city include distressed and unsustainable areas, respectively. The areas suffer from the lack of infrastructure, unstable and left buildings, fine-grained parcels inappropriate for redevelopment, the concentration of poverty, crime and disorders, and unsafe spaces. *Tehran Municipality* and the *Organization for Urban Redevelopment* have implemented several plans and renewal projects to address the deterioration of the built environment during the 1990s and 2000s. Following the infill development approach, the renewal and regeneration projects have aimed to revitalize the inner urban areas and prevent the continuation of urban decay. One of the strategies applied in this regard in Tehran has been urban catalysts (Sajadzadeh, Hamidinia, Dalvand, 2018; Hashemi, Shieh, Zabihi, 2020). The most common projects include building malls, markets, hotels, cultural or community centers, parks, streets, public spaces, walkways, parking, etc. However, there is still not a clear border between catalysts and non-catalysts projects in Tehran. In other words, calling a project a catalytic one primarily refers to the urban authorities and their developers' efforts to highlight the benefits of a project in their surrounding areas. The majority of the projects have been funded by the government/municipality (public sector) or through the *public-private partnership* model. Public-private Partnership (PPP) as a tool to overcome the financial crisis and the low performance in public administration (Codecasa, Ponzini, 2011) has been largely recommended and applied in urban regeneration (Kort, Klijn, 2011; Mohammadi et al., 2014) and can be seen as one of the manifestations of neoliberalism. The neoliberal perspective in urban regeneration has also been accompanied by deregulation, competitiveness, and stakeholder engagement. Negotiation with developers, determining privileges for partnership, and lowering the building laws to make the collaboration attractive and efficient for developers are among the strategies Tehran Municipality has applied in urban regeneration.

While urban catalysts have been accepted as a valuable tool in urban regeneration by many practitioners and scholars, one can hardly find an unambiguous definition for urban catalysts. In other words, there is still not a clear definition explaining what the tools should bring with them and how they should influence their surroundings. Therefore, this

paper is going to provide a more comprehensive definition of the tools by reviewing the existing literature. Moreover, by looking through the negative consequences or inefficiency of such projects and practices, it tries to set the criteria through which we can reach more sustainable urban catalysts.

2. Literature Review

2.1. Definition of Urban Catalysts

Various kinds of physical and non-physical interventions may be labeled as urban catalysts. Undoubtedly, each kind may have different characteristics and impacts while they follow similar purposes, the acceleration of urban development and regeneration. Attoe and Logan (1989:45) explain that a catalyst is an urban element that is shaped by a city and then, in turn, shapes its context. Its purpose is the incremental, continuous regeneration of the urban fabric. A catalyst is not a single end product in an urban regeneration process but an element that impels and guides subsequent development (Attoe, Logan, 1989: 45). In other words, urban catalysts are strategic tools, and their effectiveness depends on the complementary and following policies and actions. Urban catalysts should generate activity, act as anchors, and respond to spatial conditions that can promote positive development, so they need to be strategically planned and located in terms of activities and the arrangement of those activities (Bohannon, 2004: 15-26).

The first generation of catalysts, *prestige*, and *flagship projects*, widely experienced in the 1970s and 1980s in many North American and European cities, are the production of neoliberalism ideology and the symbols of place-marketing instruments and property-led approach to urban regeneration (Temelova, 2007: 169-170; Smyth, 1994: 27). The particular form of the prestige projects mentioned by scholars includes convention centers, festival marketplaces, shopping malls, major office complexes, and leisure and sporting facilities (Loftman, Nevin, 1995:300; Harvey, 1988). The large-scale and costly developments in some sources are sometimes called megaprojects. On the other hand, flagships are smaller-scale projects, like an office complex, with the same purpose: they encourage or facilitate organic growth within urban areas and change local perceptions about particular locations (Loftman and Nevin, 1989: 301). The concept of an urban catalyst developed under the catalytic theory (Attoe and Logan, 1989) as a subset of the prior urban design theories and are the tools for effective urban design. Accordingly, "an urban catalyst might be a hotel, a shopping complex, a transportation hub, a museum or theater, a designed open space or, at the smallest scale, a special feature like a colonnade or a fountain" (Attoe and Logan, 1989: 45). Attoe and Logan (1989: 46) propose that urban catalysts are better thought of as smaller elements- a building, a fragment of a building, a complex of buildings, or even a report or set of guidelines. Loftman and Nevin (1995: 311) explain that shifting the concept of urban regeneration from land and property development to the regeneration of communities has led to the policies encouraging the prestige projects and flagships to generate more socially equitable outcomes mid-1990s. Thus, the new prestige and flagship projects tend to be more responsive to the community demands rather than only considering economic development.

Megaprojects, including prestige projects or large-scale and expensive infrastructure projects, also have been addressed as urban catalysts (Varrel, Kennedy, 2011; Sarkheyli, Rafieian, 2018; Ponzini, 2011). Stadiums, convention centers, sports facilities, brownfield redevelopments, transit projects, airports are among the megaprojects considered as urban catalysts. Some scholars also view mega-events such as sports events and cultural festivals as urban catalysts and as powerful engines in the neoliberal reconfiguration of the City (Sanchez, Broudehoux, 2013).

The most recent generation of catalysts includes non-physical and small-scale, preferably community-led interventions. Some of the small-scale catalysts are theorized through the concept of *urban acupuncture* which has been introduced by Lerner (2014). Urban acupuncture was described as a cross-architectural manipulation of the city's collective sensory thought and as a strategy focusing on small, subtle, and light interventions that employ and positively direct community energy, including active citizens to address urban problems and improve the city's landscape, and is a substitute for large, top-down interventions that usually require massive investment from scarce municipal funds (Al-Hinkawi, Al-Saadi, 2020). The "needles" of urban acupuncture can be various types of interventions and events (Daugėlaitė, Gražulevičiūtė-Vilėniškė, 2018; Lerner, 2014) ranging from a building, a park, a public space, a fountain, a street art, to a street festival, or a BRT¹ system or any other positive happening in public spaces.

¹ Bus Rapid Transit (For example, the BRT system in Curitiba was outlined by Lerner (2014) as urban acupuncture.

Moreover, the concept of urban catalysts has been used in tactical urbanism, including low-cost and temporary changes to the built environment like the temporary use of abandoned building and spaces as a way to stimulate further urban regeneration in an area (Oswalt, Overmeyer, and Misselwitz, 2013; Martin, Hincks, 2020). This focuses on the catalytic impact of the temporary use of the leftover site in urban areas usually driven by community groups.

Thus, there has been a shift in attitudes toward catalysts since the 1970s: from the large-scale physical developments built by private investors to the smaller scale physical and non-physical changes based on local demands or driven by local communities. However, it does not mean that local authorities are not tempted to seek a new prestige project, which is large-scale and costly, especially in neoliberal societies.

2.2. Dimensions of Urban Catalysts

Catalysts of all kinds have a nearly similar mechanism to regenerate urban areas. As the urban acupuncture theory states, the catalysts create the chain reactions in their surrounding area through motivating and activating the useless and static energies and forces. Catalysts also replace the undesirable image from an area with a bright vision. Catalysts influence people's perception of an area (Bohannon, 2004: 10), enhance local attractiveness, and boost civic pride and business confidence (Temelova, 2007: 169-170; Bianchini et al., 1992; Tavasanolu and Healey, 1992). They can create a new, better identity for an area and increase the attractiveness of a place.

Consequently, or at the same time, catalysts attract private sector finance (Smyth, 1994; Temelova, 2007: 170). Catalysts increase the property values (Remelova, 2007: 170; Bianchini et al., 1992; Smyth, 1994; Loftman and Nevin, 1995) and the profitability of investment in an area. Besides, catalysts generate activities and work as an anchor (Bohannon, 2004: 10). They activate the energy flow (the movement and activities of people, the ecological flows, the information flows, and exchange) in an area (Daugėlaitė, Gražulevičiūtė-Vilenišė, 2018: 5). Catalysts cause more people, tourists, and developers to be interested in visiting and living, and investing in the area. Also, catalysts attract similar activities from the same type and other types (like commercial, office, housing, art, culture, and leisure) that formerly had no demand in the place (Smyth, 1989). Catalysts provide benefits for all city residents through the generation of wealth, jobs, a high-quality physical environment, and a new place to visit, admire and enjoy (Loftman and Nevin, 1995: 304). So, as the preparatory or ultimate actions, utilizing catalysts leads to physical revitalization. Catalysts may be a physical development on their own. However, they encourage more developers to invest in their surrounding areas and develop or renew infrastructure and old buildings. Temelova (2007: 169), in his paper, shows that a high-profile project can be one of the driving forces in physical revitalization through the provision of symbolic power, credibility, and appeal to a declining neighborhood. The characteristics mentioned above for urban catalysts could be summarized in four dimensions of influence: reimagining/reimaging and identity promotion, economic value creation, activity generation, and the encouragement of physical development/ the physical stimulation (figure 1).

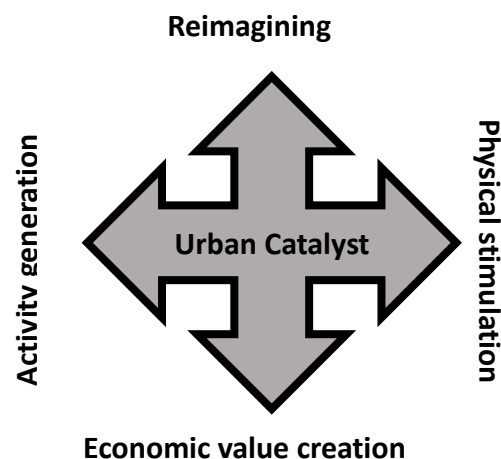


Figure 1. Four dimensions of influencing urban catalysts

The four dimensions can be considered to distinguish an urban catalyst from other kinds of projects or interventions. Some types of catalysts may have more or less influence on some aspects comparing to others. Thus, a more

comprehensive definition of catalysts suggests that "catalysts are the physical or non-physical strategic tools causing reimagining, activity generation, economic value creation, and the encouragement of physical development to regenerate an urban area." Table 1 explains the four dimensions for urban catalysts and their related indicators.

Table 1. Dimensions of Urban Catalysts

Dimensions	Indicators
Reimagining and Identity Promotion	Creation or revival of an identity for an area (a neighborhood, a city, or a region) through the creation or promotion of cultural, social, tourism attractions, or creation of an economic hub; Landscape design and changing the negative image of the place; Improvement of the general index of quality of life in the place and making it competitive with other high-quality places in the city/ region;
Activity Generation	Increasing the volume of pedestrian and vehicle; Increasing retail and service activities (like banks, hotels, cafes, restaurants), and offices;
Economic Value Creation	Job creation; Provision of diverse jobs and activities; Considerable increase in the public sector's income through selling more services and higher taxes from new buildings; Considerable increase in land and property value comparing other areas of the city. Increase of the citizens' average income;
Encouragement of physical Development	The acceleration of development and renovation of lands and properties and more investment demand compared to other areas of the city; higher profitability of investment in the area rather than other areas of the city.

2.3. Towards Sustainable Urban Catalysts

Despite the attractive impacts of catalysts, those are criticized in several aspects. The projects, especially the larger ones, like prestige projects and flagships, have been widely criticized as exclusive facilities mainly justifiable in economic terms (Temelova, 2007: 169). Healy et al. (1992) state that these projects tend to be confined to profitable locations for private sector investments (Loftman & Nevin, 1995: 306). Some scholars addressed the social consequences of megaprojects, including extensive displacement (Gellert & Lynch, 2003), cultural change (Marrewijk et al., 2008), the destruction of the existing urban fabric (Ryan, 2013), as well as their unpredicted financial and technical challenges (Fybjerg, 2012). Also, several authors questioned the ability of flagships to trigger off development and sufficiently distribute the benefits of growth (Temelova, 2007: 170). Critics believe that the claimed successes of such projects are not proved (Loftman and Nevin, 1995: 305). Many renewals and revitalization schemes for cities touted as catalysts remain inert, have little impact and do not cause the promised urban reactive change (Attoe, Logan, 1989: 46). Also, it is noted that the projects may encourage the fragmentation of cities and the planning of individual elements rather than planning an integrated urban system; they do not offer a reliable foundation for generating stable and sustainable economic regeneration; they are the production of optimistic views to private investments and include empty promises; they may lead to higher and longer-term financial costs for public agencies; they often entail the diversion of scarce public sector resources away from welfare-related needs and deprived neighborhoods; there is little evidence that catalysts generate significant employment or benefits for disadvantaged residents and so on (Loftman and Nevin, 1995: 309-310). "Bianchini et al. (1992) warn that property-led regeneration and investment in flagships may even have damaging effects on local businesses and communities due to hiking rents and land values. It can contribute to social displacement and segregation. A decline in other urban areas may accompany the growth in the regeneration neighborhood, thus reinforcing the existing socio-spatial

inequalities" (Temelova, 2007: 170 quoted from Bianchini et al., 1992; Harvey, 2000; Vicario and Monie, 2003; Kaplan et al., 2004).

These critics question the efficiency of urban catalysts in the degraded areas, where most are the settlements of the poor, the weak, and unemployed people. They argue that the related physical developments and the subsequent changes may lead to inevitable challenges like extensive displacement, gentrification, public dissatisfaction, segregation, and speculative tendencies. However, as long as the introduction and spread of the new types of community-driven, small-scale and non-physical catalysts, there have been efforts to maximize the benefits and minimize the harmful impacts of catalysts. In other words, the catalyst should be designed, planned, and implemented to be more sustainable solutions. It means that the provision of socially, economically, and environmentally sustainable catalysts as tools for urban regeneration matters.

The most commonly stated definition for sustainable development is that put forward by Brundtland, emphasizing that three dimensions of economy, society, and environment need to be present (Lombardi et al., 2011). While the contemporary sustainability literature may center around the UN's more diverse set of sustainable development goals (SDGs), the three dimensions themselves were explicitly embedded in their formulation (Purvis, Mao, Robinson, 2019 quoted from UN, 2012). Urban regeneration has a substantial impact on all three dimensions/pillars of sustainable development (Lombardy et al., 2011). The three-pillar understanding of sustainability in brownfield remediation and regeneration has been linked to the environmental aspect to reducing the risk of contamination and the secondary adverse effects; the economic pillar in relation to the cost of remediation and the impact of site restoration on the surrounding economy; and the social pillar, including safety, community impacts, stakeholder engagement, public participation, environmental justice and social inclusion (Alexandresu et al., 2018 quoted from Hou and Al-Tabbaa, 2014).

This paper tries to consider the evaluation criteria by assuming potential conflicts between urban catalysts (which possibly lead to reimagining, economic value creation, activity generation, and physical stimulation) with sustainable development. As it was illustrated in Figure 2, the three pillars of sustainable development (Economic, Social, physical, and Environment) and their related sub-concepts have been seen in this research. The concepts were summarized in environmental resiliency, context-based development, human-based development, environmentally-friendly development, culture-based development, local identity promotion, good governance, social inclusion and vitality, social justice, promoting the local economy, economic dynamics, and market adaptation. Considering the different catalytic impacts, the conflict map between catalytic impacts and the sustainable development goals was drawn. According to the potential conflicts between the goals and the catalytic effects, seven substantial criteria were identified for the sustainability assessment of urban catalysts.

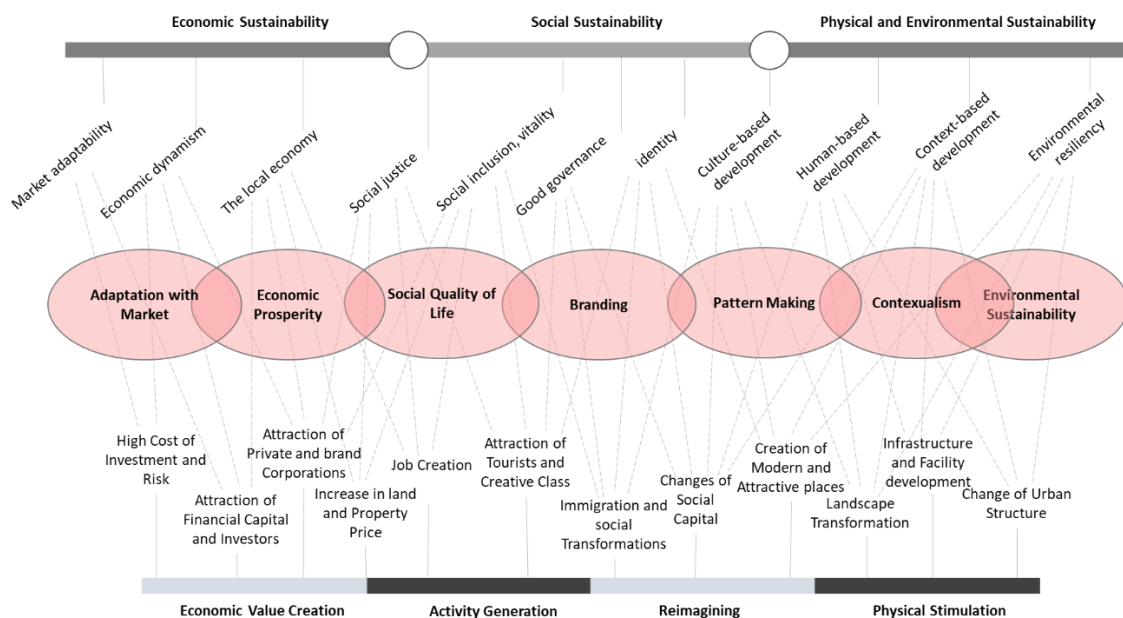


Figure 2. Conflict map between sustainability goals and the probable catalytic impacts of an urban catalyst

3. Research Methodology

The research aims to provide a more comprehensive and clearer definition of urban catalysts in practice and in the shadow of the sustainable development concept. Firstly, as a result of the literature review, it was discussed that if urban projects are creating changes in the everyday activities in an area, the general image of the area, the physics and texture, and economic value of a built area could be considered as a project with catalytic impacts. However, the catalytic consequences could be valuable if those could be screened through seven criteria. Thus, as the second step, the authors asked a group of experts in sociology, civil engineering, urban planning, architecture, environmental specialist, economist, and management to list the sub-criteria and indicators for each criterion considering the particular conditions in the City of Tehran. The lists were combined, integrated, checked, and recategorized at a meeting with experts at Tehran Municipality. Therefore, the list has been used as a checklist for evaluating and ranking the case studies in Tehran (Table 2).

Table 2. Criteria and indicators for assessing the intensity and quality of stimulation by urban catalysts

Criteria	Sub-criteria	indicators
Environmental sustainability	Conservation	15
	Energy and consumption	
	pollution	
Sensitivity to Context	Physical	10
	Functional	
Pattern making	Based on Local values	8
	Based on Standards	
	As a Compact and Mixed-Use development	
Branding	Physical	10
	Non-physical	
Social Sustainability	Citizens right	28
	Quality of life	
	Social network	
	Participation and engagement	
	Transparency and trust	
	regulatory	
	futuristic	
Economic prosperity	competitiveness	18
	Resources and opportunities	
Market adaptability	Self-restraint	3
	Risk accountability	

The research strategy was a case study strategy, and for that, as the third step, sixteen projects were chosen and analyzed through a checklist method. The case studies were selected from the suggestions of various experts at Tehran Municipality, practitioners, and academics in Tehran. In the fourth step, the authors collected and reviewed the published and official reports like newspapers, journal articles, documents. They made a summary of all critical and positive notions and impacts reported regarding the projects. Then, the projects were evaluated and ranked through expert judgment (a group of experts of different specialties and fields scored each project on each indicator based on a Likert spectrum (from 1 to 5)). Finally, the scores of each project were summed up, and the analytical comparison diagrams have been made.

To improve the validity and credibility of the results, the authors checked the preliminary results of the evaluation process with experts at Tehran Municipality to consider any necessary change.

4. Case studies in Tehran

To understand how different types of projects respond to the criteria, various kinds of recent projects and practices in Tehran were chosen to be scored through the checklist prepared based on Table 2. The projects were chosen based on the comments of a group of experts who were familiar with the recent projects in Tehran or were engaged in such projects at the Tehran Municipality. The projects were also selected based on their significant reported or expected impacts on their surroundings (neighborhood, city region, or city). The projects include a range of large-scale projects and flagships to non-physical practices (Table 3).

Table 3. The list of projects and practices in Tehran, selected for evaluation

Categories	Projects/Practices	Key developer	Scale of impact	Description
Large-scale projects	Persian Gulf Artificial Lake	Public sector	City	The construction of an artificial lake and several high-rise housing buildings and commercial projects in the west of the city
	Velayat Park	Public sector	City	Land Use Change of a 300-hectare site in the South of Tehran, an old military airport, to a public space and theme park
	Nahjolbalaghe Park	Public sector	City	Development of a 30-hectare urban park (between Niyayesh Highway and Evanak Boulevard, along with the Farahzad River Valley, which is the north-south natural axis located in the northwest of Tehran, including walking and biking paths, the art garden, rock-climbing park, and a skate park
Flagships	Hyperstar Shopping Mall	Private sector	City region	A shopping complex, in the West of Tehran, with brand shops and a food court which is developed by an Iranian subsidiary of French multinational retailer Carrefour in Iran
	Atlas Mall	Private sector	City region	A commercial complex, comprising nineteen floors for offices, shops, stores, restaurants, six-level parking, developed by an Iranian bank in Niyavaran, one of the northern and affluent neighborhoods in Tehran
	Koroush Commercial and Cultural Complex	Private sector	City region	A commercial and cultural complex with modern architecture and harmonic design of color and light in the west of Tehran: It includes the country's largest cineplex, cinema gallery, kids club, food court restaurants, many coffee shops, and a collection of various stores.

Table 3 Continued

	Milad Tower	Public sector	City	A multi-purpose tower and one of the tallest towers and freestanding structures in the world is a part of the International Trade and Convention Center of Tehran. The tower with an octagonal base, symbolizing the traditional Persian architecture, functions as a sophisticated urban attraction and city plaza.
	Tabi'at Pedestrian Bridge	Public sector	City	The most extensive pedestrian (270 meter) overpass, connecting two public parks by spanning a highway in northern Tehran: The project, designed as part of a local competition for the design of a bridge to connect two parks, has won several international awards due to its exemplary approach to an infrastructure project. The bridge is not only a pedestrian path but also is a multi-story gathering place with restaurants, cafes, and open spaces for the community.
	The Grand Mosalla of Tehran	Public sector	City	The Grand Mosalla mosque of Tehran is a location for holding weekly Friday prayer and cultural, political, educational, worship activities, including book fairs and religious ceremonies. Its design reflects the Islamic architecture in modern time Iran and the Islamic architecture in other areas that were formerly part of Iran.
	Khavaran Cultural Center	Public sector	City region	The complex's architecture inspired by Iranian traditions and elements provides a low-income neighborhood in the South-east of Tehran with a variety of cultural facilities - theatre and cinema halls, library, educational classes, exhibition hall, sports center, meeting spaces, and marketplace.
	Bahman Cultural Center	Public sector	City region	The Bahman Cultural Center, built on a formerly slaughterhouse in the slums of southern Tehran, is a municipally created public space for cultural advancement in Tehran and was the first and largest of its kind in the City of Tehran. The land-use change and construction of the cultural center have had a significant impact on the process of social change, enriching the women and the youth in the region.
Urban design projects	Marvi Gozar	Public sector	Neighborhood	The restoration project of Marvi Gozar, initiated by Tehran's Beautification Organization and Tehran municipality, consists of designing an entrance space, restoring the old facade, adding a traditional bazaar roof, and creating a plaza (meidan in Persian).
	Transformation of Hefdah-e-Shahrivar street to a walking street	Public sector	Neighborhood	Transformation of a commercial street called Hefdah-e-Shahrivar, one of the main central streets in Tehran, to a walking space to make it a tourist destination

Table 3 Continued

	Panzdah-e-Khordad pedestrian street	Public sector	City region	Converting Panzdah-e-Khordad, a historical and commercial street to a walking street and a tourist destination with vibrant public spaces and tourist activities
Non-physical practices	Museum of Qasr Prison	Public sector	Neighborhood	Restoration of Qasr Prison and its transformation to a museum and public space
	Parvaneh Friday market	Public sector	City region	Parvaneh Friday market building as Bazar for handicrafts: A multi-story car parking (Parking garage) works as a temporary market (Bazaar) of Persian handicrafts and antiques on Fridays and attracts a large number of artists and art-lovers.

5. Results and Discussions

The results, illustrated in figure 3, show that nearly all projects achieve the lowest scores from the market adaptability criterion. However, the more sensitive projects to their context (context-based development criteria) and the social quality of life got the highest scores.

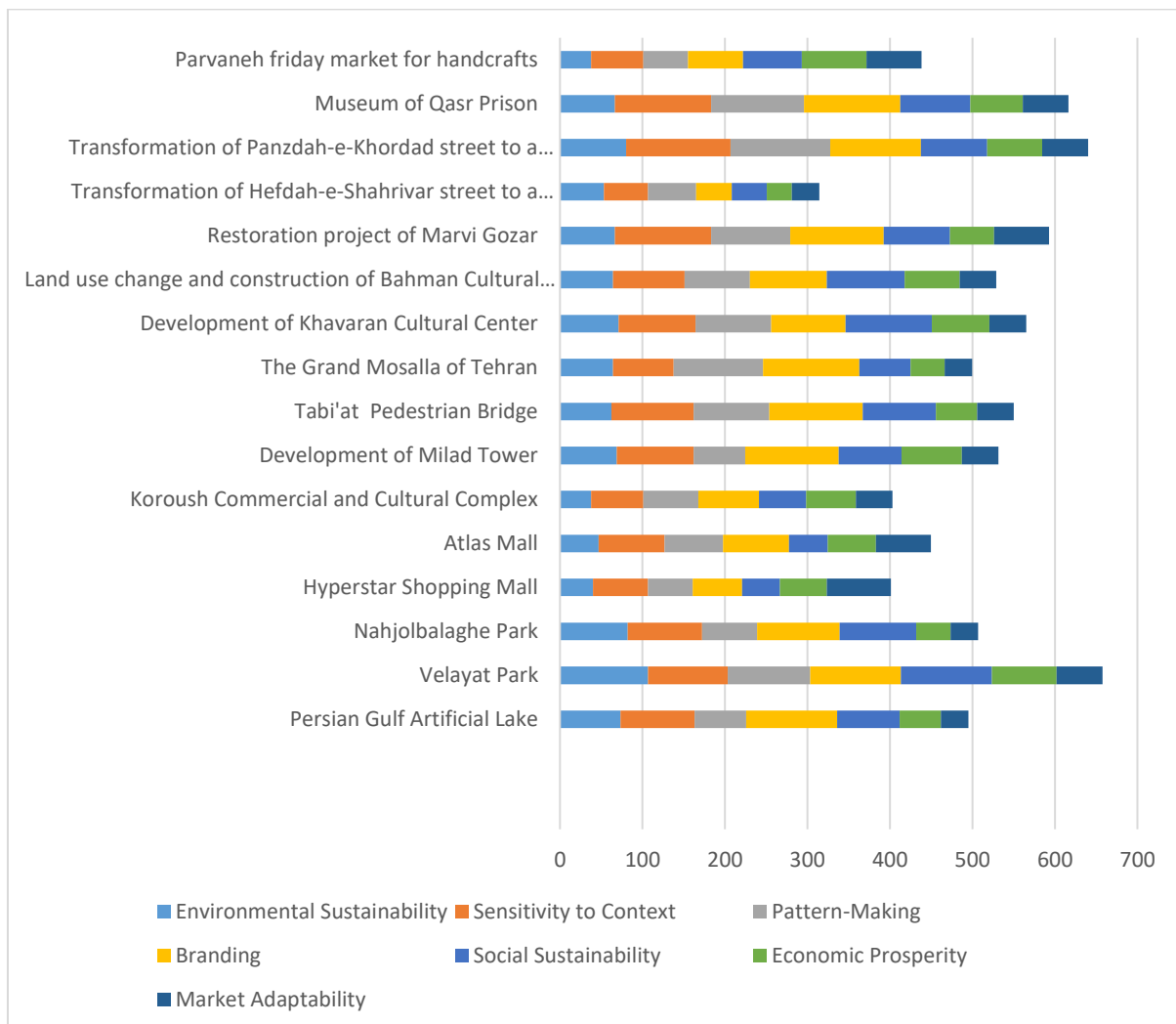


Figure 3. The scores of the selected projects/practices in Tehran according to the suggested evaluation criteria

The large-scale projects show that despite the expected economic and social benefits of the development project of *Persian Gulf Artificial Lake* in the explanatory reports of Tehran Municipality, the project got low scores in market adaptability and economic prosperity criteria. Due to the new character, the project has made the City and the western

regions, and tourist attraction and physical branding achieve a high score. However, the project did not get a good score in the environmental aspect because of its insufficient attention to the surrounding neighborhoods' health quality and environmental protection. Both the development projects of *Nahj olbalaghe* and *Velayat Parks* got high scores in the environmental aspect. *Velayat park* got a high score in social sustainability, pattern-making, branding, and contextual sensitivity. The project also includes various activities and has provided various job opportunities for different groups giving it higher scores in the economic prosperity criterion. Besides, the project has been developed in a low-income neighborhood with low access to such entertainment and green facilities. The project's good access to public transportation is another reason the project got a high score compared to the other recent projects and practices in Tehran. On the other hand, *Nahj olbalaghe park* was developed in an unsafe and brownfield area and was designed as a variation of well-designed open spaces for different users and activities. The unique landscape design of the project also causes the project to get a high score in terms of branding.

As it was mentioned in the problem statement and the literature, megaprojects and large-scale projects have usually been criticized due to their social and economic consequences (Flyvbjerg, 2012; Gellert and Lynch, 2003; Marrewijk et al, 2008). The cases studied have been developed by public budget, and two of them (*Velayat Park*, and *Nahj olbalaghe park*) targeted the leftover lands (a formerly military airport and a valley with substantial social and environmental problems). Therefore, they had a considerable role in the city improvement, among other things. However, the Persian Gulf Artificial Lake is mainly designed to make a new brand for the city and the region to stimulate and serve the high-density housing and office developments in region 22 of Tehran (a newly built region).

Regarding the flagship projects, based on the research findings, the development of *Tabi'at Bridge*, *Khavarn cultural center*, and *Bahman cultural center* have successfully improved social quality. At the same time, the shopping malls, *Milad Tower*, and the *Grand Mosalla of Tehran* were not successful in the social sustainability criterion. However, *The Grand Mosalla of Tehran*, *Milad Tower*, and *Tabi'at Bridge* got high scores in branding since those work as contemporary landmarks of Tehran now. Also, the flagship projects instead of the *Hyperstar shopping mall* and *Koroush shopping mall* got high scores in branding and pattern-making. The unique architectural form of the *Tabi'at Bridge*, reflecting both natural and modern features, its adaptation with the natural areas surrounding it, and the provision of a vibrant public space, causes it to get high scores in the sensitivity to context, pattern-making, branding, and social sustainability. *Bahman* and *Khavaran cultural centers* got high scores due to the functional variation, job production, and influence on the social improvement of the surrounding communities.

As discussed by Temelova (2007), Healy et al. (1992), and Loftman & Nevin (1995), most of the flagships are mainly justifiable in economic terms and locate in profitable locations. It is noteworthy that except *Khavaran* and *Bahman cultural centers*, the other flagships evaluated in this study have been located in the medium to high-income regions. Most of the projects, especially the shopping malls, which have been developed by the private sector, were developed with a higher density or other land uses than was set by building by law and the city master plan. Even though it could be argued that the projects are attracting people and inviting more developers and activities to their surroundings, the projects can be criticized due to their role in segregation and the exacerbation of the gap between the lower and higher-income neighborhoods (Temelova, 2007: 170; Bianchini et al., Harvey, 2000).

Among the urban design and non-physical projects, the transformation of *Hefdah-e-Shahrivar* got a low score because of the dissatisfaction of a group of people, lack of public participation, and inadequate attention to other criteria. The high score of *Panzdah-e-Khordad street* and *Marvi Gozar* are because the projects aimed to limit the physical interventions in the existing structures and were appreciated as almost successful rehabilitation and regeneration projects. However, inadequate attention has been paid to market adaptability, economic prosperity, and environmental sustainability in these projects. Among the other non-physical projects/practices, the *Qasr prison land-use change* to a museum got a good score. At the same time, it has not considered the environmental and economic criteria effectively.

As it was discussed in the literature chapter, the most recent strategies recommended for urban regeneration include smaller-scale, not expensive, and non-physical changes (Oswalt, Overmeyer, and Misselwitz, 2013; Martin, Hincks, 2020; Al-Hinkawi, Al-Saadi, 2020). The projects, especially those designed or led by communities and the citizens' initiatives, can be successful in terms of social sustainability. Tactical urbanism and temporary use, and urban

acupuncture can be useful tools for urban regeneration. However, the studied cases show that the projects' success also depends on the quality of community engagement and the continuity of the projects/practices. Their catalytic impacts are also dependent on the other complementary projects/practices supporting their positive impacts in the regeneration of a degraded urban texture. In other words, as it was mentioned, the catalysts are strategic tools (Bohannon, 2004; Attoe and Logan, 1989), and their effectiveness relies on the following and complementary policies and actions.

The scores the selected projects in Tehran have gotten in each sub-criteria and indicator can present an overview of the common approaches of city projects and practices in Tehran. For example, in the environmental sustainability criterion, inadequate attention has been paid to the betterment of public access to the projects, energy-saving, sustainable energy resources, sustainable construction materials, recycling, reducing human heat, and reducing water and soil pollution. Regarding sensitivity to context, the visual adaptability of the project structure with the surrounding physical and natural features, adaptation with users' demands and comfort, acceptable walking distance, and protection and conservation of the existing natural and human-made elements, particularly the valuable and stable ones have been very effective in the higher or lower scores. Insufficient attention to the vernacular, local, and environmental-friendly values and architecture, encouraging social interactions, and not having a strategic perspective on physical development and placemaking (in pattern-making and branding criteria) are also seen in the recent projects.

The lack of evaluation criteria for evaluating physical and non-physical approaches causes the authorities to decide based on their attitudes. Developers can get the municipality's support by distorting their projects' attributes and exaggerating their projects' benefits. Although personal attitudes can also influence the qualitative scoring of a project in different criteria, such criteria can lead to more projects toward better quality in the long term.

Figure 4 suggests a framework for the evaluation of any catalytic projects. It aims to screen the projects' impacts and guide planners, authorities, and developers in designing, locating, and approving urban catalysts for urban regeneration. The framework has been made up of seven primary questions addressing the seven criteria for evaluating the projects toward sustainability and the four dimensions of catalyst projects adopted from the literature review and discussion.

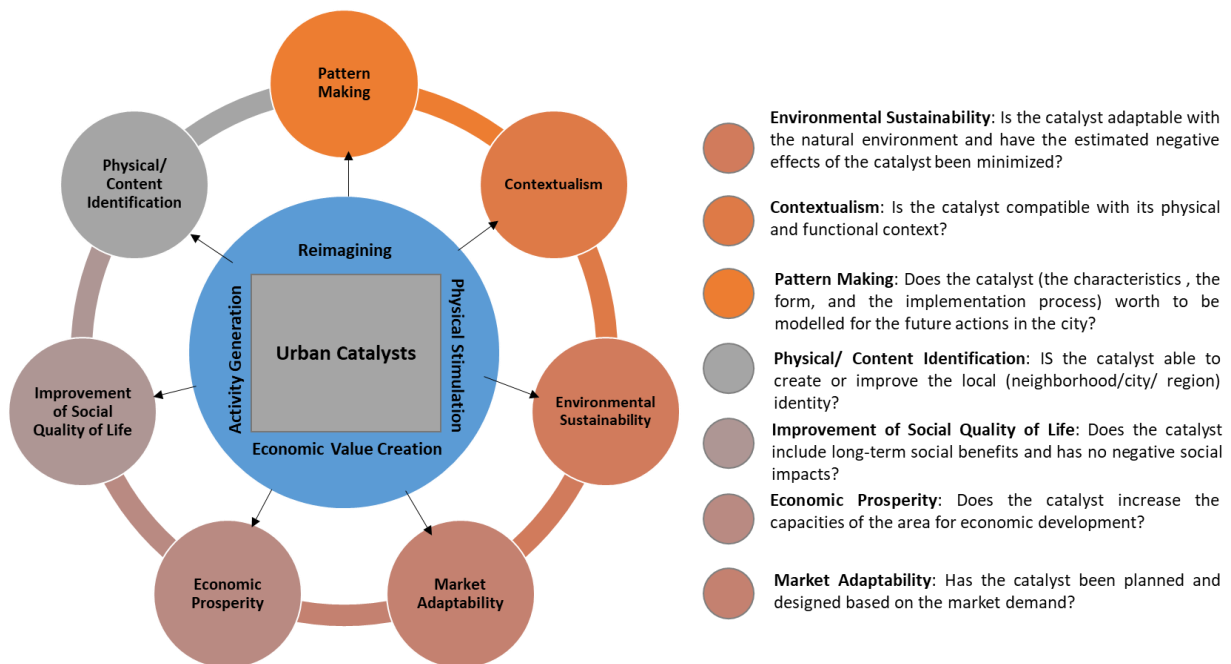


Figure 4. Questions for sustainability assessment of urban catalysts

6. Conclusion

Urban Catalyst is a relative and comparative term. However, it can be a seductive and precarious title. How such projects are valued is strongly dependent on society's values, including the values determined directly or indirectly by those in power. According to the literature review, such projects usually affect an urban texture in four dimensions, including *reimagining*, *activity generation*, *physical stimulation*, and *economic value creation*. These aspects get different meanings in different spatial and temporal realms along with the societal, technical, and value changes. Therefore, identifying such values and considering those as the basis for evaluation of the projects' impacts is significant in order to guide and direct the future pioneering project.

This paper discussed the likely conflicts between the catalytic projects' impacts (the four aspects) and the sustainability goals (economic, social, environmental, and physical sustainability) through the existing literature. According to the conflicts, it suggests an evaluation framework, including seven criteria for evaluating catalytic projects. The criteria include physical and content identification, pattern making, contextualism, environmental sustainability, market adaptability, economic prosperity, and improvement of social quality of life. The criteria are explained as the questions which could be translated based on each city context and the significant values considered by each community. The framework can be used either in the preliminary process (evaluation of proposals) or when the projects or practices are done and are the subject of evaluation due to other reasons like receiving financial aid or other credits and privileges.

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