A National Guideline for Transit-Oriented Development: Challenges and Prospects for the Iranian Edition

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Abstract

The outstanding consequences of transport land-use integration under the label of transit-oriented development (TOD) approach in pioneer countries have spurred several newcomers to apply such a policy. Of which, Iran with a centralized planning system has recently provided a TOD national guideline with the purpose of curbing traffic-caused challenges. This study attempts to describe the process applied for the guideline preparation and discover operational challenges and prospects for successful TOD implementation, offering a native edition in Iran. The research has a qualitative approach, based on the case study. The critical analysis of Iran's existing situation, together with the review of a five-year process which ends up with the final approval of the guideline, are basic tools applied to investigate the situation. The results demonstrated that although the guideline, as a turning point, pinpointed the "integration" policy in Iranian policymaking efforts, there are still several barriers to realize TOD policies in Iran including inconsistent urban policies, profit-making from TOD potentials, no practical experience, lack of public support and weak local authorities. This study also offers some lessons for those countries with a similar system of urban planning and/or policy challenges, which are planning transport and land use integration.

***Keywords**:* Transit-Oriented Development, Policymaking, Urban planning, Middle East, Iran

1.Introduction

Iran has become more urban in recent decades in accordance with rapid urbanization in developing countries (United Nations, 2018). The latest national census (2016) shows that the rate of urban population growth has been increasingly rapid and in a remarkably short time (1965-2016), it has changed from about 38% to 74% (Figure 1).

Aside from the natural population growth, immigration has been at play in the appearance of the primacy of today's eight metropolitans and 24 large cities — between 250 000 to one million (Bardi Anamoradnezhad, 2016; Daneshpour & Tarantash, 2017). As a rule, the population has moved from less-developed to developed areas featured by more (urban) services and job opportunities (Varesi & Sarvari, 2006). This could be the result of highly-concentrated, diverse economic opportunities or/and political observations in several large cities like Isfahan, Arak, and Qazvin (Bardi Anamordnezhd, 2016.Fanni, 2006) as well as the absence of spatial balance under the recent decades of territorial planning and policy-making in Iran. Accordingly, as of post-war modernization and industrialization efforts, (large) cities became more enchanting for immigrants day-by-day. Not surprisingly, the result was the worsened housing shortage and skyrocketed land prices (Maghsoodi Tilaki et al., 2013; Shieh, 2006), informal economy (Satari Far et al., 2015), sprawled urban areas over acres of peripheries, and rural transformation (Saei Orosi, 2013), and the emergence of informal settlements around large cities (Maghsoodi Tilaki et al., 2011; Daneshpour & Tarantash, 2017). In addition to sprawled cities, the fast-growing motorization in Iran, in line with the global trends, dramatically caused the demolition of the indigenous structure of Iranian neighborhoods. As such, the domination of car mobility over most public spaces and street life were resulted in recent decades (Hosseini & Naghi-zadeh, 2016; Poormokhtar, 2013).

The motorization trend tends to be worrisome since - according to SCI (2018a)- the number of passenger cars registered in 2016 has been surging up to 57 percent of total vehicles. According to OICA, it has been estimated 179 cars per 1000 inhabitants by 2015. Although the motorization rate tends not to be as high as such developed countries as the U.S. (with 821/1000 inhabitants) and even many emerging economies, the issue is that the figure is rapidly growing (Figure 2) and the private car use rate is high as well (Soltani et al., 2018). Iran pursues a heavy vehicle use trend faster than most of the developed countries (Shaygan et al., 2017) with a 15 percent of annual growth rate (Soltani, 2017).

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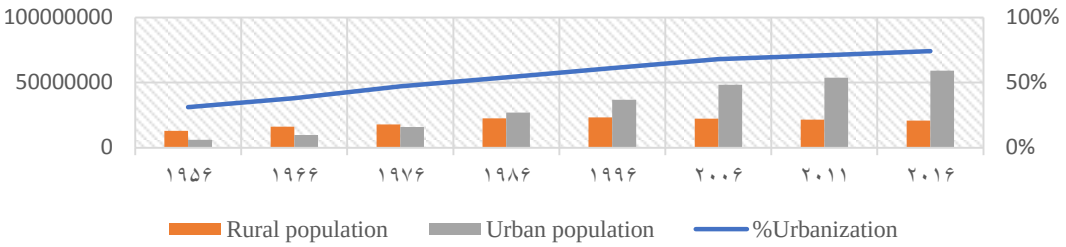

Fig. 1. Rapid urban population growth in Iran, source: authors based on the census data. (Source: SCI, 2018b)

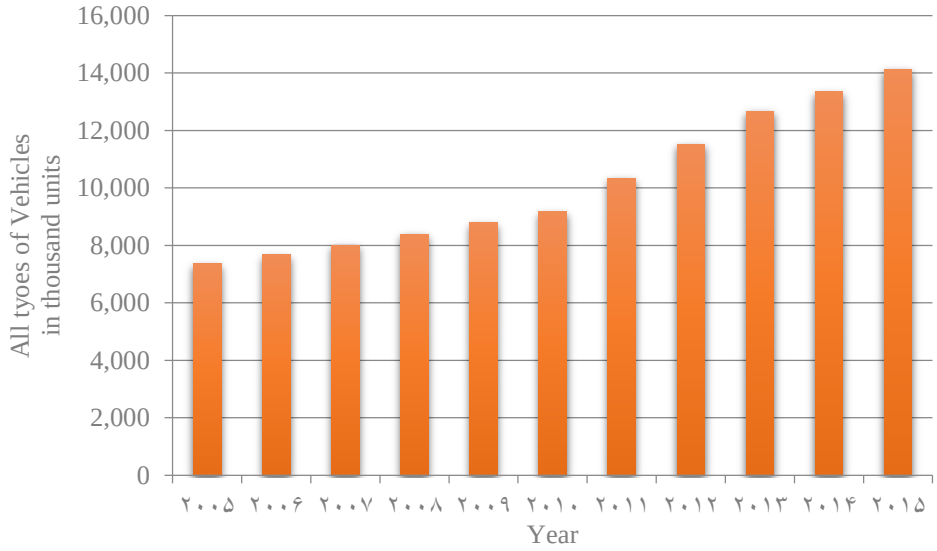

Fig. 2. Vehicle in use in Iran. (Source: OICA, 2015)

As in elsewhere, the impacts are clear in Iran: congested and polluted urban areas, mostly due to the poor quality of public transport, inadequate traffic management, the structure of street networks (World Bank, 2005; Moshfeghi et al., 2020), and consequently the considerable share of fossil fuels in energy end-use of Iran as the main source of green gas emissions (Mirmoghtadaee & Seelig, 2015).

The share of the transport sector in the consumption of oil products has been 58 percent in 2016 (IEA, 2018). As such, light-duty vehicles seem to be responsible for most of the urban air pollution (Saket et al., 2019) since they are the most frequent among all vehicle types circulating in urban areas and mostly consume gasoline. In fact, mobile sources (vehicles) are responsible for 70% of total PM emissions and 85 percent of all pollution sources in Tehran (Hosseini & Shahbazi, 2016). In Tehran, for example, there are 18.9 million vehicular daily trips that private cars are responsible for about 51 % (about 9.6 million) of total daily trips (Municipality of Tehran, 2019). This rate has been 10 %, 16% and 23% for metro, buses and minibuses, and taxis and minivans, respectively, during 2017-2018 (ibid).

In total, an increasing number of nuclear families, households' income, higher car ownership versus limited share of public transportation, traffic fatalities, vexing traffic congestion, and polluted urban areas have challenged the livability of Iranian cities, to a large extent. To address it, so far, the government, policymakers, and municipal officials have seriously made some efforts to turn the car-based transportation and urban planning models into the sustainable ones. Traffic demand management (e.g., restricted traffic zones), developing metropolitan mass public transit such as subway and bus rapid transit (BRT) systems in large cities, and more recently, approving a national TOD guide (2020) are some examples. The latter — as the most important national plan on the integration between transport and land-use planning ever passed- concentrates on the coordination between current urban development plans (from urban design framework to regional plans) and sustainable transportation. The guideline also determines the role of a number of organizations and actors influencing future TOD planning. Although TOD policies are generally designed in the local tier of policymaking and planning worldwide (i.e., provincial and municipal levels), the centralized, top-down nature of policymaking and dominant government-led initiatives resulted in a "national" guide in Iran. Taking the approval of the guide as a turning point, the present study attempts to describe the process and discover operational challenges and prospects for a successful TOD policy transfer and consequent implementation, offering an Iranian native edition. The current paper is based on the authors' experience of the process and results of a five-year study in "Road, Housing and Urban Development Research

Centre" (BHRC) to develop the Iranian national TOD guideline. The researchers will thus base the study on the international TOD literature and local studies, reviewing the contents of transportation and urban planning policies, relevant documents, and reports in Iran. The main goal, finally, would be to find generalities applicable to other TOD newcomers including oil-based, Middle Eastern countries and cities, which have similar problems, and - according to the literature- their policy-makers are trying to find practical solutions with the focus on TOD policies. As such, the research seeks to take a step closer to "think globally, act locally", what such nations aim to do so. This is based on the subject raised earlier in Thomas et al. (2018) which demonstrates the importance and difficulty of transferring "soft" lessons (e.g., government support, appropriate actor collaboration, and active public engagement) compared to "hard" technical tools, and difficulties and barriers in successful policy transfer. It is expected that the Iranian experience can be used as an example and starting point with countries having similar planning environment.

2. Research Methodology

The leading questions in this paper are: what lessons can be learned from the process and content of the local version of a global policy transferred to a central planning system? How could be the process and structure? And what are the possible main challenges/prospects for the implementation and realization of such a policy? The case of adoption of TOD in the Iranian planning system has been chosen as it can be considered a pioneer country to develop the TOD policy at the national level. As the main concept of TOD originates from Western countries with different planning environments, there are doubts about the success of "policy transfer" to a country with a different institutional and political atmosphere. The process of policy transfer may start from "soft learning" and even if the real practice takes time to occur, "organizational learning" will be also valuable (Da□browski et al., 2018). The paper will focus on the process of adoption in the context of governmental institutions involved in the process of policy transfer and the planning context in which the transfer has happened. The authors involved in the whole national guideline development process and enabled access to the detailed data of working groups, committees, preparation, and approval phases; that would be otherwise difficult to obtain. Special data related to all official correspondences between major organizations responsible for the preparation, review, and approval of the guideline, and the contents of official meetings between the technical committees and High Council of Urban Planning and Architecture have been also used for the paper.

The research has a qualitative approach, based on the case study. The critical analysis of Iran's existing situation, together with the review of a five-year process which ends up with the final approval of the guideline, are basic tools applied to investigate the situation. The paper consists of the following sections: In the next section, the literature on the transit-oriented development notion and practices overseas is reviewed. In section 4, the context of existing urban policies in Iran is explained, including transportation and urban planning policies, agendas, and planning instruments. Section 5 and 6 describe the gradual development of the transit-oriented idea in Iran and the process of the national guide provision. The final sections discuss the challenges and prospects for such a planning strategy in Iran and lead to the conclusions, including some recommendations for future research paving the way for TOD planning in Iran and countries with a similar situation.

3.Transit-Oriented Development

Transit-oriented development re-emphasizes the importance of integrated transport land-use urbanism, which has already been practiced in pre-modernist communities, especially, in European countries. This is based on the capability of changing the land-use configuration in reducing car dependency in contemporary urban design movements (Pourtazak et al., 2018). Although rarely a universal definition can be found for TOD owing to the diverse landscape of communities (Cervero, et al., 2004), it is defined as "a mixed-use community within an average 2,000-foot (or 10-minute) walking distance of a transit stop and a core commercial area. TODs mix residential, retail, office, open space, and public uses in a walkable environment, making it convenient for residents and employees to travel by transit, bicycle, foot, or car" (Calthorpe, 1993). TOD is a process concerning with the development of mixed-use areas including public services around a transit station (like LRT, BRT, bus) with high efficiency and high quality (Cervero R. , 1998; Curtis et al., 2009; Dittmar et al., 2004). TOD strategy combines land-use and transport functions to reduce urban sprawl and transform a city (Cervero et al., 2004; Newman & Kenworthy, 2006; De Vos & Witlox, 2013).

Coined by Peter Calthorpe, as a new urbanist, the key idea was based on the linkage between movement and urban structure, in line with Smart Growth and New Urbanism in nature (Xu et al., 2017; Dunphy & Porter, 2006) in order to fight against car dependence and its hostile impacts (Shibley, 1998; Goetz, 2013). TOD policies have proved to be beneficial for health, environment, economy, and society (Noblit & Hare, 1988). Transit-oriented areas produce less air pollution (Loo et al., 2017), since walking and cycling in TODs is economically valuable and less costly even than public transport (Victoria Transportation Policy Institute, 2010). Furthermore, according to Newman and Kenworthy (1998), it tends to foster a sense of community producing social benefits. TODs also fit with other recent trends in urbanism, such as the new role of streets as public spaces with multiple purposes (Park et al., 2019).

TOD proposals have already been applied in the planning process in various countries worldwide — particularly in Europe and Scandinavian cities (Curtis et al., 2009; Xu et al., 2017). In recent decades, practical guidelines on TOD have become an applicable approach for the transformation of American cities to avoid extensive

urban sprawl (Chisholm, 2002). In addition to the U.S., a set of transit metropolises such as Hong Kong, Singapore, and Tokyo have widely adopted the integrated transportation and development strategies that resulted in higher transit ridership (Cervero, 1998; Knowles, 2012). Some cities in South American countries have also developed TOD strategies around BRT stations (Goodman et al., 2005), with the prominent example of Curitiba, Brazil. India can be considered the first country to develop national TOD policies and guidelines. The application of new policy has been also investigated in some large cities such as Mumbai and Bhopal (MUDGI, 2016). Development of TOD policies and public transportation facilities have been started in some oil-based economies. A literature review indicates the efforts made in Qatar (Doha), Saudi Arabia (Riyadh), and Iraq (Baghdad). As Aldalbahi and Walker (2016) indicated, although Riyadh has a first-rate road network, it suffers from serious traffic congestion and air pollution. The low-share of public transport in daily trips, increasing car-ownership, and some traditional trends, e.g. limitation of women to use public facilities, are considered the major problems in their report. It is thus indicated that high-quality public transport can be considered an important element of mobility strategy by the authorities (Aldalbahi & Walker, 2016). In a similar study in Doha, TOD has been introduced as a potential solution to major problems due to a set of challenges — such as lack of land-use integration, transportation facilities, car dependency, insufficient public transportation facilities, low density, and urban sprawl (Al-Harami & Furlan, 2020). Although the situation in Iraq tends to be rather different from that of Saudi Arabia and Qatar, in a published study, it is emphasized that Baghdad has similar problems: growing urbanization, urban sprawl, excessive use of private cars, and inappropriate land-use mix and densities. Here again, TOD has been suggested as an urgent planning alternative to addressing such challenges (Alwehab & Al Ani, 2016).

The advantages of TOD, however, are not immediate, and even "best practice" locations such as Curitiba, have been shown not to sufficiently coordinate this development with other policies to diminish "environmental [impact], and reduce degradation, or motorization and irregular and substandard living areas [Favelas]" (Ghidini, 2009). There is a consensus that TOD in the long term should prove to be a winning development strategy in the developing world and could provide even greater benefits than in wealthier countries (Gilat & Sussman, 2003; Cervero, 2013). Such global practices and outstanding outcomes demonstrate that Iran — as emerging economies — can re-consider its urban policy framework and planning strategies with the aim of adopting transit-oriented proposals to meet urban challenges. Of critical success factors proposed for TOD planning and policy-making (Thomas et al., 2018), the role and nature of "plans and policies" seem to be prominent. As such, in trying to adopt a generalized model applicable to countries with similar problems/planning environment, the starting point will be to introduce how TOD policy has been transferred into the Iranian planning system, and if the experience can be duplicable under similar circumstances.

4. Policy Context

4.1.Planning policy: background and trends

In spite of the fact that the entire history of Iran is defined with various efforts made on arranging urban settlements across the territory, the life span of formal urban planning in Iran is rather short. It is agreed that urban planning was officially kicked off in the 1960s through a set of comprehensive plans prepared for some Iranian cities. This was supported by the establishment of the Ministry of Development and Housing in 1964, taken as "the starting point for urban planning in Iran" (Kamrava, 2009). In parallel, as of 1964, the Ministry of Interior (MOI) was charged with the short-term urban proposals for cities, which had been officially excluded in terms of making the comprehensive plans (Farhoodi et al., 2009). To have a legal position and also include the built-environment issues at the scale of architecture, the High Council of Urban Planning and Architecture (HCUPA) was officially established by the National Parliament of Iran in 1973, with the aim of coordinating urban development plans and promoting Iranian architecture. In general terms, the council is responsible for evaluating national planning policies, approving urban comprehensive plans, and preparing planning standards and regulations. It works as a technical arm of the central government in terms of urban planning and development issues.

To demarcate responsibilities and define the hierarchy of plans, the code of 'Renaming Ministry of Development and Housing to Ministry of Housing and Urban Development' was passed in 1974. Accordingly, the new ministry was responsible for a set of duties, other than those dedicated to the former one, including urban planning, urban development, housing provision, and governmental buildings construction. This has been a significant step in the Iranian urban policymaking because the definitions of territory comprehensive plan, urban comprehensive plan, and detailed plan were presented for the first time. As long-term plans, their main focus has been on the physical development of cities, resulting in suburban land development (Ziari, 2006). Land use, zoning, road network and transportation, basic urban infrastructure, development direction, housing, and urban regeneration were of the most frequent outlines. While this kind of planning was criticized and reviewed in the western world of the 1960s and afterward, Iranian policymakers decided to apply it, without being coordinated with a leading strategy at national and regional levels (Habibi, 2018).

Such a system of making planning policies and practices has been in place for several decades. Although it has systematically defined the associated efforts and to a large extent improved both the knowledge and techniques of urban planning in Iran, it is still criticized in a variety of ways, illustrating the fact that the efficacy of urban plans in Iran is precluded (see Barati, 2006; Farhoodi et al., 2009; Moshiri, 2010; Zamani & Arefi, 2013;

Rasoolimanesh et al., 2014; Azami et al., 2015; Mirmoghtadaee, 2016; Saeidi mofrad & Mofidi Shemirani, 2017; Assadpour & Melles, 2018).

Today, a set of new trends can be seen in urban policymaking that can support transit-oriented proposals, including some amendments in the current planning strategies: First, the regulation of urban street design has been recently reviewed in favor of public transport and non-motorized transportation. Second, the guideline for urban plan provision is also under revision at the national level, making an effort to replace Modernist comprehensive plans with a strategic planning paradigm which is attributed with a problem-oriented approach. Furthermore, in an attempt in June 2018, the high council passed a resolution namely “new approach in the provision of urban development plans” including such new outlines as actors' collaboration, city-region relationship, decentralization, and local entities, transparency in development plans, and integrated transportation and urban development (TOD) (High Council of Urban Planning and Architecture, 2018). In total, it is clear that new policies try to fill the abovementioned gaps in the current urban planning process and make use of state-of-the-art planning paradigms in contemporary planning knowledge worldwide.

4.2.Spatial and urban transport planning

The city comprehensive plan and detailed plan are the two most important figures to tackle urban affairs in Iran. They are prepared under some conditions posed by the predefined guidelines, more importantly, Treaty No.12. It includes a set of uniform outlines equally proposed for the entire Iranian cities. Its main focus is on land-use planning, mobility network and transportation issues, population density, floor area ratio (FAR), infrastructures and services distribution, housing, land ownership, and historical building and zones, proposed in the form of detailed maps and development codes. Proposals, strategies, codes, and maps stemmed from such plans will be applied for many years, depending on the plan vision (e.g., ten years for the comprehensive plan).

Land use, as the core of such plans, is mainly planned on the basis of some quantitative evaluations e.g., per capita. As such, the consulting engineers usually address urban/regional requirements just by dedicating the number of lands required for each land use. The mixture of land uses in connection with a public transport station is not usually regarded in this way. According to Tehran's comprehensive plan, for instance, a primary investigation revealed that most of the public activities are proposed to be concentrated around urban highways, not public transport infrastructures (Tehran Urban Research and Planning Centre, 2016). Generally, the final section of “standards and regulations” divides the city into several functional zones and sub-zones, including residential, commercial, green, mixed zones, etc. This section proposes a set of codes for maximum height, maximum floor, maximum FAR, occupied area of the land, setbacks, and parcel size. A steady density is devised across each zone according to the minimum width of near streets so that higher FARs can be possible only around wider routes, regardless of being accessible to public transport stations. Furthermore, there is a limiting maximum FAR in historical zones, including the permitted number of floors — that is usually "one" or at a maximum floor is two — kept lower than other urban areas.

Regarding parking codes, it is mandatory for all buildings to meet minimum parking codes and provide the associated parking space inside the buildings. Parking codes are different for various land uses. For example, dwellings must have at least one parking space per unit which takes an average area of 30 square meters of total building FAR, while for the commercial uses the required space is determined based on each 100 square meters net FAR. In addition, all lots must have a parking entrance directly connected to the streets which can interrupt the flow of pedestrian movement along sidewalks.

In 1994, the High Council of Urban Traffic Coordination of the Country was established under MOI by a code with the same name. The council chaired by the deputy of MOI is responsible for designing coordinated policies on urban traffic and transportation and all the issues related to the urban movements nationwide, including high supervision of all urban transportation plans (Islamic Parliament of Iran, 1994). A by-product of the code of 1994 has been "Comprehensive Urban & Suburb Transportation and Traffic Studies", recently updated in 2016. Also, so-called Transport Comprehensive Plans are the most important transport planning document of cities to guarantee quality urban transportation and maximize ridership — exclusively through public transportation (Plan and Budget Organization, 2016) — but without attention paid to the land use planning role. Although land-use studies have partly been mentioned in the guideline, its coordination with public transport has not been consolidated. The major problem is that its strategies do not essentially accommodate the strategies of the urban development plan.

In parallel with these plans, city comprehensive and detailed plans determine the features of the mobility network, including the sizes and locations of carriageways, cycling lanes, sidewalks, parking, street profile, etc. Mobility-centered standards and codes are also the inseparable parts of the guidelines. Figure 3 demonstrates how urban transportation planning and management are handled in Iran. In general, MOI, as the main actor, is responsible for making urban transportation policies and plans, along with city councils at local levels. Meanwhile, the Ministry of Road and Urban Development (MRUD) manages the issues related to transportation sectors excluding urban transport, while is responsible for all policies and plans associated with urban development and plans affairs.

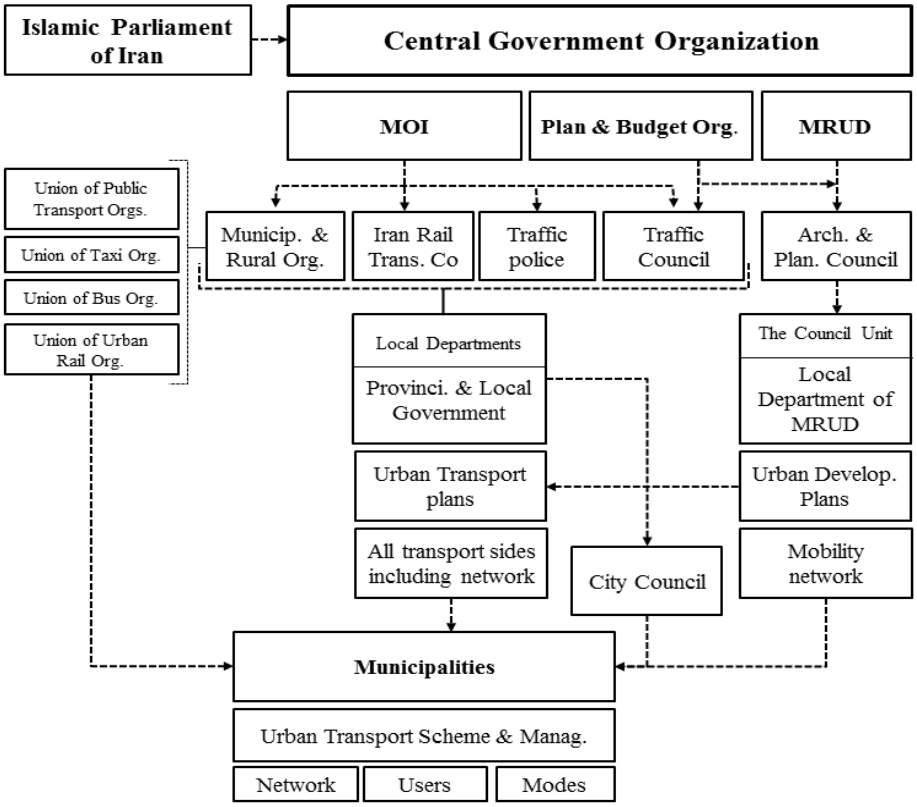

Fig. 3. Brief structure of urban transportation planning in Iranian cities

Municipalities are in charge of implementing strategies and action plans and managing urban affairs. The implementation, quality, and progress of plans are supervised by the local departments of MOI and MRUD. City councils pass annual budget plans, including the budget required for transportation plans. Traffic police are in charge of traffic management. In addition to this set of key actors, there are other national and local entities engaged in urban transportation with diverse responsibilities (Table 1).

Table 1
National and local entities engaged in urban transportation planning, implementation, and management

Institution/ Entity	Affiliation	Tier	Key functions / duties
Islamic parliament of Iran	Legislature	National	Legislation/policymaking National budget plan
Plan and Budget Organization	Central government	National	Preparing technical guidelines including urban & transport plans and making decisions on transport projects and funding
High Council of Urban Traffic Coordination of the Country and its local departments	MOI	National / local	Policymaking, planning, coordination, supervision (of transport plans)
HCUPA and its local departments	MRUD	National / local	Policymaking, planning, coordination, supervision (of urban plans)
Iranian Rail Transportation Co	MOI	National	Coordinating urban rail organizations, accelerating urban metro projects, decreasing costs, localizing equipment production
Traffic Police Department	MOI	National / local	Road traffic management and enforcement of the regulations
Municipalities and Rural administration organization	MOI	National	All municipality affairs including financial support of municipality plans
Union of National Public transportation Organizations	MOI	National	Coordination and solidarity of public transportation organizations of municipalities (under 100,000 inhabitants) across Iran
Union of National Taxi Organizations	MOI	National	Coordination, assistance, education of taxi organizations across Iran
Union of National Bus Organizations	MOI	National	Coordination, assistance, education of bus organizations across Iran
Union of National Urban Rails	MOI	National	Corporation among and assisting urban rail companies across Iran, and interaction with upper entities
Institute of Transportation and Intelligent Systems	Tehran Polytechnic University	National	Research on the application of ITSs in urban transportation
City council	MOI	Local	Budgeting
Traffic and Transportation Organization/deputy	Municipality (MOI)	Local	Infrastructure construction, traffic engineering, management, supervision

(Source: authors based on organizational duties underlined in the laws text or the official websites)

On the demand side, there are several major transportation pro-car policies and strategies, encouraging the growing motorization in Iran. Sympathetic toll system for cars, accessible loans and governmental facilities for car producers and users, highly subsidized fuel price, driving-targeted urban transportation policies (e.g., available free/low-cost parking), and car-oriented urban design codes at local levels are some instances of the associated policies. The high level of subsidization of both final product and inputs like capital costs has caused an increasing transport demand beyond economic justification, a growing rate of private car use, and infrastructure maintenance discouragement (World Bank, 2005).

Reviewing most of the codes, regulations, plans, and strategies applied so far — over the contemporary urban and transportation planning in Iran, it can be seen that there is a procedural legal and institutional framework that ended up in a transit-centered development document and subsequent events. In fact, a set of sectional strategies have been used to organize the issues related to the urban challenges e.g., traffic congestion and air pollution, specifically in Tehran and other large cities. From the second half of the 2010s, the integration of public transportation modes has been given weight, while the private car movement has still a priority for policy-makers. Of public transport modes, the integration of rail transit with inter-urban and intra-urban systems in the new government, from 2013, has been paid attention, by which the national TOD document resulted. On the other hand, old-fashioned master plans (i.e., urban development and transportation) have recently been replaced with sustainable (strategic) ideas, such as sustainable urban regeneration and transit-oriented urban development. But what can be seen across the whole modern period of urban and transportation planning and design is that, aside from scanty recent efforts, no evidence can be highlighted as the integrated transportation and urban planning in Iran.

The next section will discuss the process for preparation and approval of the national TOD agenda and guide. Doing so, at first, the organization chart of MRUD and the responsibilities of each part will be introduced in this way. Then, the actual process of preparation, review, and final approval of the national guideline will be introduced.

5. National TOD Guide Procedure: From Conducting to Approval

Traditionally, urban and traffic planning were two separate tasks, supervised and controlled by different institutions, sometimes with overlapped responsibilities which lead to a so-called car-oriented urban development in Iran: The "Ministry of Housing and Urban Development", which was responsible for planning and development of settlements, was established in 1974. At the same time, the "Ministry of Road and Transportation" used to deal with various issues related to the movement of people and cargo via all transportation means (aviation, marine, railroad, and road transit systems). In 2011, due to the decision made by the government to reduce the size and responsibilities of governmental bodies, the two ministries of "Road and Transportation" and "Housing and Urban Development" have been merged to form the new "Ministry of Road and Urban Development" which would cover the responsibilities of the two ex-ministries. This action caused various reactions and the pros and cons of this decision have been discussed seriously. Each of the ex-ministries was responsible for a vast area of duties, and the new ministry had to deal with all those tasks individually. Considering all advantages and disadvantages, there was at least one positive consequence, which was the growing awareness of the necessity of integrated land-use-transportation planning. In another word, the importance of connection and integration of the city and transit networks has been recognized and became the focus of planning policies. The introduction of a new concept of "rail-based urban development" raised by Abbas Akhoundi (ex-minister of road and urban development) in 2014, was a practical consequence (Akhoundi, 2017). His first official action was a hand-written letter to the three vice-ministers including the president of the "Railway of the Islamic Republic of Iran", vice-minister of "Urban Planning and Architecture" (UPA), and president of "Road, Housing and Urban Development Research Centre" (BHRC) asking them to prepare an 8-year action plan to achieve the goals related to so-called "rail-based urban development". The official task created a new movement in the ministry which was the starting point of a new generation of research projects and actions. The new approach finally resulted in the preparation of the "National TOD Agenda" and "National TOD Guideline".

MRUD has officially followed the process for preparation and approval of the national TOD agenda and the guideline. Doing so, two vice-presidencies of UPA and "Transportation" together with BHRC started the cooperation process (Figure 4). BHRC as the research and development organization affiliated with the ministry has the task of scientific support with the focus on applied results to fill the knowledge gaps of the ministry. It has the power to prepare guidelines and regulations related to construction and transportation activities. With this background, BHRC started fundamental and applied research to define the local concept of TOD. Considering the practical nature of the guideline, transportation vice-presidency has also supported the process.

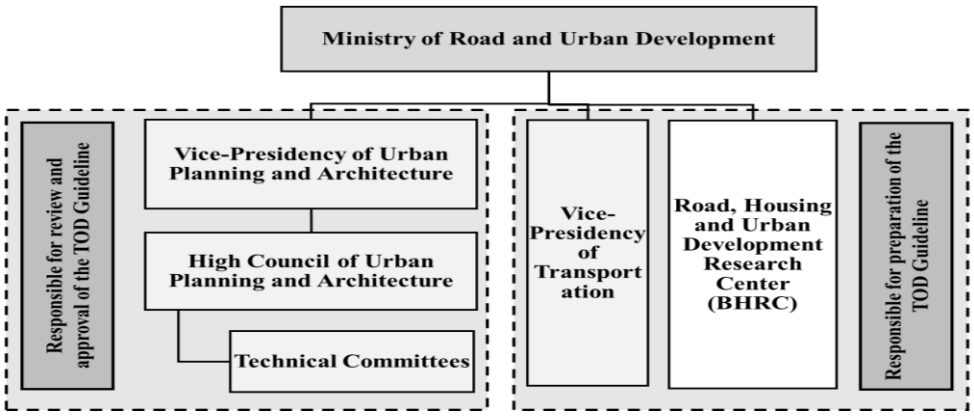

Fig. 4. Task divisions for preparation and approval of the national TOD guideline

Meanwhile, according to the official process of HCUPA, any planning regulation should pass the process of review and acceptance in the technical committees of UPA (Figure 5), before it can be approved and ratified by the high council. The formation of technical committees was legally based on the 1973 law of the establishment of HCUPA. Currently, five Technical Committees are working under the UPA, each has its own duties. The composition of the committees is similar to the HCUPA, with the difference that HCUPA is composed of the higher-level representatives of the member organizations, while in the committees the experts from the same organizations will take part. After the general acceptance of any plan/ regulation in the committees, it can be transferred to HCUPA for final review and approval. The structure of the committees, while providing the possibility of a comprehensive review of any document from different -sometimes- opposing viewpoints; make the process of reviewing documents prepared through an innovative approach, time-consuming and controversial. This might be considered as one of the reasons for prolonging the review process of the national TOD guideline. However, considering the multi-disciplinary character of TOD policy worldwide, achieving a consensus among various organizations may be considered promising to enhance the realization potential of the document.

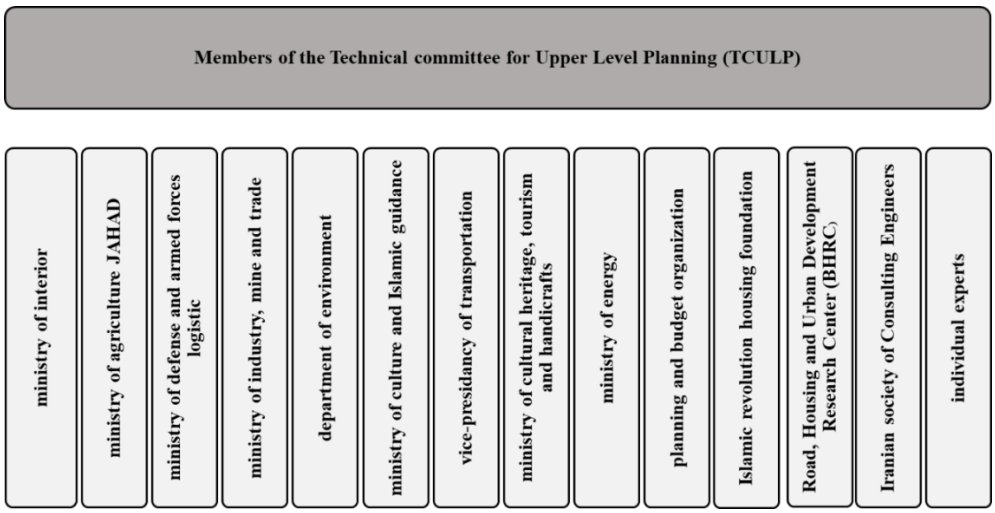

Fig. 5. Organization of the technical committee for upper-level planning of HCUPA

As expected, the review process in the technical committee was very controversial. Long discussion needed to be done to achieve a mutually agreed definition: TOD entails higher density and changes on the mixture of land uses, with the general goal of concentrating activities in the station area. This character opens the door for speculation and profit-making of developers, which do not support the TOD approach, as discussed later. The danger is that higher densities happen without any link to sustainable mobility. Another topic of discussion was the method to link the TOD concept to planning documents at various levels, from regional to local. These issues together with the responsibilities of main organizations for the realization of the TOD policy have been foreseen in the guideline. Figure 6 indicates the timeline of the process, which finally was led to the approval of the guideline.

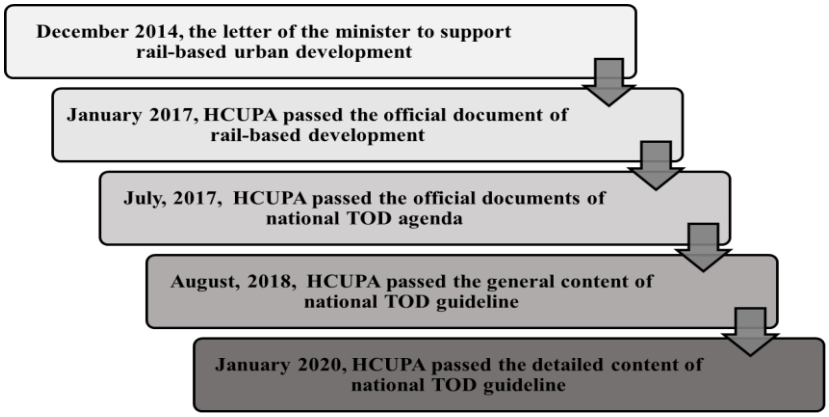

Fig. 6. Timeline of the planning and approval of the national TOD guideline

6. Content of the National TOD Guideline

The national TOD guideline has been prepared to achieve consensus among governmental and non-governmental organizations as well as experts who are involved in decision-making, decision-making, planning, and implementation of urban planning and transportation planning tools and documents. HCUPA enforced and released the official document with the emphasis on the following considerations:

TOD approach has been developed in coordination with the national TOD agenda and should be enforced at urban and regional scales with consideration of the individual character of cities and regions and also, at all planning levels.

- The general goal of the guideline is to achieve integration of urban and regional development with public transportation planning and also to establish agreement on the definition, approach, and application of TOD in all planning documents.
- Official audiences of the guideline are planning organizations and authorities who are responsible for the review and approval of the plans.
- The enforcement of the guideline at all planning levels entails planning for education programs and capacity building for planners and experts, with the coordination of MRUD as the main responsible body.
- The content of the guideline should be reviewed and revised at pre-planned intervals.
- The office of urban planning and development (affiliated to UPA) is responsible for the revision of the content of planning documents according to the content of the guideline.

The national TOD guideline is composed of four parts : (1) Definition (e.g., TOD definition, levels, principles, place types, etc.), (2) Generals (i.e., vision statement, goals, strategies, policies, etc.), (3) TOD redefinition with regard to Iranian planning system (e.g., an adaptation of TOD levels into Iranian planning levels, station typology, expected output at each planning level, etc.), (4) Role and function of different organizations to facilitate TOD implementation (e.g., the role of main governmental stakeholders in supervision, revision, dissemination and capacity building, documentation and funding of the guideline) (MRUD, 2020).

7. Prospects and Challenges

Recent approaches in the development of the TOD agenda and national TOD guidelines were turning points in urban mobility planning in Iran. By now, the national and local bodies are further aware of the importance of transportation and urban development linkage. In a shift, Iran Railway has recently taken an approach to (re)locate central rail stations further close to urban development connecting with other urban transport modes, for instance. At the urban scale, various cities are quite competing in order to put TOD proposals in place (e.g., Tehran and Qazvin). However, the weight of challenges standing against TOD planning in Iran is greater than opportunities. In fact, paper works and even official rules and regulations are not sufficient tools for realizing expected goals. Achievement of sustainable mobility objectives needs the activation of all stakeholders at national and local levels, otherwise, the official documents will remain untouched in the libraries. Iranian experience during recent years indicates that the following topics considered to be the main obstacles to realize TOD policies:

7.1. Inconsistent planning policy and the consequent changes in the priorities

Planning policies and approaches root in the political system of any country. As discussed earlier, the planning system in Iran has a top-down mono-concentric nature in which governmental authorities have a central role in policy definition. The planning system has also an inconsistent character; changes in the central government after the presidential election will lead to major changes in the policy priorities. As such, changes in the managerial team will lead to the collapse or negligence of previous trends. The experience for the development of TOD guidelines during several years indicates a similar situation. After the resign of the ex-minister, the successor expresses new, different priorities. The success for final approval of the guideline was only due to the efforts of some experts with limited support from the main authorities. International findings also indicate that

inconsistent planning policy and major changes over time is an obstacle to achieve TOD goals (Thomas et.al, 2018).

7.2. Profit-making from TOD potentials such as densification, land-use changes, etc.

Most TOD textbooks and guidelines define it as a high density, mixed-use urban development in the station areas. The general approach, which is acceptable in the North American planning environment, might be considered a threat in the Iranian planning system. Municipalities, as local authorities to define land-use and building density (in the framework of comprehensive plans), have an inconsistent and unstable budget for urban management. In recent decades, receiving penalties from "land-use change" and "selling extra building densities" are major parts of the official budget of Iranian municipalities especially in metropolitan areas. In this context, TOD might be used as a "scientific" justification for land speculation and profit-making (Mirmoghtadaee, 2016). Tehran municipality, as an example, has located areas around metro stations to develop "TOD projects" which are multi-story commercial centers with private parking lots near the stations. This is a common practice in big cities with no prospect for the development of public transport or planning to increase their share in daily trips.

7.3. Lack of practical experiences

Misunderstanding and misuse of the TOD concept are among major obstacles to have a successful TOD experience in Iran. The first experiences of so-called TOD projects are multi-story commercial centers adjusting metro stations in some big cities, which have been started a decade ago. The projects were considered a tool for financial support to develop metro-lines. This "false" start caused a misunderstanding of the role and meaning of a TOD project. However, in recent years after raising the concept of TOD policy and development of the agenda and the consequent guideline, the efforts started to change the image of TOD from profit-making and money-raising to its main goal to increase the share of the public transportation system in daily trips. Iran is still at starting point to develop the main concept and realize the main goals.

7.4. Weak public support under lacking educational programs

TOD is a multidisciplinary approach, which can be explained according to various opinions and normative backgrounds. One of the main goals to develop the national guideline was to reach a consensus in TOD definition and policy approach. However, as mentioned earlier, the guideline itself may not be sufficient to achieve the goals; there is an extreme need for capacity building and education among experts, policy-makers, and even the public. The general misunderstanding of Iranian experts and policy-makers, which consider high-density commercial centers adjusting the metro stations, as TOD project, is a serious risk, which ensures the need for education, and discussion on different approaches and what is needed according to local situations. According to the guideline, MRUD is responsible to plan for educational programs; however, as the ministry involved in a various and wide range of tasks from housing provision up to the whole range of transit systems, it is not realistic to expect that they give priority to TOD topic. Affiliated organizations such as BHRC that is officially responsible for research and education within the duties of the ministry may support educational programs. The supply-demand chain is also very important here: urban and transportation planners should also demand educational programs. This will be expected when the ministry enforces the TOD approach and asks for its realization at all planning levels and in all planning documents. Although it is included in the guideline, without the willingness of and serious demand from the ministry, the legal documents will not go into real practice.

7.5. Low capacity of local authorities to TOD implementation

TOD is based on a wide range of principles from walkability, cycling, and mixed-use planning to the provision of different public transportation facilities. Local authorities involved in sustainable urban mobility planning do not consider the whole range of possibilities offered by TOD. They often consider it as a resource-consuming approach suitable for wealthy metropolitan areas. Iran has a wide range of cities including small, medium-sized, and few metropolises. Local authorities of small and medium-sized cities, which accommodate a considerable share of the urban population, usually access to limited financial resources to manage the city. Provision of sufficient public transportation infrastructure entails funding from the central government, which is hardly available. The local authorities are usually not aware of cheap strategies such as improvement of sidewalks or cycling facilities, which are the best solutions for small and medium-sized cities. Here again, capacity building and educational programs specifically designed for these cities are needed. Local authorities should access a wide range of sustainable urban mobility possibilities, which are not limited to BRT and metro systems, and may include local buses or improved shared taxies, etc.

8. Discussion, Conclusion, and Future Work

The research has been started with three leading questions. In conclusion, the authors try to present crucial arguments to the raised questions. The potential, main challenges/prospects for implementation and realization of TOD policy is one of the leading questions which has been comprehensively discussed in the previous part, indicating five main challenges for TOD realization in Iran. The lessons which can be learned from the process and content of Iranian National TOD; and the way it can be structured formed the main structure of the final argument. Effective TOD policy transfer requires a

supportive environment of urban policy design and other preconditions by which the context for TOD successful implementation is provided. Aside from little recent improvement, the general content and process of policy design in Iran tend not to be conducive to the national TOD policy adopted in these years. Overall, reviewing the content of modern urban policies in various areas of urban affairs in Iran demonstrated that a disparate set of inconsistent policies and regulations completely or partially stays in the way of transport land-use integration. Except for little evidence of recent transit-centered policies, urban development policies generally encourage car mobility, which is contradictory to TOD proposals through sprawling, car-oriented new town, far-reaching constructions without public transport connections, secondary priority of pedestrians, etc.

On the transportation side, what can be seen is that a variety of the corresponding entities, laws, and regulations formulates urban transport planning policy in Iran, which has partly made a kind of dissonance in the planning process. For instance, even though municipalities are in charge of almost all transportation planning and executive plans, parallel sub-institutions focusing on different modes, such as metro, bus, and taxi, have some disintegrated roles. While comprehensive urban transport plans are mandated to be coordinated with the city comprehensive and detailed plans, there are typically discordances between strategies. In fact, neither development plans nor transport plans tend to pay attention to the integrated transport and land use proposals, unlike the global best practices (e.g., Curitiba). Actually, it seems to be a Development Oriented Transit (DOT) model by which transport plans mainly address urban physical developments. On the other hand, parallel actions and unremitting changes on the contents of the laws and passed regulations (i.e., amendments), due to political instability and the bureaucratic structure, have made transport policies inefficient somehow. In the same vein, car use is facilitated by subsidizing the fuel, available parking, car purchase loans, and constructing the context required for high-speed car movement inside urban areas (i.e., urban highways).

In response, the national TOD guideline has been developed as a general policy paper to be included in planning documents. The challenges to develop a general agreement doubled by insufficient financial support for practical research, hinder the development of practical design guidelines or design manuals. The guideline only deals with upper-level policy-making and does not go into details. It can be considered the first step to integrate urban-transportation planning in Iran. Best practices world-wide indicate that TOD has a local character and local authorities of the states should develop guidelines according to their individual situation. It is expected that different Iranian provinces start local practices to be able to develop local policies and detailed design manuals. It means that the policy-making, which has already a top-down approach, should motivate a bottom-up movement. In this case, the experiences and documentation of local authorities would support the further improvement of the national guideline (Figure 7). In this sense, next action research is recommended on various aspects of TOD planning in Iran, more specifically to support local efforts. Today, for example, local authorities need to be familiar with financing mechanisms based on Iranian economic conditions; they should be aware of required design-oriented updates under TOD proposals; role of TOD actors, public engagement prospects and challenges, TOD-centered educational programs are other prerequisites and research outlines in Iran.

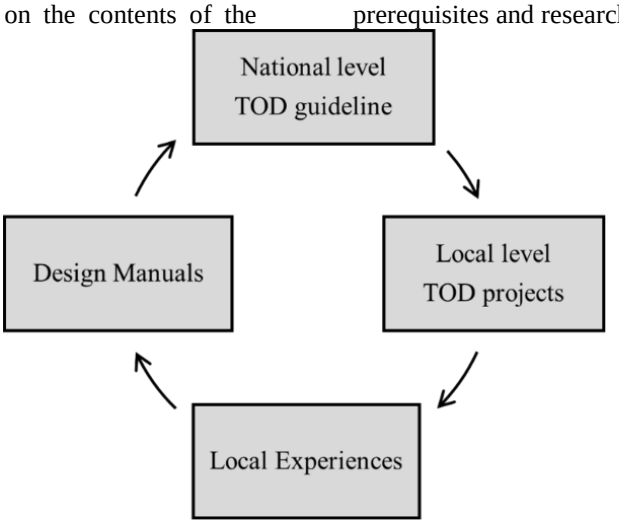

Fig. 7. Top-down and bottom-up approaches to improve TOD guideline

This study might also offer some lessons for such countries with a similar system of urban planning and/or policy challenges which are planning transport and land use integration. According to Table 2, strong political will supported by an assistive institutional structure and inter-body cooperation resulted in the preparation and approval of the plan. In addition, the content of the guideline had some lessons. Apart from establishing a new planning policy system for the country, it tried to translate the idea based on Iranian local circumstances. The guideline was also multi-facet engaging various bodies and flexible to be evolved during the development phases. Such policy lessons have the potential to be easily transferred to other contexts with some local adaptions. As discussed earlier,

it may conclude that Iran has managed to start "organizational learning" and to develop "institutional capacities". TOD as a planning policy to integrate urban and transportation planning has been already introduced to planners and policy-makers. Although misunderstanding and misuse is still inevitable, there are hopes for starting the second phase of policy transfer which is implementation and real practice in towns and cities.

Table 2
A summary of offered soft lessons by the national TOD guideline

Theme	Topic	Offered lesson
Preparation and approval procedure	Institutionalization	• Institutional amalgamation of "urban development" and "transport" affairs: Ministry of Road and Urban Development
	High-level (government) support	• Direct order and support of the minister for TOD plan preparation
	Inter-body relationship	• Involvement of transportation as well as urban development and architecture (UPA) vice-presidencies, and a multi-disciplinary research body (BHRC)
Guideline content	Context-sensitiveness (transferring and translation)	• Making attempts to present the native edition of global knowledge and policy
	Flexibility	• Open doors for the guideline review and revision at pre-planned intervals
	Knowledge sharing and engagements	• Definition of the roles and responsibilities of various governmental and non-governmental organizations • Education programs for planners, officials, and interest groups

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