Exclusionary Decision Making in Tehran Metropolitan Region- Complexity, Self organization and Power of Action

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Abstract

Viewing urban areas as webs of complex, interwoven networks, this article aims to analyze the decision-making process and its outcomes in Tehran metropolitan region. To do so, first the theoretical basis of complexity in urban life and its implications for planning have been reviewed. Using the main notion of power of action i.e. agency, and through creating the network of actors and their relations as defined by the planning system, a qualitative assessment has been carried out. Findings suggest that the concluded decision-making trends and their corresponding planning interventions are feeding the power conflicts between actors and have mainly turned the inherent capacity of self-organization to solve problems into a rather harmful occurrence through processes of exclusion, the most prominent of which are: partial involvement of the actors of the network and a disregard for their interactions, silo mentality and sectoral and fragmented decision making. All of this point out to the necessity of a move towards a form of decision making that is more facilitating, inclusive, fluid and bottom-up in every aspect.

Keywords: Urban complexity; Self-organization; Decision making process; Power/agency; Tehran metropolitan region.

1. Introduction

For years planners and governance authorities in the city of Tehran and Tehran metropolitan region have tried to make sense of the reasons that the provided plans are not realized or implemented accordingly, for example why informal and illegal settlements are formed and grown despite the planning's efforts regarding housing and employment provision. The low rate of the realization of plans in this context is the problem that this article wants to study through these questions:

- Using a complexity approach, what are the some of the main trends in decision making in terms of actors and their relations?
- How these trends are linked with the realization of the decisions?

This article argues that trying to find the answers within the framework of complexity can be beneficial in two ways: firstly in understanding why things happen the way they do and secondly to find out what direction should future efforts take.

This article chooses notions of 'power' and 'agency to act' within networks along with self-organization, as part of the complexity theory and complex systems theory, to show that the divergence from the formal planning, often considered negative by planners and administration, can actually be explained as the residents' efforts in trying to create a better situation for themselves. Within this perspective, it seems that these occurrences can generally be deemed positive because they are based on the needs of the residents, realized by them, and also because they are where does the conflict come about? Or in other words, in what way does planning frustrate the self-organizing process?

In the following sections, first there would be a brief review of the concepts of complexity in urban context and the notion of self-organization and how they relate to creating power of actions for different actors. Then the existing processes in the context in terms of decision-making and planning are introduced and analyzed to show how the conflict between the actions of the people, planning and administrative bodies arises. The article goes on to explain how the observed trends in the region, dubbed in this article as processes of exclusions, affect the position and power of the actors within the network and provide the contextual conditions for the self-organization to have incompatible and conflicting outcomes or in other words the context's role in translating the efforts of the population into even more perceived imbalance.

2. Complexity and Cities

In recent decades and with the development of new technologies, global reorganization of relations and environmental risks, the urban areas have gone through fundamental changes resulting in a new outlook on the roles of location and periphery, definitions of space and place, mobility and other concepts. Complexity and its theories have tried to provide a framework for understanding the new dynamics and their chaotic nature and unpredictability.

Cities are no longer perceived as geographical entities with distinct identities. Rather, the urban today has

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become a concentration of multiple socio-spatial circuits, diverse cultural hybrids, sources of economic dynamism and a complex range of interrelated processes that form a coherent, albeit multifaceted time-space system. The city is perceived as a complex set where past, present and future converge; a dynamic entity that embodies the social narrative and the attempts to govern its social interactions and spatial distribution, i.e. urban development. In political terms, Friedman defines urban development as anything that happens to a city in terms of maintenance, transformation or any other change of its original state (Cvetinovic, Nedovic-Budic and Bolay 2017, 142).

Thus it is necessary to shift the deterministic concept of a city to a more comprehensive and network-oriented concept that considers complexity of the networks and their interfaces to better understand and generate urban strategies (Huang 2012, 43-45).

Although these efforts are gaining momentum in theoretical studies, they are still rarely utilized in practice. Specially in the context of this study, Tehran metropolitan region, where the modernistic ideas of top-down control are still the prevalent discourse.

The use of complexity theory in the analysis of urban areas has occurred only within the last 15 years (i.e., fractal analysis, cellular automata). For many, the book that introduced complexity to the study of urban areas was Fractal Cities by Michael Batty and Paul Longley (1995). While Batty's books concentrate on methodology, others are applying the philosophy of complexity theory to planning. These researchers have started a movement that is building momentum in urban planning literature (McAdams 2008, 2).

Complexity deals with multiple causes, patterns, networks, interdependence, nonlinearity and structure. Bar-Yam states that the central questions in analysis of complex systems are about 1) Emergence (relationship between fine and large-scale behaviour) and 2) interdependency (how does one part affect the other parts or the system?) (Bar-Yam 2015).

In complex systems, which are part of the broad literature of complexity, parts of the system are considered agents (also referred to as actors in other parts of the related literature). These agents (considered as individuals or organizations with certain characteristics) associating with other do not interact randomly or capriciously but self-organize in a manner that is dynamic, but also non-linear, resulting in states of existence, referred in complexity theory as 'emergent states.' The systems are open such that new elements or agents can come into the system to change it to another state (McAdams 2008, 3). The two notions should not be confused though, properly defined 'self-organization' and 'emergence' can happen without the other.

Cities as complex systems share the same characteristics. A city is composed of layer upon layer of interactions which represent a multiplexing of networks acting to deliver energy, information, materials and people to its parts in such a way that the networks contain great redundancy. If fractured, cities usually continue to work although if their key hubs are attacked they will break down. In the same way if they become overloaded, their networks jam but in general, because they operate from the bottom up through the actions of millions of individuals, they ten d to adjust easily and quickly to changed circumstances (Batty 2012, 55). Therefore, the aggregate conditions one sees within urban systems develop from the bottom-up, from the interaction of a large number of elements at a local-scale. Policy and planning need to adapt to this realization and consider urban systems from the bottom-up. That is why, there is currently a move towards individualistic, bottom-up explanations of urban form and behaviour, which synthesizes nicely with what we know about complex systems (Crooks, Patel and Wise 2013, 32).

The framework of complexity challenges the existing urban concepts and redefines them in a new light. For example as Paasi states a region can be defined as 'the product of the networks, interactions, juxtapositions and articulations of the myriad of connections through which all social phenomena are lived out'. Such `border and scale-crossing' complexity becomes clear when we look at regional assemblages, politics, and power in the context of governance. Even so, their idea of a region as a relational assemblage can be pushed further to take a broader look at the complexity of actors involved in region building (Paasi 2010).

This framework also has implications for the practice and theory of planning and consequently the role of planners. As Portugali states, complexity theories of cities (CTC) never explicitly criticized classical urbanism and yet the criticism is implicit in the very logic of CTC: Classical theories of cities assume that cities are essentially closed systems and as such tend toward a state of equilibrium and as such are predictable and controllable. While in complexity approach cities are essentially open systems and as such are in a permanent state of 'far from equilibrium condition' and 'on the edge of chaos' (Portugali, 2012, 53). With this implication, the traditional role of an urban planner in predicting and controlling the changes will significantly change. However, what it changes to, is the integral question.

The changes of the city of Tehran and its permanence in the surrounding area and later formation of other settlements in the metropolitan region can be a clear attestation to how unpredictable the urban dynamics are. Having said that, the traditional notion of control is still glaringly present in planning administration and legislation.

While an exact definition of complexity is hard to pin down, the main characteristics of complex systems are self organization, emergence, non-linearity, feedback, and path dependence. Together, these concepts provide a new way of thinking about cities and new tools for solving the problems faced by cities (McAdams 2008). Contemporary understandings of complexity are increasingly emphasising the concrete situations whereby everyday places and things matter and everyday choices are made: where 'forms of life' evolve through the selection by participants of particular and situated orders from ranges of 'adjacent possibilities' (Kauffman 2002). Building on

these, cities are emergent phenomena formed by individual and collective choices which make greater urban and social orders.

Therefore there is a common theme in most of the literature of complexity that connections/relations and interdependencies between actors and agents plays a vital role in the behaviour of complex networks. This concept has brought about a large body of research and has led to the perspective of looking at space and place relationally. This study is trying to build on the importance of these relations and how they can induce action.

The main shift in looking at urban life through the lens of complexity is moving from an individualised, subject-object oriented perspective to an inter-subjective relational perspective in which actors are engaged in 'a game burdened with a political reality founded in power' (de Roo 2010).

2.1. Self-organization

Self-organisation emphasises a mechanism through which complex systems generate their own state of being while continuously evolving to find an optimum fit with their environment. The concept of self organisation originated from the hard sciences of physics and cybernetics. It successfully crossed into biology before being discovered by the social sciences. Economics was an early adopter, followed by urban and regional studies and more recently planning (Zhang and de Roo 2016, 253).

A key feature of systems that regenerate themselves is that they do so spontaneously. To do so otherwise would require control of every basic element of the system and it thus follows, that systems of any complexity must effect self-regeneration through self-organisation from the bottom up (Batty 2011).

One of the first people to consider cities as self-organizing systems is Juval Portugali. In his concept the city is a reciprocal product of the initiatives of actors, influenced by personal/individual motives (caused by their environment), interacting with spatial developments that are in their turn product of collective actions. The outcomes of such processes manifest themselves in specific urban forms and patterns (morphological or functional), physical growth or the emergence of new socio-spatial groups as a result of certain geographical settings or characteristics such as houses, lots and housing blocks (Boonstra and Boelens 2011, 110).

In an urban context Bonstra and Boelens (2011) define self-organization as 'initiatives for spatial interventions that originate in civil society itself, via autonomous community-based networks of citizens, outside government control'. They use this concept to explain why and how citizens contribute to urban development out of their own motivations. The continuous movement results in patterns and unforeseen initiatives emerging spontaneously, without being controlled by one central manager or director. An emergence of social structures or patterns without the machinations of external agents or in other words a process of autonomous development and the spontaneous emergence of order out of chaos (ibid). However as Zhang and de Roo (2016) explain, in any context, not all the consequences of self-organization are desirable. This is where a difference can be seen between complexity in physics and social complexity. Because the latter has to take into account human beings, their consciousness of their environment, their capacity to learn or to adapt and their ability independently to oppose, or to act contrary to, generic rhythms, flows, attitudes or conventions (Zhang and de Roo 2016).

Self-organization here is essentially a new way of seeing, of realizing that self-organizing systems, be they humans or cities, are essentially and profoundly unstable, chaotic, far-from-equilibrium, unpredictable, and that therefore we have to find ways to live with their complexity. From this perspective follows, for example, a new type of action in the city, a new type of city planning, the aim of which is not to control, but to participate (Portugali 2000).

Therefore, actors in the network of any urban area such as Tehran are self-organizing while the urban decision-making is still practicing the controlling, top-down rhetoric. The authors suggest that this is where lies a conflict in which the context of the prevalent mindset to control pushes and in a way distorts the self-organizing efforts of the system to extremes beyond what contextual conditions dictates, resulting in lower rate of plan realization and less all around outcome desirability.

The distortion happens because the current planning body uses its power, achieved through its position in the hierarchical system and relations, in the form of various tools from administrative to legal in order to 'win' the conflict, and in doing so pushes the self-organizing efforts of the other parts of the network to compromised alternatives. Alternatives that are not considered favourable by either sides of the conflict.

2.2. Implications for planning

Within the framework of complexity thinking, planning deals with an ever changing environment riddled with phases of stability and dynamism, non-linearity, self-organization, evolution and relationality. In this regard the traditional notion of planning which embodies a high degree of predictability and control cannot be a compatible choice.

Several concepts lying at the heart of planning are decidedly fuzzy in nature, where fuzziness refers to multivalence, or 'vagueness' as Bertrand Russell called it. It contradicts conceptions of a 'true or false' nature, pointing instead to the shades of grey that can be found between such black and white oppositions. 'Complexity' is indeed a fuzzy concept. However, unlike 'sustainability', for example, it has particular theoretical implications. While the fuzziness of 'sustainability' affects actions and behaviour in planning, 'complexity' influences our understanding of planning (de Roo 2010, 2).

Complexity refers to uncertainties and unpredictable outcomes when different natural, technical and social conditions are integrated with actions and reactions from various actors and stakeholders and when a great number and a variety of elements and time dimensions interact in society as a whole and in planning in particular. Planning

administrations and planners have to manage and improve methods to handle the growing complexity in planning practice (Nilsson 2010).

Rauws introduces these uncertainties as Unexpected natural, political and economic events, coincidental confluences of gradual change processes feeding larger transformations and unforeseen societal responses to policy programs illustrate how the reproduction of uncertainties occurs in many domains and at multiple levels of scale. Moreover, social views on which possible future should be aimed for are often unstable. Accordingly, in trying to engage with the positive and mitigate as much as possible the negative, policymakers and decision-makers are continuously challenged by the uncertain conditions in which they operate. The set of uncertainties defying planners can be categorized as follows: uncertainties regarding knowledge about present and future environments, regarding actor intentions, and regarding value judgment on planning interventions (W. Rauws 2017, 32)

The unpredictability, uncertainty and the evolving characteristic of the cities which take them away from a stable condition and distance them from equilibrium along with their self-organizing reality should be the shaping framework for planning. In this perspective using the words of de Roo and Silva (2010) 'the planner is not to be just the ultimate creator or the interactive mediator but to become a manager of change who attempts to avoid the negative and embraces the positive effects of change'. Or as Mororni asserts, planners can attempt to generate social order indirectly through framework-instruments that are not future-oriented but 'present-oriented', and they are not shaping devices, but 'filter devices'. Filter devices imply simply avoiding certain negative effects, and leaving all the other possible outcomes free (Moroni 2015, 257).

Rauws et al. state that in such contexts, visioning, designing and decision-making on spatial issues should be sought not only in 'being', based only on an understanding of what is present, but also as part of on-going trajectories of change—in 'becoming'. This suggests planners should not merely respond to change reactively but must also proactively influence processes of coevolution by stimulating or mitigating specific feedback loops (Rauws, Cook and Van Dijk 2014, 136).

As social networks are open, interdependent networks of actors, the planners cannot achieve the above-mentioned unless they take into account the changes in all parts of the network. They need to consider how intentions and desires of various acting groups translate into the 'becoming' of the changes within and of the network.

3. Conceptual Framework of the Study

Viewed as the qualification of and confrontation with reality, complexity can have a distinctively negative connotation. However there is more to complexity. Particularly interesting is the conceptualization of it which takes place in various ways (de Roo 2010). Through reviewing the theoretical basis, this article suggests a conceptualization based on the agency and power of action and decision-making created for various actors within the network. Different types of relations and the amount of connectedness of each actor within the network, gives them the power to make decisions which often translate into actions. Correspondingly, being cut off and excluded from some of the relations can lead to often conflicting courses of action, built upon different types of power generated within the network.

This study suggests that the position of the actor within the network, determined by actor's characteristics and contextual conditions, gives them the power to make decisions, either individually or as a group. These decisions then go through a filter of processes in the network and can either emerge as actions that are deemed concordant with what is defined as the network's goal or conflicting with it (Fig. 1).

4. Methodology

Based on the proposed conceptual framework, in order to have a qualitative assessment of how decisions are made in the planning system in the region, the network of actors and their relations, as defined by the planning, should be discerned. In order to do so, the planning system was considered as a ternary of legal and regulatory framework, administrative and management framework and development plans according to (Whittick 1974).

The existing laws and regulation related to the decision making in urban planning can be divided into three main groups pertaining to:

- The necessity, definition and general premise of development plans
- Establishment of institutions and elaboration on their authorities and responsibilities
- Implementation tools for development within the framework of urban planning

Administration/governance structure in the region can be divided into two classes, governmental and non-governmental & public organizations. Table 1 shows the different institutions in each category in the national, regional and local scales (see Table 1).

In terms of development plans, the decision making and decisions of the plans introduced in **Error! Reference source not found.** have been reviewed. There are a number of other plans for different parts of the metropolitan region of Tehran, however due to the highly localized nature of them; they haven't been included in this study.

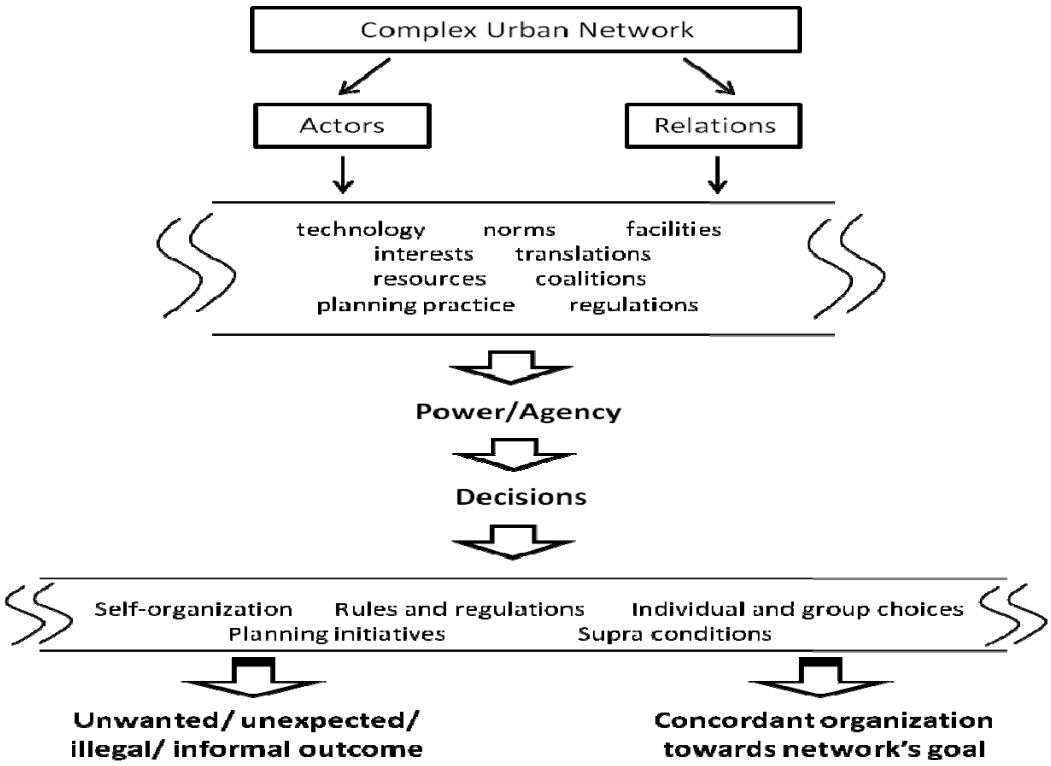

Fig. 1. Conceptual framework of the study

Data has been gathered from these written documents, through coding (using Nvivo software). Based on the framework of this research, the actors and their relations have been coded in the documents using the following categorization (extracted from the literature review):

Types of actors (concluded from (Healey 2007, Chapter 6), (Bouchareb 2011, 58), (Latour 1996), (Villeneuve, et al. 2006, 137-138)):

- Governmental institutions
- Public institutions (municipalities, Housing Foundation of Islamic Revolution and others)
- Private institutions (Businesses, Investors, Private developers and others)
- Planners and experts
- Civic society (citizens, local councils, NGOs and others)
- Non-human actors (infrastructure, context characteristics, events, entities and others)

Regarding the relations, there can be a wide variety of relations between actors which can be different according to context and objectives. The result of coding shows that the relations discerned in the reviewed documents, can be categorized as either influential (causal, one-sided or reciprocal), approval or custodial.

These codes were then used to create the network that the planning documents form for the region. The connections and disconnections between the actors or groups of actors in the network have been analyzed by the authors, concluding the decision making trends evident in the planning system of the region. To further clarify these trends and to demonstrate the possible consequences of the trends, evidences from the real-world effects of each is presented as well.

Table 1
Governance/administrative structure in Tehran metropolitan region

	Governmental	Non-governmental & public
National	Ministry of interior Ministry of roads and urban development Supreme council of architecture and urbanism Ministry of industry, mine and trade Ministry of energy	
Regional	Province administration * County administration * District administration *	
Local	Rural district administration *	City and village councils

* Organizations corresponding with administrative divisions of the country and considered as subdivisions of the Ministry of Interior

5. Decision Making Trends in Tehran Metropolitan Region

As was explained, urban environments such as metropolitan regions are dynamic systems which will show reactions to any change that affects them. These changes are generated by the parts/actors/agents and aside from being reactive, are also adaptive processes demonstrated by said parts, either for survival or to reach equilibrium again.

Only one of these plans looks at the region as a connected entity and tries to incorporate the relations between the cities and rural areas into the decision-making process. The plan, called Tehran Metropolitan Region Plan, calls for more collaboration and coordination in the governance of the region. It proposes the formation of a single unifying institution to manage the decisions in the region, which considering the track records of these institutions in Iran and also the size of the existing administrative body, does not raise hope as a viable solution.

In this plan and according to the law the metropolitan region of Tehran consists of nine provinces, 55 cities and more than 1500 villages (according to the 2006 census data, the latest publicly available census) (as in Fig. 2).

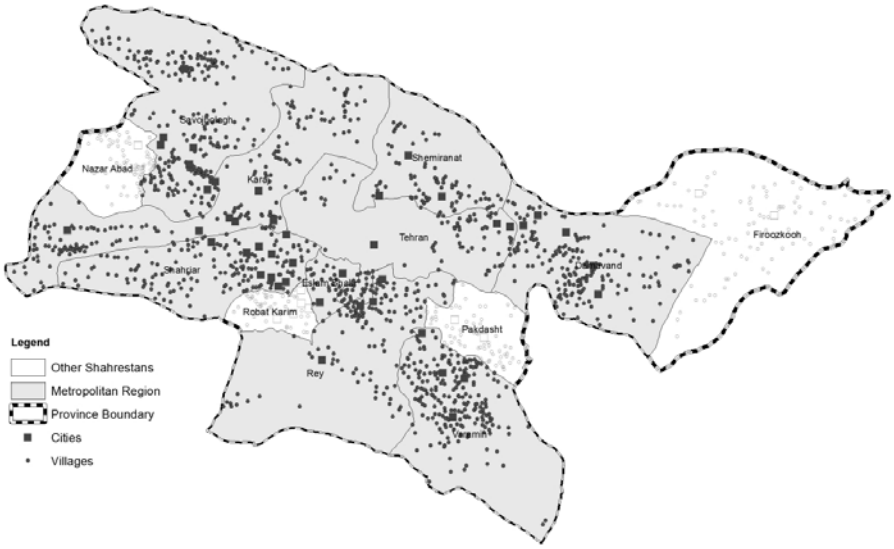

Fig. 2. Map of Tehran metropolitan region within Tehran province

The historical formation of the metropolitan region of Tehran can be divided into four eras: 1) The formation and evolution of the historic Tehran, 2) The formation and evolution of the new Tehran, 3) organization and the evolution of the metropolis of Tehran, and 4)the formation of the metropolitan region. Some of the reasons contributing to this evolution are the decentralization of population and activity from Tehran, peripheral growth, sprawl, and informal settlements. In general, it can be said that the formation of this metropolitan region is mainly the result of internal forces of the planning, legislations and governance decisions in the region rather than external forces of globalizations and economic reconstruction (Hajipour 2009).

Reviewing the history of the plans provided for the region and their objectives demonstrates that:

-With regards to administration and governance, the condition of the Tehran metropolitan region is reminiscent of the optimism of 60s about the 'potential for government action to improve the quality of life. For many urban experts, especially public administrators and political scientists, the first prerequisite was to reorganize (Sancton 2000, 466)'.

-The strategies and policies are, in the words of Patsy Healey, 'cosmetic rhetorical invocations required to meet some legal or funding requirement, a conception of a rigid plan, form of a comprehensive spatial pattern or a coordinated, sequential program of action (Healey 2007, 267)'.

Reviewing the processes of the provision of these plans and the planning's decision making, reveals the following trends in the region. The authors believe that these trends are the underlying themes which contribute to the conflict between the self-organizing efforts of the network and the decisions made by the planning body.

5.1. Fragmented essence of decision making

Despite the significantly connected nature of the region, decisions are made without any regard for the surrounding areas. The plans for the city of Tehran and its municipality still do not take into account the effect of their decisions in the surrounding areas, whether immediate or not. Decisions such as permit to build extra housing units than what has been approved in the plans, gentrification of an area and transportation initiatives are made with the assumption that their ripple effect will somehow be contained within the official boundaries of the city.

An example of such effects has been reviewed in a study about the consequences of the urban governance in the city of Tehran (Kheyroddin 2010), according to this study the decisions made in the central city have rendered a large number of people unable to reside within the city, inevitably creating a movement towards periphery,

despite numerous vacant housing units inside the boundaries of the city (as in Fig. 3 and Fig. 4).
An outcome of such decisions is evident in the formation of settlements outside the official boundaries of the city, settlements that have long been one of the 'problems' that the urban planning in the region has been endeavouring to overcome, with solutions such as building of new towns. However the planning body fails to acknowledge that, to a great degree, they are the very result of the fragmented decisions made by the planners themselves. The decisions that do not consider the region as an interconnected web of networks comprised of actors and their relations.
The fact that metropolitan areas are not officially recognized in the urban planning regulations or administration levels of government as geographical entities and that they are not 'legal establishments', further feeds the fragmented process of decision making.

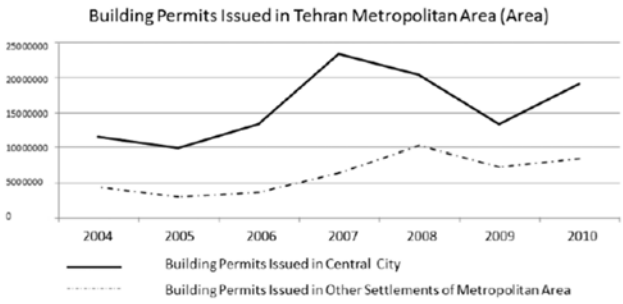

Fig. 3. Area of Issued Building permits in the city and metropolitan region of Tehran
source: (Kheyroddin, Piroozi and Soleimani 2015, 17)

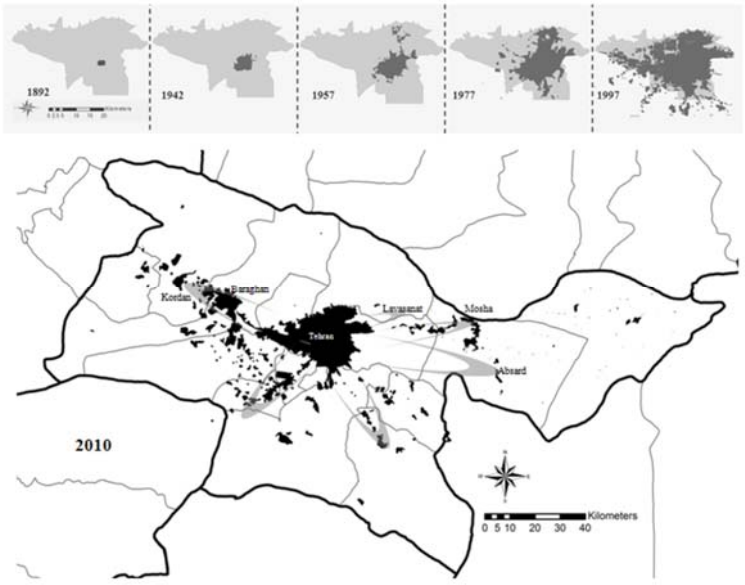

Fig. 4. The evolution of the city of Tehran and Tehran Metropolitan Region
source: (Kheyroddin, Piroozi, et al. 2013, 12)

5.2. Partial involvement of actors

When it comes to the role of different groups of actors especially the citizens, the planning discourse and practice in Iran is still at the very early stages of participation, and even this level of participation is only evident in some cases in the local level and does not have much resonance in the regional or national level. To use the words of Boonstra and Boelens (2011), the participation of citizens in Iran has 'in practice merely enabled citizens to criticize and react to spatial proposals made by the government agencies'. There are very few instances of efforts of stepping beyond this stage, mostly in urban renovation projects in which a kind of 'public–private partnerships or a new kind of entrepreneurial style of planning' is being promoted.
A study by Kazemian and Mirabedini (2011) has investigated the role of different institutions in policy making in Tehran using questionnaires and interviews with authorities in governance and urban administrative organizations. The results firstly show the insignificancy of the role of the citizens (see table 2). A closer look to the results related to housing and land market reveals an interestingly high effect of the economically powerful groups with 48% frequency in answers which comes second after the municipality.

These results are compatible with the existing regulations regarding urban planning in Iran, since there's no regulation that explicitly ties the legitimacy, approval or implementation of a decision to the consent of the target groups, and planners and decision-makers have complete authority over such decisions. It seems that the dominant reading of the space, is the one belonging to the governing body and planning experts.

Referring to the conceptual framework of this study, the position of some actors who are better connected gives them more agency to effectively pursue their interests.

Table 2
the frequency of the questionnaire answers about the role of different institutions in policy-making in Tehran
source: (Kazemian and Mir Abedini 2011, 33)

Policy-making field Institutions	Town council	Governmental bodies	Tehran municipality	The industry owners and economically powerful groups (unofficial agents)	Citizens	The private sector
Housing and land (house provision and housing market control)	14%	70%	20%	48%	2%	28%
Infrastructure provision	22%	54%	64%	2%	0%	2%
Physical development and growth	34%	46%	42%	36%	0%	6%
Economic development and decisions	20%	60%	22%	30%	2%	14%
Transportation (inter and intra city)	18%	46%	68%	4%	4%	0%
Problem/conflict solving	16%	72%	8%	26%	2%	0%

5.3. Silo mentality and sectoral decision making

The ever present silo mentality and sectoral approach to decision making can be traced in various aspects of planning. Some of their most evident outcomes can be summarized as follows:

- parallel decisions
- disregard of what's being done in related organizations
- environmental disregard
- the reliance on the role of planning experts

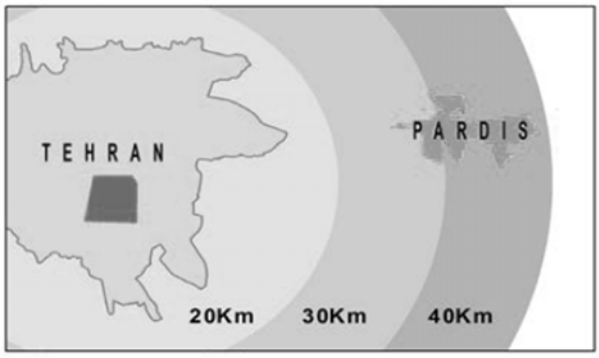

Fig. 5. The placement of the new town of Pardis
source: (Kheyroddin and Naderi 2016, 21)

Expanding on these points, the case of the new town of Pardis on the eastern periphery of the city of Tehran can be a good example.

In decision making process, when approving a project in the region, there is usually little to no coordination with other related organizations. This has been especially evident in the case of the development of new settlements. In the plan for these projects one part of the study is concerned with the provision of utilities such as power and water to the new settlement. These studies are usually done using the information provided by the organizations in charge of water and power provision, i.e. the maps of the current networks of the utilities, but without any direct discussions with them in terms of implementation or usage calculations.

In the case of the new town of Pardis (as in Fig. 5), following the chronological decisions regarding utility provision demonstrates how the silo mindset affects the process. At the beginning of the formation of the new town and even after the building of the different phases of the project had started there was still debate about how the required water for the 170 000 population (plan of 2004) of the town would be provided. Due to a lack of a study regarding water provision in the initial plan, a third party carried out a research and as a result the Latian Dam was chosen as the source for water, despite stating that the dam, already providing part of the water for the city of Tehran and other areas, cannot provide for all the predicted population. In addition to the dam another temporary solution was proposed in the form of two deep wells being excavated in the area. In the meantime and without any coordination with other organizations, the plan went through a series of changes proposed by the urban administration and provided and approved by the planning body. According to the newest revision (2010) the target population of the city was increased to 400 thousand residents in 2026 (Tehran Province Water and

Wastewater Organization (Eastern) 2007), (Pardis Municipality 2009), (Mahdi Zadeh 2013).

After this decision and until 2015, where most of the building of the residential units of the new town was completed, the problem of water provision still persisted for a large part of the city. In 2015 an agreement between the city's administration and Tehran province water and wastewater organization was finally made about financing the provision of water for 20000 built houses in one phase of the plan of the city (News-MRUD 2015), (Hamshahri Online 2015). Along with water, other utilities have the same conditions.

The cost of these provisions are also mostly miscalculated or disregarded in the process of plan provision and approval. For example in the case of Pardis, the cost of provision of utilities which was agreed upon years after the approval of the initial plan, increased the cost of the built social housing units up to at least 35 percents compared to what was estimated in the plan (Eghtesad Online 2015), making it unaffordable for a large number of the initial applicants, marking the start of an ongoing conflict between the people and the administration in the new town, diverging what is realized in reality and what the plan determined to happen.

Another example of the silo mentality in the context is the significant reliance on the role of planning experts, as is evident from what has been mentioned up to now. This reliance is to the point that even concepts such as participation that are by nature a way of limiting or balancing the role of the planners, has become tools in the toolbox of planners and are often used to legitimize decisions made by the planners themselves. In this regard, the definition of participation has been morphed into merely choosing between alternatives which are solely formed by the planners.

6. Discussion

The study of the planning trends in the region and the examples provided in this article are clear indications of how the traditional planning, assuming predictability and linearity, disregards the characteristics of complex systems.

The decision making trends introduced have one common underlying theme: exclusion of part of the network of actors from the process. Using the notions of urban complexity, the authors believe that these processes of exclusion and their impacts (power-inducing or power-deducting) are the reasons contributing to unintended outcomes for a wide range of decisions made in the context of Tehran metropolitan region. Outcomes such as unexpected and widespread fluctuations of land prices, displacement of inhabitants and high level of mobility to unplanned areas, formation of unplanned settlements, changes in the labor composition, environmental consequences.

This research states that one of the linking notions that connects exclusion with unintended and conflicting outcome, is self-organization. In the bottom-up process of self-organization, when faced with non-inclusiveness along with the fact that some actors feel like they are robbed of their rightful representation in decision making, they make decisions without any regard for what is considered lawful, regulatory or formal. People try to solve their problems and gain their interest by moving, converting land-uses, changing profession, generally taking matters into their own hands in areas in which they have power of action. Contrary to the planners' belief, it is important to understand that these conflicting decisions made by actors are not inherently wrong, the 'wrongness' takes place when and where exclusion happens. When parts of the network and their interests are written off in the decision making process.

There is another way to explain this as well. Decision makers in the context make their own ideas about their involvement and how to exert control, the ideas that are born from considering only some parts of the actual network. However, in reality, these ideas can be in contrast with various autonomous self-organizing processes in the context. Comparing the introduced trends with what can be defined as the role for planning and planners in complexity approach (mentioned in section *Implications for Planning)* it is evident that currently, the planning decisions are still aimed at maintaining a non-existent equilibrium and made within the framework of certainties that are proven to be merely illusions in complex systems.

According to the main idea of the paper that power breeds action; the reactive and adaptive actions are not specific to the people with less 'perceived' individual power in the network and in the lower socio-economic strata. The higher socio-economic groups who have the upper hand in power relations, will also start to seek their own benefit, even more so in the chaotic behavior of such a system. And because they have the capital and power, they end up affecting the system significantly too. A good example that demonstrates both ends of these self-driven efforts is the land-use conversions from various types to residential. At one end, the people with less socio-economic means will move to the green or agricultural lands around the main cities and choose to reside there, sometimes illegally, so that they could benefit from the services of the main town. On the other hand, a lot of agricultural or garden land-uses in environmentally favorable areas (usually rural) far from the main city are converted to luxury vacation houses, functioning mostly as a second home.

In terms of house/residence seeking and also as a result of the interplay of housing market and labor market, self-organization demonstrates itself as the abundant formation of informal settlements, whether along the main road connecting to the city or as peripheral and edge neighborhoods around the city and to a degree as forms of physically detached settlements in different distances from the main city.

In the self-organization process actors/agents pursue their interests. Generally the interests of different the actors do not align and they try to enforce their own interest using their power of action. Based on this perspective, what happens in the region is presumably the right choice for individuals or groups, considering the conditions, but may

not necessarily be the best choice for the overall system on a move towards a more equilibratory state.
In this sense, self-organization has gone wrong in this region, because one of the basic ingredients of it is missing: multiple interactions between all of its components. Where one densely connected system is forced to work as two or more parts, the non-inclusive decisions of the plans have intensified the spontaneity of some other decisions. It is worth noting that the word "wrong" is used pertaining to the perception of the planners, whereas outside of this viewpoint, self-organization simply exists and it is not necessarily right or wrong.

The state's role in urban planning here has become a non-zero-sum-game where agencies of government become partners in the private development process. And people faced with no possibility to affect the decisions being made, try to self-organize in the form of power undermining and emergent actions. This happens outside of the limits of government and administration and therefore often does not comply with rules and regulations, set by said government. Furthermore, the decisions made and implemented in the current process, limit the choices of actors and individuals in their self-organizing efforts as well and therefore adding to the complexity of the system. A trajectory that can potentially lead the system to a form of demise (as in Fig. 6).

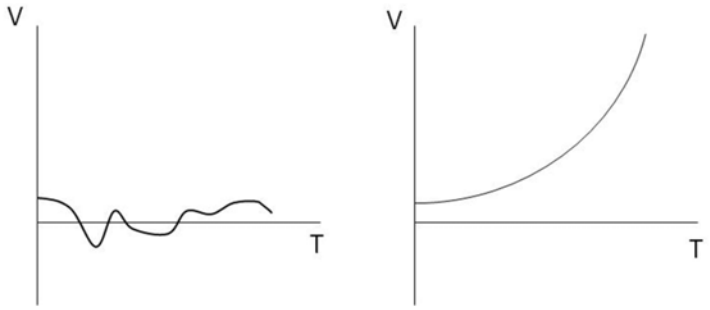

Fig. 6. The evolution of two complex systems, on the left the system goes through different stages but in each stage eventually moves towards the starting point (equilibrium); on the right the complexity of the system continuously increases until the system collapses or becomes dysfunctional

Regarding the power of action which is an integral element in the framework of this study, Asgary and Kazemian describe the power structure in Tehran metropolitan region as divided and chaotic, with three main elements (Asgary and Kazemian 2006, 11):

- The pro-centralization official and administrative power
- The semi organized and affluent economic power
- Un-organized power of citizens with short-lived periodic demonstrations

Considering the reviewed state of planning and its realization along with the introduced processes of exclusion, this categorization would be true in terms of their effect on initial policy and decision-making processes. However, observing the outcomes of planning for the study region clearly demonstrate that citizens and their collective decisions have been very influential on the evolution of the region in the long run. Yet since they are not recognized in the official processes and their interests do not align with that of the groups with highest agency i.e. the economically affluent groups or governmental and official administrations, their self-organizing efforts have been deemed illegal, destructive and unfavorable for the region as a whole. In other words, although power laden action is everywhere, only the authoritative action of the formal actors/institutions are recognized and perceived as legal or right.

7. Conclusion

Cities are complex, relational, self-organizing systems comprised of interrelated networks. They change and evolve based on the individual decisions of actors in a bottom-up process. Therefore, in order to come close to understanding the whole, one must focus on the actors and their relations. This perspective forms a framework in which traditional definitions of planning, decision making and participation are challenged and consequently replaced by more fitting readings. This article tried to use such a framework and specifically the notions of power and self-organization to make sense of some of the conflicts in the studied region, and to demonstrate how planning processes in Tehran are at odds with the nature of complex systems.
Being rooted in individual decisions, self-organization often does not seek ambitious goals and rather just happens. But in any case, it is reflective of the needs of actors. Considering this representation, it is safe to say that in this context the conflicting, 'informal' and 'illegal' choices of actors in different regards may be the best possible option for the actors that choose to do so, as they are excluded from other dynamics, being stripped of some form of power they were entitled to. For example in the choice of place of residence in the region, people's choice to live in informal settlements may be their only viable decision based on the agency they have compared to their status quo. Although, having been driven to make this

decision, it will probably not bring about desired advantages for themselves or the region as a whole.

In other words, the exclusions from the network take away some actors' power of action within the 'formal' arena of decision making causing them to act in other relational arenas within the social network, deepening the gap between what is deemed 'right' by different parts of network, ensuing conflicting actions with lower desirability for all.

In conclusion, it seems necessary to try to understand actors and relations first and the definition of the system should come afterwards. This would determine the power relationships in the network and therefore demonstrate any possible unbalance in it. As is evident in the presented case, unbalanced powers can bring about uncertainties about what is possible and conflicting and inefficient decision making in the context. Therefore, there should be an emphasis on the necessity of looking at urban systems and their dynamics through the lens of complexity and then trying to adjust the planning perspective accordingly.

In this regard there should be a move towards a form of decision making that is more facilitating rather than controlling, inclusive rather than exclusive, fluid rather than rigid and bottom-up in every aspect. The focus should shift to recognition of the actors, relations and networks and a planning that is the outcome of the relations.

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