International Journal of Engineering and Technical Research (IJETR)
ISSN: 2321-0869 (O) 2454-4698 (P), Volume-5, Issue-1, May 2016

The Implications of and Institutional Barriers to Compact Land Use and Transportation Planning: Alexandria, Egypt

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***Abstract*— Land use and transportation compact planning is indispensable in rapidly growing cities, such as Alexandria, Egypt. The centralized system in Egypt is tackling the process of integrated plans, as decisions made by an authority are not reviewed and discussed with local authorities, also there are too many institutions involved in the development plans for Alexandria city. The current land use and transport planning and practice in Alexandria city focus on different visions, such that neither land use nor transport problems are managed effectively or efficiently. This study provides a closer look on the current situation of and land use indications and urban transportation system and the institutional system controlling the planning process within the city to identify the barriers to compact land use and transportation planning. These barriers could be seen in the case of Lake Marriout's main basin development, as a clear evidence of the centralization and limping decisions in Alexandria planning. The land use plans were set up without taking in mind the effects of this project on transportation system in that area. The commercial projects attracted many people to the area, also the development of the roads network as the area is one of the city terminals made huge problems. To address these issues, the city requires the integrated land use transport decision support tools of policy intervention analysis, scenario-building and prediction that can be used in the early land use transport planning stages. To prevent managing these issues in isolation, Alexandria's urban planners require methods of integrated land use and transport planning that can contend with the dynamics of Alexandria's urban growth.**

***Index Terms*— Urban transportation, land use development, compact land use transportation planning, Centralized decision-making.**

I. INTRODUCTION

The interaction between urban transport system and land use has gained increasing international attention as they are closely linked. The various human activities distributed over urban land creates travel demand which is healed by urban transport system. On the other hand urban transport system has a great influence on land use plans and the future form of urban land patterns [1]. The gap in planning process between land use and urban transport is more obvious in developing countries than in wealthier, advanced countries. Alexandria with a population of about 4.02 million, is the second-largest city in Egypt. The city has witnessed a major increase on population and urban side [14]. As being in a developing country, Alexandria city faces many problems in land use and urban transport system planning due to the conflicts between administrations, shortage of data and decision-makers lack of vision for the connection between land use and urban transport system.

However, the existed transport infrastructure has not been able to accommodate increases in travel demand, causing high levels of congestion. Alexandria's spatial expansion and increasing of population have caused severe changes in travel demand and the modes of transport used in the city. Integrated policy and planning have isolated visions. Therefore, particular land use or transport issues are managed in separation. Facing transport problems, transport planners focus on solving the problems and improving the transportation system. Transport planners pay little attention to the urban distribution of land use. On the other hand, land use planners focus on standing up to urban growth and land use without considering the effects on transport demand.

The objective of this paper is to address the barriers to linking of land use and transport system in Alexandria city due to the decisions made by the local governorate, as land use and transport system are treated in a separated way which is clearly obvious in many decisions taken by deferent governorates.

The methodology of this paper is to analysis the current trends in land use and transport system planning in Alexandria, to review institutional framework in order to clarify the limping relation between planning institutions and conflicted decisions made by local governorate affect the planning process and finally to address the main issues facing the interaction between land use and transport system implement in Alexandria.

II. URBAN TRANSPORT SYSTEM IN ALEXANDRIA.

The current transport system in Alexandria is unsustainable and inadequate to satisfy the transport needs with a proper service quality. It can be described by its improper modal mix, un-integrated networks, insufficient transport capacities for both private and public transport systems, lack of traffic management, and poor traffic safety. The city is rapidly growing and motorizing randomly. The overpopulated urban areas are serviced with limited number of narrow streets, traditional public transport systems (trams and buses), and without sufficient parking spaces or pedestrian facilities. Under these circumstances, the transport demands (mainly motorized) continually increase within a finite transport system.

2.1. Transport network and infrastructure

As a result of rapid population growth which is estimated at nearly 1.7% per year and improving living standard, the

motorization increased (Number of Licensed Vehicles in (2011) 670,000 vehicles). Consequently, the daily transport mobility has markedly increased to 6.2 million. However, the mobility here does not reflect the actual transport demand, as

citizens usually skip inessential trips to avoid uncontrollable traffic jams on the overcrowded road network.

The urban road network of Alexandria is the city itself, oriented along the east-west axis. The grid of the road network is constituted by only two primary corridors from the east to the city center and one corridor from the west to the city center. The main link between the eastern and western parts is two narrow streets, each of which is a one way street (8–12 m wide). The transverse connecting system of the network is very poor. There is only one complete north/south transverse road which joins the city with the external regional road. The secondary road network is extremely limited and, in some areas even non-existent. The main characteristics of the road network can be summarized in the following,

- inappropriate areas for moving traffic and parking cars;
- Too narrow footpaths;
- Inadequate traffic facilities, such as guidance signs, signals, and foot crossings.

2.2. Public transport

The public transport sector in Alexandria is operated by two state-owned organizations. The "Alexandria Public Transport Authority (APTA)" which operates buses and trams, and the state railway organization "Egyptian Railway Authority (ERA)" which operates railway services fig.1.

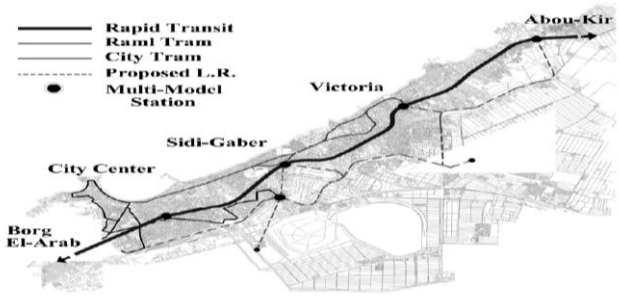

Fig.1: Public transportation in Alexandria.

2.2.1.Bus. With about 362 buses approximately on all main roads. The bus network includes non-optimized 140 lines with line lengths of about 65 km. Some of the lines continue far into the surrounding area. As the city growing rapidly, the coverage area of the bus network has increased, but the increase in vehicle supply is not balanced with the network expansion.

2.2.2.Tram. There are two tram lines within the city, The City Tram which serves the old city with a 28 km length network and double tracks (17 lines). It consists of 119 tram units with 256 passengers capacity of each unit. It has no separated track running with other traffic in the middle of narrow roads area. The Ramel tram joins the eastern part with the city center with its 10.5 km (3 lines) track and 11 tram trains; each one consists of three cars. The capacity of one 3 cars-train is 670 passengers. Although The Ramel Tram has its own track ,the track is interrupted by several road junctions.

2.2.4.Railway. There are two trans in the city ,Abou-Kir railway is a two-track regional system with 13 reversible trains serves the connection of the city center with Abou-Kir suburb with 22 km long track, also the low-income zones along its route. Each train consists of 6 carriages and a diesel locomotive and about 1500 passengers per train .It is the fastest mean of public transport in Alexandria.

2.2.5.Shared taxi and taxi. The shared taxi network in Alexandria covers the whole city. It has expanded more on those areas where bus supply is inadequate. The shared taxis are generally ill-maintained, randomly operated and play a major share in traffic congestion. Their stops between terminals are not identified, and the vehicles can stop anywhere, sometimes on major streets. The operation of 4-passenger-taxis is similar to that of shared taxis. There no ordination between taxi\shared taxi and local authorities ,so it is difficult to link them with other public transport.

III. 3. Land use planning in Alexandria.

Alexandria is second largest city in Egypt after Cairo, it expands for 32 km along the coast of Mediterranean in linear urban form. The built-up area in the city has more than doubled during the last quarter century. During this period, many development resulted in a shift from the old central districts of Wassat, Gomrok and Gharb to the north-eastern (Montazah, Sharq) and south-western (Al Ameriyah) parts of Alexandria City with a sprawling suburban pattern leading to a considerable consumption of agricultural land without adequate urban infrastructure and proper urban planning, as can be observed in New Borg el Arab and Lake Maryut.

3.1. Mixed Land Use

The built-up area of Alexandria is 73,800 feddan (309,960 sq km). Residential use has the biggest share of land use with occupying almost 46 % of the total built-up area. Regional roads and railways have about 29 % of the built-up area due to transportation purposes to facilitate the flow of transportation process into and out of the city. Then Industrial uses almost 19 %, finally other uses including services ,open areas and military comes with the least share about 6%, fig.2.

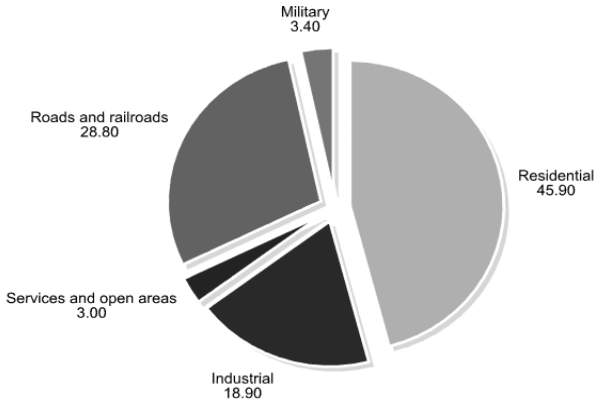

Fig.2: Alexandria, Land uses (%), (CAPMAS), 2006.

3.2. Connectivity

Alexandria is well connected to other parts of Egypt via a number of routes. The Cairo-Alexandria Agricultural Road connects the city to other cities within the Delta region. The Cairo- Alexandria Desert Road connects the city with the new developments, such as Sadat City and Nubaria City. The Alexandria-Matrouh Coastal Road extends towards the west, serving a number of summer resorts, such as Marina, and connects the city with other towns, such as Alameen and Marsa Matrouh. This road extends to the Egyptian-Libyan borders. Alexandria is also well connected to other northern settlements, such as Rosetta, Damietta and Port Said through

the International Road. Furthermore, the city has an international airport, and is connected to other areas of the country by railroads. The street pattern of Alexandria takes the form of grid-iron, where major roads, such as the Hurreya st. , El Geish st, stretch from the east to the west. Other important streets, such as Suez Canal Street, go from north to south fig3.

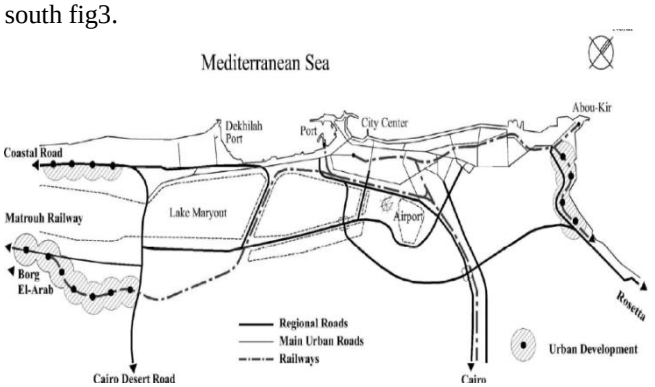

Fig 3: Alexandria; Roads, Railways, and Developing Axes.

3.3. Density

The city is divided into 13 districts, they are, El Monatza, El Raml, Sidi Gaber, Moharam Bek, Bab Sharq, El Atarin, El Manshia, El Gomrok, El Laban, Mina El Basal, Karmoz, El Dekhela, and El Amria The most populous districts (qism) of Alexandria according to CAPMAS 2006 are Montaza, El-Ameriyah and El-Rammil. However, Moharam-Bek, El-Manchiyat, Mena El-Bassal El-Labban and Karmooz are indicated as zones with high population density, as they constitute the old areas of the city. Residential densities of Alexandria all over its different districts are relatively high table.I.

Table.I: Alexandria, Population, Area and Density, (CAPMAS, 2006).

Zone/District (Qism)	Population	Area (feddan[1])	Density (persons per feddan)	
			Gross Density	Residential Density
Bab Sharq	179,729	1,349.34	133.20	721.22
El-Ameriyah.	491,373	100,389.13	4.89	207.95
El-Attareen	343,836	6,934.52	49.58	321.64
El-Dekhiyla	40,605	441.88	91.89	308.55
El-Gomrook	85,192	840.87	101.31	623.66
El-Labban	36,750	264.80	138.78	348.34
El-Manchiyat	23,616	136.76	172.68	415.77
El-Rammil	752,371	7,510.47	100.18	538.18
Karmooz	120,062	850.63	141.14	774.59
Mena El-Bassal	254,986	2,465.56	103.42	704.97
Moharam-Bek	299,401	1,307.79	228.94	807.01
Montaza	1,173,803	20,833.33	56.34	523.67
Sidi Gabr	226,304	2,778.47	81.45	565.90

IV. ADMINISTRATIONAL STRUCTURE

One of the major challenges facing urban and community development in Egypt is centralized decision-making. There is a lack of coordination between central urban development organizations and local entities. In the planning process the sectoral ministries are responsible to prepare their own policies and plans, during the absence of an integrated framework for these policies and plans. Moreover the linkage within one sector is missing. It is said that the Transportation projects are following an overall master plan, although some projects is held by private sectors. David Sims claims that most of the projects implemented are initiated in a mysterious way [7]. Consequently, many decisions, laws, policies and procedures are not locally rooted enough to meet the needs of local communities.

4.1 Multi-level urban governance in Egypt: a quick overview of a centralized system

There are four governmental entities which are nationally involved in regional governance: MOP, GOPP, NCPSLU and SCPUD. On the regional level, economic regions are not really involved in the planning. The economic regions don't have executive organization linking between them and central ministries. On the local level, the local administration law empowers the local units and transfers the powers from the central level to the local level [9]. Decentralizing the system in Egypt has been a raised subject accompanied with a variety of approaches and trails to distribute the different functions. However the absence of an integrated and unified approach identifying decentralization policy and action plan led to the continuity of a centralized planning system [10] fig.4.

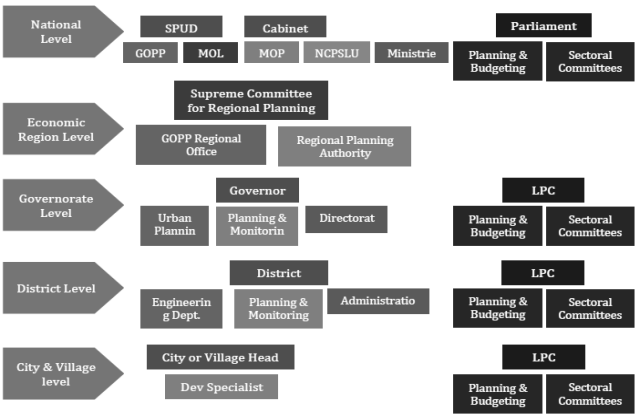

Fig.4: Key governmental entities involved in planning at the different levels

Many attempts occurred to decentralize the powers accompanied by creating regional or local units. One of these attempts is establishing development agencies in the new urban community with specified powers and specialties to develop the community. Currently it is acting as an executive body to implement NUCAs instructions, although it lacks the power of decision-making. The board of authority wasn't also given the power and specialties that it was established for, since currently it only propose recommendations that might be taken into consideration or not.

4.1. Governmental institution system

Local government units include the governorates, administrative districts, towns, quarters and villages. Each of these units is considered as a legal entity. The local units are responsible - each in their area of competence- for the management and operating of public utilities and the enforcement of the laws and regulations relating to organizational matters. The regulations apply as follows: each local unit is assigned to a certain level of the service it

provides in other fields such as social affairs, logistics, agriculture, land reclamation and irrigation, etc. The executive regulations specify the utilities to be entrusted to the governorates for their establishment and management, and those whose establishment and management will be entrusted to other local government units table II.

Table II: Distribution of planning and development powers between Governance levels.

SECTOR	NATIONAL LEVEL	LOCAL BRANCH OF MINISTRIES	GOVERNORATE	PRIVATE SECTOR, NGOS
Planning and Urban Strategy				
Land management and building permits				
Urban Transport				
Housing				
Heritage				
Waste Management				
Water and sanitation				
Slum upgrading				
Environment				
Tourism and Culture				

4.2 Legislative and institutional obstacles

In some cases the legislations doesn't provide concrete bases or regulations preventing ministers from taking positions that will lead to centralization or conflict of interest, providing the competent minister this position increases the decision-making centrality. For example, the act of issuing decrees to appoint the minister of housing as the chief of NUCA in 1980 was repeated afterwards. Centralization in NUCA management led to reducing the new urban communities development process. Despite of the powers given by the law to the authority, it lacks the proper tools for implementing the approved plans, since developing new communities needs cooperation with different parties. Another case occurred in 2005, NCPSLU board of directors included representatives from several ministries. While the boards' chief was the Minister of Agriculture and Land Reclamation. Observing the situation leads to perceiving it as sectoral controlled entity. Nevertheless the establishment of NCPSLU at the first place intends to affiliate it at as a higher level than the ministries [12].

4.4 Lack of coordination

Many central institutions and affiliates are acting in the planning process, depending on different activities as tourism, industry and agriculture. In each sector different stakeholders are involved and the integration between all of these sectors to create a comprehensive plan is an obstacle facing the urban planning in Egypt. The Ministry of Local Development is responsible for coordination between ministers and governors. However it rarely coordinates between them or undertakes solving the disagreements between elected officials and appointed ones .While the Supreme Council for Local Administration responsible for resolving coordination challenges never actually met.

4.5 Inadequate institutional setup and capacity for urban management as a result of many factors including local authorities' limited decision-making powers and fiscal autonomy, and the limited capacity of civil servants in de-concentrated service departments and local authorities (not surprising given the meager public sector pay scale).

4.6 Inadequate public-private-partnership (PPP) framework, as well as poor and often times non-transparent practices at the local level. Very few local authorities have the tools and know-how to structure PPP arrangements for service delivery and most have very limited ability to offer the adequate incentives package to attract the private sector.

V. Lake Marriout's Main Basin Land Bordering Development

As the legal institutional framework in the urban planning and development field was presented, however the full understanding of the situation also needs more investigations in real life implementation. It could be studied through case study clarifying the planning process and institutions involved on different levels of planning.

The overall Carrefour site has an area of 528 feddans (222 hectares) and is bound by the Cairo-Alexandria Desert Highway from the south and east, Lake Marriout's main basin and the new Coastal Highway from the west and the Moharam Bek-Kabary Road from the north. About 88.8 Feddans (37.3 hectares) have already been allocated to other uses including a large retail complex anchored by Carrefour hypermarket (which currently attracts about 20,000 visitors daily), a Police forces hospital and a residential complex which is under construction fig.5.

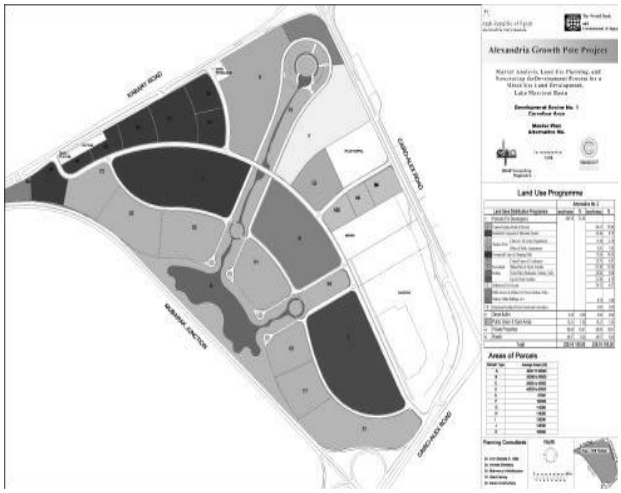

Fig.5: Detailed Urban Plan of Carrefour Site

The area of Carrefour (known as new downtown) is one of the most obvious cases in Alexandria city for land use and transportation separated planning and limping decisions, as about 14 different authorities have role in the management of the lake. The following relevant parties on the formulation of this new entity: Alexandria Governorate ,Ministry of Agriculture ,Ministry of Water Resources & Irrigation, Ministry of Housing, Utilities and Urban Development ,Ministry of Investment and Ministry of Environmental

Affairs. The new entity has well planned as a commercial area in the first stage of the proposed project, but transportation planning is clearly absent. Therefor many problems appeared due to the increasing in population and visitors heading to it.

Accessibility: although the area of downtown is easily reached from all over the city due to the grid road network ,it still difficult to people without private vehicles or whom cannot afford to use a taxi to go there ,as there is no specific transportation line or multi-mode facility for it.

Parking: the only parking area is around the Carrefour buildings as a private area for the project, but the commercial area in the opposite of it was neglected from the planning as it appeared after the main project, simply people with private vehicles park their cars in the main road.

Pedestrians: there are no plans for people walking in the area, as the new commercial area began to appear, there is no bridges or traffic lights to facilitate moving from it to Carrefour and back again so people have to cross the road in the middle of cars which causes many accidents.

Congestion: as the number of private cars keeps increasing rapidly, the current planning of the area could not cope up with it. The main road is used for going to downtown, Borg Al Arab city, Cairo and many other places .There is no certain lane for vehicles moving out of the city and there are no traffic lights or signs for directions or limited speed. Maintenance lane does not exist there is just a narrow lane in the front of the commercial area ,but as there is no enough parking areas ,this lane is always full of cars and on the other side of it in the main road ,which makes the road very crowded.

5. Discussion

Mismatching land use and urban transportation planning is considered as a key issue in Egypt, although the integration between land use and transportation planning is a must for achieving sustainable development .The evidences of this mismatching are clearly obvious in rapidly urbanizing cities. Transportation departments are often busy solving daily transport problems than applying and developing strategic plans preventing them from happening in first place. Land use departments usually interested in the implement of their project without considering transportation forecast or transportation circulation in the area affected by the project. The separation of land use and transport development is not only reflected in plan-making processes but also in actual development activities, with land development at the local level (towns and villages) usually implemented much faster than municipal transport development because local governments generally do not hesitate when opportunities for land development arise. In addition, the location of land development is largely determined by local governments and investors, while transportation in particular, motorways and main roads remains under the control of the municipal government. This is one of the major reasons why some communities are still isolated from the existing transport network.

Strategic planning and coordination of land use and transportation and across different transport modes is practically non-existent. Institutions rarely have sufficient time or funds to expand transport infrastructure fast enough to cope with land use plans. The centralized system in Egypt is tackling the process of integrated plans, as decisions made by an authority are not reviewed and discussed with local authorities, also one side plans that neglect the needs of people and prevent the public and private sector partners as well from addressing some of the problems and what they really need.

In the case of Alexandria city this mismatching is a main problem, as the city keeps growing its borders rapidly .The city master plan, recent studies and plans failed to implement a real integrated land use and transportation system model due to many reasons such as; limited experience of the governor and local unities in planning field, lack of fund, decision makers isolated from the real situation and short vision in dealing with problems as they are treated separately. In fact the results of the current trends in land use planning would have negative effects on the reduction of private vehicles usage for travel, these trends in land use would increase private vehicles usage. Land-use planning will have an impact on mobility through its effects on aspects of land-use patterns, including density, mixed land use, and distance to transport infrastructure, which determine housing and workplace locations, the distribution of urban facilities, and transport connections between various locations and activities.

The case of Lake Marriout's main basin project is a clear evidence of the centralization and limping decisions in Alexandria planning, as the land use plans were set up without taking in mind the effects of this project on transportation system in that area. The commercial projects attracted many people to the area also the development of the roads network as the area is one of the city terminals made huge problems .Congestion is a permanent problem seen every day also accidents ,as road safety is not found. Despite the area strategic place, the dominated transportation mean is privet vehicles, as there is no formal public transportation mode for it. The integrated land use and transportation planning approach can relieve the conflict between land use and transportation plans and policies and facilitate shared visions policies and strategies and thus provides a sustainable land use and transportation future for Alexandria.

VI. Conclusion

Alexandria has witnessed remarkable, rapid urban growth over the past few years. This growth has concurred with a lack of a planning framework, weak institutions and misguided policies that have caused isolation between land use and transportation plans. Current land use and transport planning policy and practice in the Alexandria city municipality is working on separated visions, meaning that specific land use or transport issues cannot be managed effectively. Also there are too many institutions involved in the development plans for the city, as in the case of Marriout Lake, there are about 14 different authorities have a role in the management of it. To address these issues, the city requires the integrated land use transport decision support tools of policy intervention analysis, scenario-building and prediction that can be used in the early land use transport planning stages.

On the other hand, the institutional relation between land development management for transport should be paid more attention. An appropriate integrated development structure should be presented to enable the land management system to

facilitate compact development plans. Institution building, which works to setup an inter-organizational management framework for compact development in Egypt's cities, is the primary step required to strengthen management capacity. In addition, more rhythmic relationships between land use developments at the local level and transport investment by municipal governments should be addressed. The comprehensive management of land development authorization and transport delivery should also be addressed. Further studies on the institutional authorities framework should be made to eliminate the conflicts between local, regional and national land use and transportation in Egypt; and to study the effect of political decisions on land use and transportation state and policies are encouraged. This approach requires a full understanding of the current situation and complete participation on all institutional and administrational levels.

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