Demographic and Social Change in the Middle East and North Africa: Processes, Spatial Patterns, and Outcomes

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Abstract: The Middle East and North Africa region has been an important player in the swift demographic transition process that happened in many parts of the developing world starting in the mid-twentieth century. This demographic change was not independent from the developmental efforts and political transformations that the region was experiencing. Social and demographic change in the Middle East and North Africa brought with them power struggles, changes in social and political structures, and confusion in all areas of social life, all of which could be seen in the region. This paper focuses on the more general aspects of the demographic and social characteristics in the countries of the Middle East and North Africa in 1950, 1980, and 2015, bearing in mind the relationship between mentalities and events, and dealing with the issue through the lens of social change, demographic change, resistance, and the struggle for political change in an international context. This study has two main approaches. First, it investigates demographic changes and spatial clustering with a qualitative (cluster analysis) approach in Middle Eastern and North Africa countries based on selected demographic indicators for the years 1950, 1980, and 2015. Then it discusses the relationship between the outcomes of these demographic changes and recent socio-political developments in the region. One of the main findings of this study is MENA countries present three different structures in different time-periods in terms of demographics and these structures are responsible for the regional social, economic, and political transformations.

Keywords: Demographic transition, social change, population geography, Middle East, MENA

1. Introduction

The Middle East and North Africa (MENA) region (Figure 1) has been an important player in the demographic transition process that has happened rapidly in many parts of the developing world since the mid-twentieth century. This process took place roughly twice as fast as in the MENA region than in developed countries (Nijim, 1985: 39; Reher, 2004: 19-20; Bongaarts, 2008: 105). The demographic change special to the Middle East and North Africa region was not independent from the other development efforts and transformations the region was undergoing (Winckler; 1998; Moghadam and Decker, 2013; Khan et al., 2017).

Despite differences among the MENA countries, the state-building process (Moghadam and Decker, 2013: 73), industrialization, and urbanization of the countries since the 1980s did not exempt the region from global trends; these trends are generally associated with an increase in the education level of society and an increasingly global network. Furthermore, the dynamics that led to demographic and social change in the region were often concurrent with dramatic political changes (Moghadam and Decker, 2013).

Since World War II, the transformation process particular to the countries of the Middle East and North Africa has been divided into three pivotal periods. The

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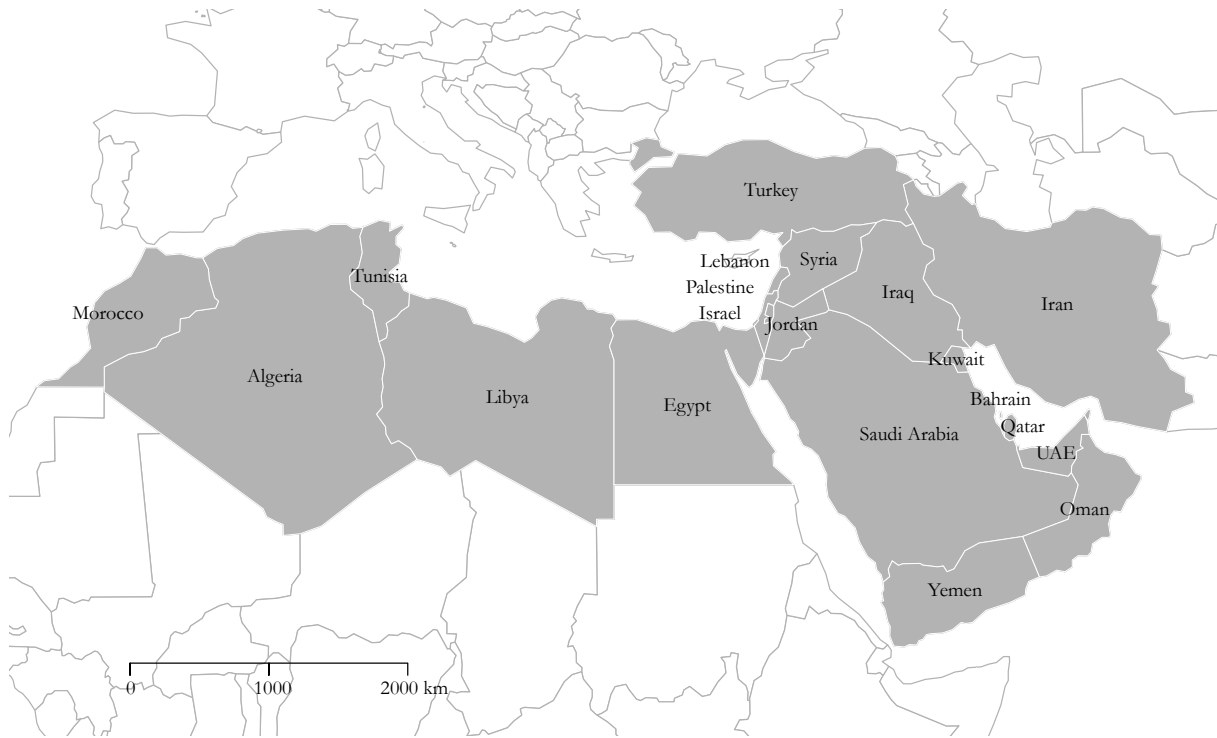
Figure 1. MENA region / countries*

* In the relevant literature, there are different definitions of the MENA region. In this study, we use 20 selected countries for the region as follows: Algeria, Bahrain, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Palestine, Qatar, S. Arabia, Syria, Tunisia, Turkey, UAE, and Yemen.

first spans 1950-1970 and involves decolonization, socio-economic development, and the countries' state-building process. The second encompasses the 1980s, during which structural adjustment efforts in countries and Islamic movements became widespread and demographic transitions in the region accelerated. The third and last period spans the 1990s to the present day. This last period is marked by the characteristics of the advanced stages of demographic transitions in the region, as well as by Islamic movements, efforts to secure women's rights, mass unrest, and conflicts (Moghadam and Decker, 2013: 73).

Nearly all of the MENA region's recent political changes have been identified by a number of internal and external factors, and those political changes and unrest clearly affected all the countries at different levels (Cammett, 2013). Among these factors, the most familiar factors are: the young population reached a significant size as a result of recent demographic transitions, high unemployment, and a worsening standard of living, but on the other hand the Middle Eastern peoples adapted to world societies and thus expanded their consciousness (Winckler, 1998; Moghadam and Decker, 2013). In these transformations and conflicts, which have influenced almost all of the Middle East and North Africa, regional, cultural, religious-sectarian, political, and economic dynamics that sharpen both class and social differences of the communities living in the region have played an important role (Moghadam and Decker, 2013: 75). However, the social unrest that has spread to almost the entire region over the last twenty years has recently turned into widespread protests and then internal confusion and conflict.

Demographic transition and social changes are processes that interact with each other and create demographic variability by region of the world (Morrill, 1993). In recent years MENA countries have experienced high total fertility rates and population growth rates, and those factors have brought the young population to a very large size ("youth bulge", Moghadam and Decker, 2013: 84) since the 1980s as in other many developing countries (Fargues, 1993: 17). But on the other hand the rising expectations and demands of the peoples of the region for social and economic development have led to serious pressures on governments and institutions (Winckler, 1998). Societies in the MENA region have more involvement in education than in the past (Moghadam and Decker, 2013: 85), and the rise of consciousness has led to a

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search for rights as well as mass movements. This consciousness played an important role in the recent unrest. On the one hand, thanks to their protests for their rights, Islamic political movements and women and youth movements increased their voices to become more visible. Confusion based on cultural differences, shifting gender relations, serious socio-economic problems, and the transitional democratization practices experienced by the countries have played an important role in the emergence of upheavals experienced by the region (Moghadam and Decker, 2013).

This paper has two purposes. First, it analyses demographic changes and spatial clustering (regionalization) in the Middle East and North Africa countries (Figure 1) based on selected demographic data for the years 1950, 1980, and 2015. In this analysis, the current demographic data provided by United Nations World Population Prospects (UN, 2017) at the country level are analysed using quantitative (Cluster) analysis. Second, it discusses the relations between regional special demographic changes and characteristics and recent social and political developments.

2. Background

Demographic transition refers to the movement of death (or mortality) and birth (or fertility) rates in a society, from a situation where both are high to one where both are low (Bongaarts and Watkins, 1996; Weeks, 2002; Weinstein and Pillai, 2001; Caldwell, 2006; Rowland, 2012; Yaukey et al., 2007). The interval separating mortality and fertility rates is the transition itself, during which substantial and rapid population growth often occurs, as births exceed deaths (Allman, 1980: 280; Rowland, 2012: 17-18). Unlike in developed countries, demographic transition has generally not yet finished in the developing world, where rapid population growth and clear geo-demographic differences between countries persist (Bongaarts, 2008: 109; Newbold, 2010: 19-20).

The total population of the Middle East and North Africa (including Iran and Turkey) increased from roughly 68 million in 1914 (Issawi, 1982) to more than 340 million in 1994 (Winckler, 1998: 445) and to almost 500 million in 2015 (UN, 2017), a more than sevenfold increase during a period of 101 years. As stated by Winckler (1998: 445), the reason for such a dramatic increase is not migration, but instead the growth of

natural increase rates in the indigenous populations over the last two or three generations, which are considered to be among the highest worldwide. The MENA region's crude birth and crude death rates, which were as high as 50 and 30 per 1,000 population in 1950-55, began to decline in the 1960s; by 2010-15 they had reached about 22 and 4 per 1,000 population, respectively[1] (Table 1). Like other developing countries, when MENA countries started their demographic transition (Allman, 1980; Winckler, 1998 and 2003), they had higher levels of birth and death rates than those observed in developed countries a century earlier, with total fertility rates (TFR) in many countries continuing to average 6.9 children per woman in 1950-55. In the region as a whole, TFR declined to an average of 5.9 children per woman in 1980-85, and in 2010-15 it was down to 2.8. Today, some countries have below-replacement levels of fertility (2.1 children per woman), while others have maintained their TFRs of more than 2 children per woman (Table 1). However, the rate of natural increase increased from an average of 25.8 per 1,000 population in 1950-55 to 30.2 in 1980-85, based on the rapid decline in mortality but still-high fertility (5.9 children per woman). Then in 2010-15, the rate of natural increase declined further to about 17.6 per 1,000 population.

Between 1950-55 and 2010-15, life expectancy increased substantially from an average of 45.2 years to 74 years thanks to better medical care and nutrition, healthy environmental conditions, and in general declining mortality. Due to the pace of the demographic transition in MENA, decreasing fertility and mortality, and increasing life expectancy, first the median age of the total population decreased from about 20 years in 1950-55 to 19 in 1980-85, and then increased to about 27 in 2010-15 as a fluctuation in the rate of natural increase was observed during the whole period.

On the other hand, except for Bahrain, Qatar, and the United Arab Emirates (UAE), a high fertility trend between 1950-55 and 1980-85 led to an increase in child dependency ratios in many countries. In this period, the clear positive net migration rates in Bahrain, Qatar, and the UAE are likely responsible for the decreased child dependency ratios in these countries. However, between 1980-85 and 2010-15, all MENA countries saw clear reductions in the child dependency ratios due to the salient falls in TFRs. Slight fluctuations can

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[1] These and all further regional rates and statistics are reported as unweighted averages of the 20 countries considered.

be observed in the old-age dependency ratios at the country level between 1950-55 and 2010-15. Yet the region's average old-age dependency ratio was almost flat from 1950-55 (7%) to 2010-15 (6.9%), with clear differences between countries' old-age dependency ratios. The sex ratio of the total population presents a remarkable rise in the whole period. It increased from 106 to 117 in 1980-85 and then to about 129 in 2010-15. The rising trend in the sex ratio of the total population could be accounted for by the male-dominated intraregional labour migrations to Gulf States (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the UAE) due to the spike in the region's oil-based economic development since the 1970s (Moghadam and Decker, 2013: 76). In relation to that, both very high sex ratios of the total population and positive net migration rates can be observed in Gulf States from 1950-55 to 2010-15 plus net migration rate of -41.1 per 1,000 population, indicating clear outflows from Syria in 2010-15 (Table 1).

3. Data, Method, and Procedure

The years 1950, 1980, and 2015 were chosen to create three clustering analyses (Analysis I (1950/55); Analysis II (1980/85); and Analysis III (2010/15) in order to determine the spatial clustering (similarities or disparities between countries) of selected demographic data belonging to the countries of the UN (2017) shown in Table 1. Some indicators contain period data from 1950-55, 1980-85, and 2010-2015, namely as crude birth rate, crude death rate, TFR, rate of natural increase, life expectancy at birth, and net migration rate. Other indicators contain data belonging to the years 1950, 1980, and 2015, namely as median age, child dependency ratio, old-age dependency ratio, and sex ratio of the total population (Table 1). The chosen 10 data sets have different units for 20 countries in the region and therefore all have been analysed after standardization[2]. Analyses were

calculated using the IBM PASW Statistics (Predictive Analytics Software Statistics) program and the k-means algorithm[3].

In terms of the advantages of multivariate analysis, clustering analysis is one of the most widely used methods of statistical analysis in social sciences, especially in recent years (Rencher, 2002; Uçar, 2010). This analysis considers the similarities of individuals, objects, or spatial units (such as countries, provinces, districts, neighbourhoods) and groups them into two or more sub-groups (Everitt and Dunn, 1991; Afifi and Clark, 1999; Rencher, 2002; Addio and Ercole, 2005; Özdamar, 2010; Uçar, 2010; Çokluk et al., 2010; Yüceşahin, 2016). The analysis indicates the spatial units (e.g. MENA countries) assigned to the same cluster that are similar in terms of the values of the variables. But each cluster is different from all the others. Countries were analysed by taking 2, 3, and 4 clusters in terms of the average of the selected variables, and the results were evaluated. Each of the three analyses started with 4 clusters according to the demographic variables of countries, but there was just one country in one of the clusters, and thus this number was abandoned. The grouping of the countries into 2 clusters resulted in the disappearance of details, and therefore 3 clusters was preferred.

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2 The Z-score is a method of standardizing data values between -3.0 and +3.0. Cluster analysis is a sensitive analysis of large variables. This can lead to incorrect results because the analysis tries to parse large sets of values. For this reason, the variables to be used in the analysis must either be the same (for example, all percentages) or standardized. Since the units of demographic variables used in the analysis differ from each other (years, speeds, rates, percentages, etc.), they have been standardized and converted into z-scores. A positive Z-score shows that the variable is high in terms of the rate, speed, or value, while a negative Z-score shows that they are low.

3 K-means clustering (PASW Quick Cluster Program) is a popular non-hierarchical clustering technique. The cluster centres are computed iteratively. For a specified number of clusters K, the basic algorithm proceeds as follows: (1) choosing an initial partition of the cases (countries) into k clusters; (2) computing for each case the squared Euclidean distance to cluster centres. Assigning each case to its nearest cluster; (3) Re-computing the cluster centres after all cases are checked; and (4) repeating steps 2 and 3 until cluster membership, cluster centres or the error sum of squares do not change (Afifi and Clark, 1999: 395; Bacher, 2002: 105). In this analysis, after the number of clusters are chosen, each remaining point in the data set is assigned to the cluster with the nearest seed (based on Euclidean distance). As soon as a cluster has more than one member, the cluster seed is replaced by the centroid. After all items / cases (countries in this study) are assigned to clusters, each item is examined to see if it is closer to the centroid of another cluster than to the centroid of its own cluster. If so, the item is moved to the new cluster and the two cluster centroids are updated. This process is continued until no further improvement is possible (Rencher, 2002: 482).

Table 1. Selected demographic indicators of MENA countries, 1950-2015

Country	Crude birth rate (births per 1,000 population)			Crude death rate (deaths per 1,000 population)			Total fertility rate (children per woman)			Rate of natural increase (per 1,000 population)			Life expectancy at birth (years)		
	1950-55	1980-85	2010-15	1950-55	1980-85	2010-15	1950-55	1980-85	2010-15	1950-55	1980-85	2010-15	1950-55	1980-85	2010-15
Algeria	50.2	40.8	25.1	23.1	9.2	5.1	7.28	6.32	2.93	27.1	31.6	19.9	42.89	61.57	74.42
Bahrain	45.0	33.0	15.4	21.1	4.1	2.3	6.97	4.63	2.10	23.9	28.9	13.0	42.93	70.50	76.38
Egypt	50.6	39.0	28.5	25.4	11.4	6.2	6.62	5.49	3.38	25.2	27.6	22.3	41.13	59.91	70.84
Iran	50.7	44.6	18.1	26.8	13.6	4.7	6.91	6.53	1.75	23.9	31.0	13.4	40.59	51.99	75.06
Iraq	53.3	39.0	35.1	27.7	9.9	5.3	7.30	6.35	4.64	25.7	29.1	29.8	37.93	59.00	69.19
Israel	33.0	23.7	21.5	6.3	6.6	5.3	4.28	3.13	3.05	26.7	17.1	16.1	68.88	74.63	82.07
Jordan	47.4	39.7	27.9	20.4	6.5	3.9	7.38	7.05	3.51	27.0	33.2	24.0	46.46	67.22	73.79
Kuwait	43.7	36.3	20.6	13.6	3.6	2.5	7.20	5.00	2.15	30.1	32.7	18.1	53.42	70.31	74.28
Lebanon	40.2	28.8	15.0	12.9	7.2	4.6	5.74	3.75	1.72	27.3	21.6	10.3	60.46	68.36	78.86
Libya	51.0	37.0	21.7	30.6	6.5	5.3	7.14	6.68	2.53	20.4	30.5	16.4	36.65	65.55	71.47
Morocco	51.3	36.7	21.3	20.2	10.0	5.7	6.61	5.40	2.56	31.1	26.7	15.5	45.66	59.58	73.61
Oman	49.1	48.2	20.8	28.3	8.6	2.7	7.25	8.32	2.88	20.8	39.6	18.1	36.05	61.90	76.33
Palestine	45.9	44.9	33.1	20.0	6.8	3.6	7.38	7.05	4.28	26.0	38.0	29.5	46.59	64.40	72.65
Qatar	47.5	33.3	12.1	13.4	2.8	1.5	6.97	5.45	2.08	34.1	30.4	10.6	55.11	73.28	77.89
S. Arabia	47.8	42.5	20.8	23.2	7.2	3.4	7.18	7.02	2.85	24.6	35.3	17.4	41.93	64.89	74.08
Syria	50.8	42.8	24.1	19.2	6.2	5.6	7.23	6.77	3.03	31.5	36.7	18.5	48.65	67.11	69.51
Tunisia	45.5	33.1	18.4	26.6	7.8	6.6	6.65	4.82	2.16	18.9	25.4	11.8	38.81	64.26	74.60
Turkey	51.2	33.4	17.3	24.5	10.4	5.7	6.62	4.07	2.10	26.7	23.0	11.5	40.97	60.22	74.84
UAE	49.1	30.2	11.2	21.9	3.5	1.5	6.97	5.23	1.82	27.1	26.7	9.7	43.80	68.76	76.67
Yemen	48.4	54.7	33.2	30.3	15.1	7.1	7.35	8.80	4.35	18.1	39.6	26.1	34.69	53.03	63.51
MENA	47,6	38,1	22,1	21,8	7,9	4,4	6,9	5,9	2,8	25,8	30,2	17,6	45,2	64,3	74,0

Source: UN data (2017).

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Table 1. (Continued)

Country	Median age of the total population (years)			Child dependency ratio (ratio of population aged 0-14 per 100 population 15-64)			Old-age dependency ratio (ratio of population aged 65+ per 100 population 15-64)			Sex ratio of the total population (males per 100 females)			Net migration rate (per 1,000 population)		
	1950	1980	2015	1950	1980	2015	1950	1980	2015	1950	1980	2015	1950-55	1980-85	2010-15
Algeria	19.4	16.7	27.6	72.7	92.0	43.6	6.3	6.8	9.1	103.5	101.6	101.3	-6.6	-0.8	-0.8
Bahrain	18.9	22.3	30.3	77.2	54.5	28.2	5.2	3.3	3.2	116.1	140.7	163.0	5.1	1.6	4.5
Egypt	20.8	19.8	24.7	65.5	72.2	53.8	5.2	8.3	8.5	101.7	101.8	102.1	-0.4	-1.7	-0.5
Iran	21.9	18.1	29.5	62.1	81.4	33.1	9.0	5.6	7.1	103.6	106.3	101.4	0.0	9.2	-0.8
Iraq	22.0	16.6	19.3	62.5	95.5	73.2	4.7	8.3	5.5	99.5	104.4	102.5	0.0	-2.7	3.3
Israel	25.5	25.0	30.3	49.1	56.6	45.7	6.1	14.8	18.4	105.8	99.7	98.4	35.2	0.1	0.5
Jordan	17.2	15.5	22.5	92.4	102.5	58.5	9.8	6.7	6.2	107.9	109.6	105.0	45.0	6.5	6.5
Kuwait	21.5	20.6	31.0	59.3	69.9	29.5	4.8	2.7	2.6	146.4	134.2	128.2	18.9	12.3	29.8
Lebanon	23.2	19.9	28.5	58.5	70.3	35.4	12.4	9.7	12.0	101.3	98.3	100.9	0.2	-16.2	49.1
Libya	21.0	16.1	27.5	69.1	96.9	45.5	9.3	5.6	6.9	107.2	110.0	101.1	0.0	6.4	-16.0
Morocco	19.5	17.7	28.0	68.9	81.2	40.9	5.1	6.1	9.3	99.0	99.0	97.7	0.0	-3.0	-1.9
Oman	18.8	17.6	29.0	77.5	86.4	26.7	5.5	5.2	3.4	103.1	111.4	197.0	-4.2	12.3	65.2
Palestine	17.3	15.1	19.3	91.4	104.1	70.8	9.7	4.7	5.2	107.8	102.1	102.8	-14.3	-7.5	-2.0
Qatar	18.9	23.3	30.7	77.8	52.1	18.6	6.3	2.3	1.4	102.8	170.5	265.5	37.1	68.7	36.3
S. Arabia	19.0	18.0	28.3	76.9	84.8	41.7	6.1	5.6	4.2	103.1	115.1	130.1	1.6	23.9	5.7
Syria	20.3	15.6	20.8	68.5	100.8	63.1	7.9	6.1	6.9	108.6	103.2	102.5	-3.8	-1.8	-41.1
Tunisia	20.3	18.6	31.2	72.3	76.8	33.8	8.0	7.2	11.0	98.7	101.1	97.7	-1.0	2.5	-0.6
Turkey	19.7	19.8	29.8	68.5	72.5	38.4	5.2	8.5	11.3	101.1	98.2	96.7	-0.2	-0.3	5.3
UAE	18.9	26.1	33.3	77.8	39.7	16.4	6.3	2.1	1.3	102.8	230.7	274.0	-0.4	29.7	9.3
Yemen	18.9	15.3	19.3	78.7	103.4	70.7	7.3	5.9	4.9	102.0	95.8	102.1	-2.2	-1.1	-0.4
MENA	20,2	18,9	27,0	71,3	79,7	43,4	7,0	6,3	6,9	106,1	116,7	128,5	5,5	6,9	7,6

Source: UN data (2017).

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4. Results: Differences and Features of the Spatial Demographic Transitions in MENA

As a result of the three cluster analyses (Analysis I, II, and III), the z-score averages (final cluster centres) of the variables are presented in Table 3. In addition, the z-scores in Table 3 have been converted to plot diagrams presented in Figure 2 to clearly illustrate the differences between the clusters. In addition, mapping the three different clusters analyses are presented in Figure 3. In Analysis I (1950/55), two of the 20 countries (Qatar and Kuwait) were assigned to cluster 1/I and the other two (Israel and Lebanon) were assigned to cluster 3/I, and the remainder were assigned to cluster 2/I (Table 2). In Analysis II (1980/85), 4 out of 20 countries (Bahrain, Kuwait, Qatar, and the UAE) were assigned to the first cluster (1/II), 4 (Israel, Lebanon, Tunisia, and Turkey) were assigned to the third cluster (3/II), and the remainder were assigned to the second cluster (2/II). In Analysis III (2010/15), 6 out of 20 countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the UAE) were assigned to the first cluster (1/III), 6 countries (Algeria, Iran, Israel, Lebanon, Libya, Morocco, Tunisia, and Turkey) to the third cluster (3/III), and 8 countries to the second cluster (2/III).

Analysis I (1950/55) revealed the spatial demographic pattern of the MENA countries in 1950-55. The most important feature of the first cluster (1/I) (Kuwait and Qatar) was high the net migration rate, as can be seen from the positive z-scores of net migration rate based on international labour migration (Table 3). In cluster 1/I, rate of natural increase, life expectancy, and sex ratio of the total population are also high. Due to labour migration, the rate of natural increase is high, and mainly the male population participates in these migrations, and this factor results in elevated sex ratios of the total population in those countries. On the other hand, birth rates (crude birth rate and TFR) in this cluster are higher than Cluster 3/I. Israel and Lebanon were assigned to the third cluster, and their TFR, crude birth rate, crude death rate, child dependency ratio, and sex ratio of the total population data are lower than the other cluster means (negative z-scores). On the contrary, the life expectancy, median age, and old-age dependency ratio averages are higher in this cluster than other clusters. This pattern implies

that both countries were in later stages in terms of demographic transition at that time. The z-score centres (means) of variables in cluster 2/I present a reverse image from cluster 3/I: Countries in this cluster have positive z-scores in TFR, crude birth rate, crude death rate, and child dependency ratio. This means that fertility, crude birth and mortality rates, and the child dependency ratio are high in cluster 2/I countries (Table 3; top panels in Figures 2 and 3). Due to its high mortality, the rate of natural increase in this cluster is low compared to other clusters. Cluster 2/I is the group of countries with the lowest life expectancy at birth and median age among MENA countries in 1950-55. In summary, the results of analysis I show that cluster 1/I and 3/I countries are in the later phases of the demographic transition period, while cluster 2/I countries are in the early stages of demographic change.

Analysis II (1980/85) showed the demographic spatial pattern of MENA countries in 1980-85 (middle panel in Figures 2 and 3). The first cluster (1/II) (Bahrain, Kuwait, Qatar, and the UAE) is the group of countries with the highest life expectancy, median

Table 2. Cluster memberships of MENA countries obtained from Cluster Analyses I, II, and III (n=20)

Country	Analysis I (1950/55)	Analysis II (1980/85)	Analysis III (2010/15)
	Cluster No.	Cluster No.	Cluster No.
Algeria	2	2	3
Bahrain	2	1	1
Egypt	2	2	2
Iran	2	2	3
Iraq	2	2	2
Israel	3	3	3
Jordan	2	2	2
Kuwait	1	1	1
Lebanon	3	3	3
Libya	2	2	3
Morocco	2	2	3
Oman	2	2	1
Palestine	2	2	2
Qatar	1	1	1
Saudi Arabia	2	2	1
Syria	2	2	2
Tunisia	2	3	3
Turkey	2	3	3
UAE	2	1	1
Yemen	2	2	2

Table 3. Final cluster centres obtained from the Cluster Analyses I (1950/55), II (1980/85), and III (2010/15) (n=20)

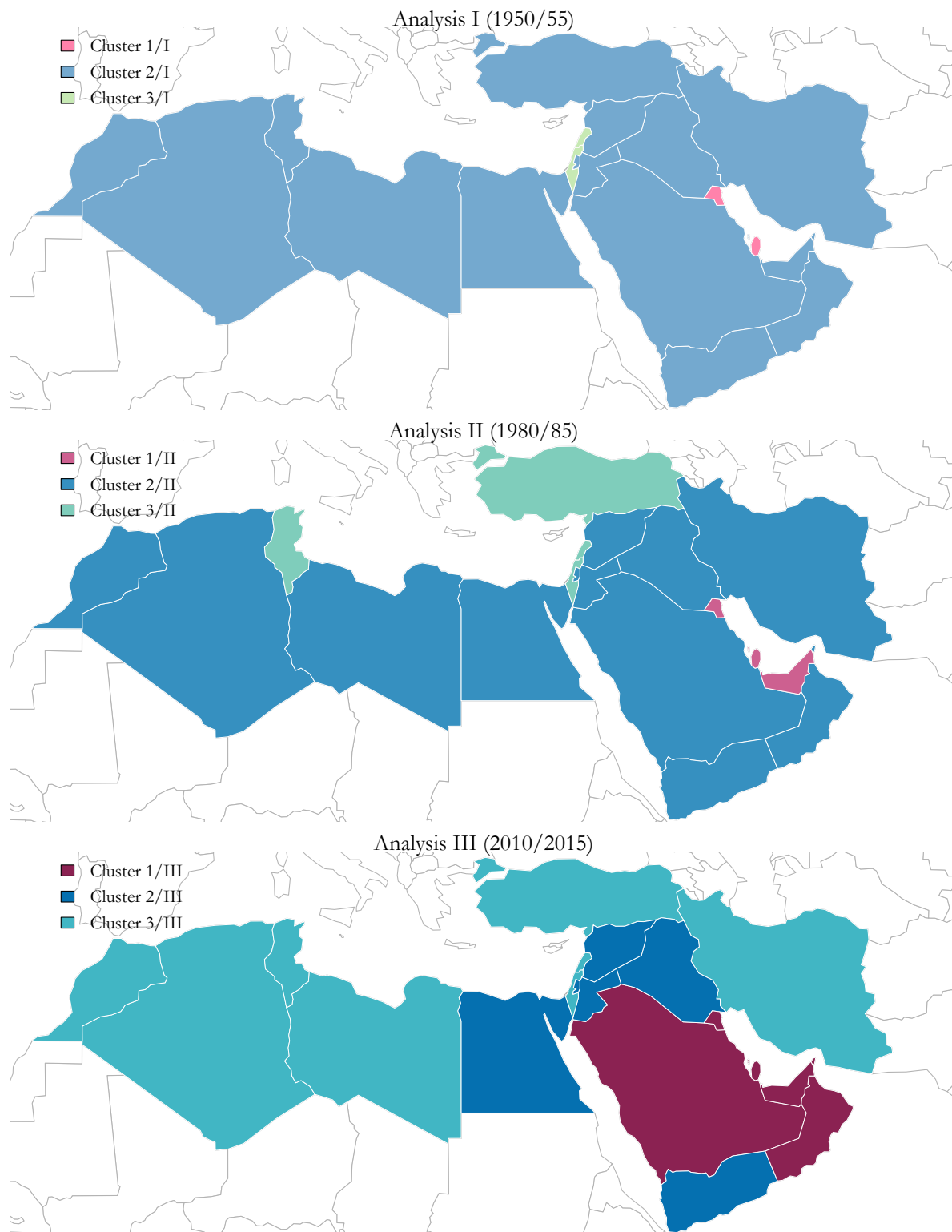|			Indicator									
			Crude birth rate	Crude death rate	TFR	rate of natural increase	Life expectancy at birth	Median age	Child dependency ratio	Old-age dependency ratio	Sex ratio of the total population	Net migration rate
Analysis I (1950/55)	Z-score	Cluster 1/I	-0.43	-1.29	0.32	1.52	1.05	0.03	-0.26	-0.69	1.79	1.43
		Cluster 2/I	0.35	0.4	0.28	-0.23	-0.41	-0.27	0.24	-0.05	-0.19	-0.28
		Cluster 3/I	-2.37	-1.91	-2.55	0.29	2.26	2.12	-1.66	1.06	-0.25	0.78
	Anova Test	F value	21.08	19.63	27.05	3.53	33.56	9.66	4.5	1.76	5.13	4.42
		P	****	****	****	*	****	***	**	-	**	**
Analysis II (1980/85)	Z-score	Cluster 1/II	-0.68	-1.33	-0.56	-0.09	1.06	1.3	-1.36	-1.27	1.61	1.19
		Cluster 2/II	0.61	0.43	0.63	0.5	-0.49	-0.63	0.64	-0.01	-0.36	-0.2
		Cluster 3/II	-1.16	0.05	-1.33	-1.41	0.42	0.6	-0.56	1.3	-0.54	-0.58
	Anova Test	F value	13.88	8.19	19.05	11.92	6.3	18.39	21.69	19.7	19	5.52
		P	****	***	****	***	***	****	****	****	****	**
Analysis III (2010/15)	Z-score	Cluster 1/III	-0.77	-1.27	-0.55	-0.51	0.49	0.76	-0.97	-1.02	1.18	0.77
		Cluster 2/III	1.22	0.51	1.22	1.21	-1.04	-1.37	1.28	-0.17	-0.47	-0.58
		Cluster 3/III	-0.33	0.56	-0.51	-0.53	0.41	0.45	-0.23	0.89	-0.53	-0.14
	Anova Test	F value	20.14	22.41	17.42	16.69	8	51.82	43.21	17.27	14.49	3.68
		P	****	****	****	****	***	****	****	****	****	**

Significance: ****$P < 0.001$; *** $P < 0.01$; **$P < 0.05$; *$P < 0.10$

age, and sex ratio of the total population in the region. All three demographic variables are high in these countries, and this is related to net migration rate, which also has high levels in this period. In 1980-85, Tunisia and Turkey also were assigned to Cluster 3/II. In this cluster, birth and natural growth rates (crude birth rate, TFR, and rate of natural increase), sex ratio of the total population, and net migration rate are the lowest compared to the other clusters, while life expectancy and median age are quite high, and old-age dependency ratio is the highest. These countries reached the later stages of the demographic transition and their population was getting older and accordingly, the old-age dependency ratio was rising.

In cluster 2/II, where other countries are located, birth rates, death rates, population growth rates, and child dependency ratios are generally high, while life expectancy at birth, median age, and the old-age dependency ratio are remarkably low (Table 1 and 3; middle panels in Figures 2 and 3).

Analysis III (2010/15) showed the spatial demographic pattern of MENA countries in the 2010-15 period (bottom panels in Figures 2 and 3). All of the Gulf States (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the UAE) are assigned to Cluster 1/III, and the result of the analysis demonstrates that some degree of demographic transition has reached the later stages in those countries. In this cluster, crude birth rate,

Figure 2. Clustering of MENA countries and the final cluster centres of the demographic indicators in 1950/55 (top), 1980/85 (middle) and 2010/15 (bottom).

Note: This plot diagram was prepared by the Final Cluster Centres obtained from the Cluster Analysis I (1950/55), see Table 2 and 3.

Explanation: CBR: Crude birth rate; CDR: Crude death rate; TFR: Total fertility rate; RNI: Rate of natural increase; LEXP: Life expectancy at birth, MAGE: Median age of the total population; CDPR: Child dependency ratio; ODPR: Old-age dependency ratio; SEXR: Sex ratio of the total population; NMR: Net migration rate.

crude death rate, TFR, rate of natural increase, and child dependency ratio are low, with rates / ratios that have declined compared to the past. Life expectancy and median age are high. However, we can observe that old-age dependency ratio, a characteristic of developed countries, is not high, but sex ratio of the total population and net migration rate are high. Therefore, it can be said that the Gulf countries are continuing to experience demographic transition, as on the one hand their population stays young thanks to labour migrations, however high sex ratios of the total population imply that labour migrations are gendered and these migrations predominantly involve the working-age male population. Egypt, Iraq, Jordan, Palestine, Syria, and Yemen were assigned to Cluster 2/III, which characterizes a relatively lagging area of the MENA region in terms of demographic transition in 2010-15. In this cluster, birth, death, and natural population growth rates (crude birth rate, TFR, and the rate of natural increase) and the child dependency ratio are significantly higher than in other countries. On the other hand, life expectancy at birth, median age, and the sex ratio of the total population and net migration rate are not high compared to other countries[4]. Cluster 3/III is a group of countries (Algeria, Iran, Israel, Libya, Lebanon, Morocco, Tunisia, and Turkey) whose populations are clearly ageing in 2010-15. In this cluster, birth and growth rates (crude birth rate, TFR, and the rate of natural increase) have declined dramatically in the recent past, but the crude death rate (based on the rising elderly population), life expectancy, the old-age dependency ratio, and median age have increased mainly in Israel and Lebanon (Table 1 and 3; bottom panels in Figures 2 and 3).

Thus, after looking at the results of the cluster analyses presented in Table 3, it is necessary to mention several important things about the demographic change of the MENA region and the countries' convergence or divergence. Looking at the F values in Cluster analysis I (1950/55), we can observe that the most important variables contributing to the spatial clustering regarding demographic variables of the countries in the 1950-55 period were respectively life expectancy (33.56), TFR (27.05), crude birth rate (21.08), and crude death rate (19.63). In this period, the old-age dependency ratio makes no contribution to the grouping of countries, because in this period children
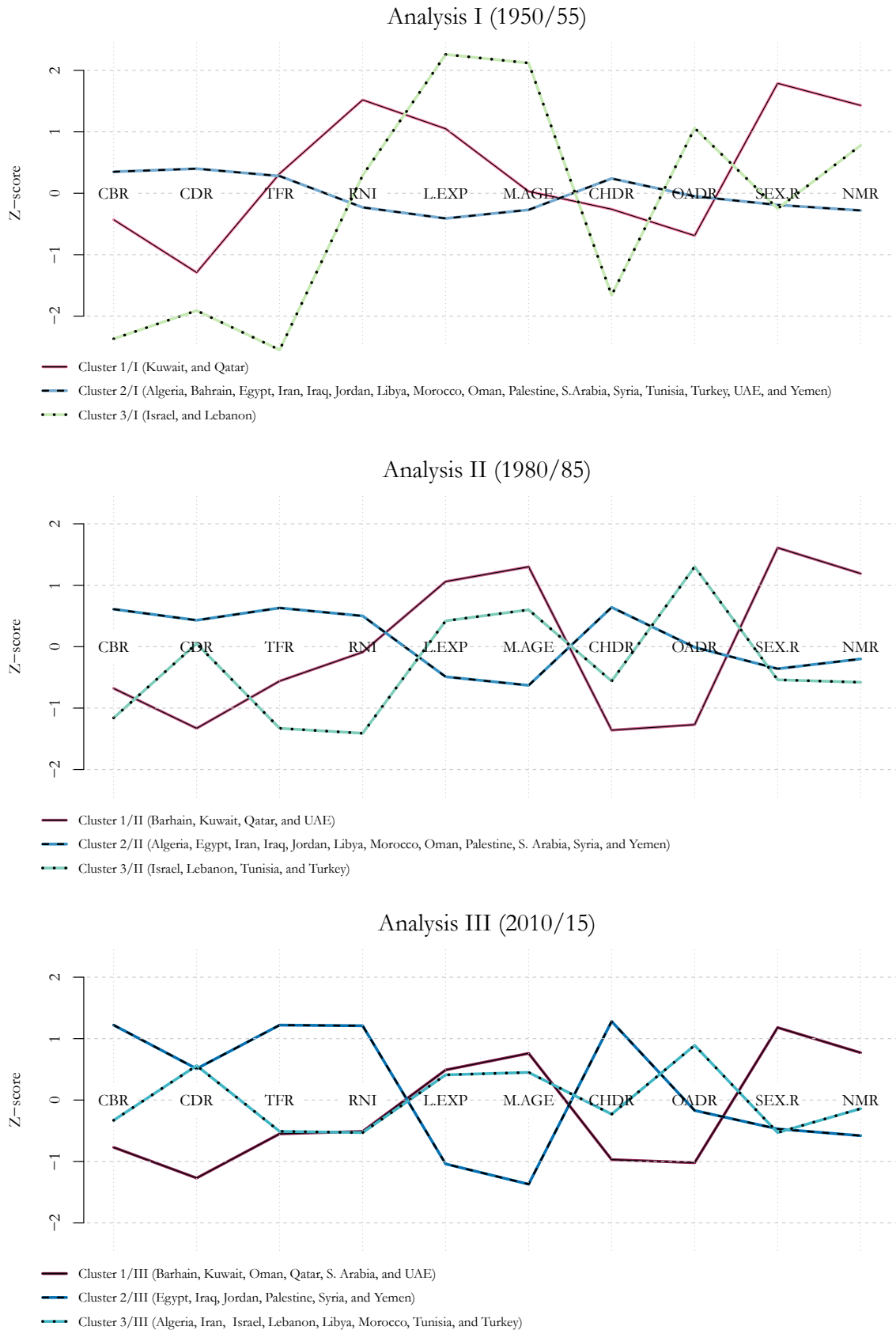
and the young population are dominant (youth bulge) in all MENA countries. The close proximity of F values to each other in Cluster analysis II (1980/85) indicate that a large proportion of the variables that grouped countries contributed closely to each other in 1980-85. This means that MENA countries have more transitional and mixed features in terms of demographic change in this period. The dominance of the young population, the predominance of the elderly population, and the high rate of net migration are the factors that produce diverging clusters or groups of countries from each other in this analysis.

According to F values in Cluster analysis III (2010/15), it can be said that the most important variables contributing to the spatial clustering of MENA countries in 2010-15 were respectively median age (F=51.82), child dependency ratio (F=43.21), crude death rate (F=22.41), and crude birth rate (F=20.14) (Table 3). Thus, in some MENA countries today (cluster 2/III countries, bottom panels in Figures 2 and 3), the child or young population is dominant and birth rates are relatively still high, although not as high as in the recent past. However, some of the countries (countries in cluster 3/III, bottom panels in Figures 2 and 3) have reached the last phases of the demographic transition, and these countries have considerable proportions of the elderly population. While in the Gulf States (Cluster 1/III, bottom panels in Figures 2 and 3) the demographic transition has reached the last phases (low TFRs, crude birth rates, and crude death rates), especially the working-age male population is predominant due to efficient labour migrations since the 1950s, and thus these countries still preserve to a certain degree their young age structure.

5. Discussion

The high birth and death rates observed in 1950-55 have declined considerably as of the 1980-85 period. As a result of socio-economic development in this period, there was a rapid decline in mortality rates whereas birth rates did not decline, and for those reasons young populations have dominated almost all MENA countries since the 1980s. Today, MENA is a region where the youth bulge is prominent and the region's total population by 2050 is in fact by the UN to exceed 700 million (UN, 2017). As seen from the previous section, MENA countries present three different structures in terms of demographics. With certain changes specific to demographic transition,

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4 Exceptionally, the net migration rate was -41.1, due to the conflict in Syria during this period (Table 1).

Analysis I (1950/55)

Cluster 1/I (Kuwait, and Qatar)
Cluster 2/I (Algeria, Bahrain, Egypt, Iran, Iraq, Jordan, Libya, Morocco, Oman, Palestine, S.Arabia, Syria, Tunisia, Turkey, UAE, and Yemen)
Cluster 3/I (Israel, and Lebanon)

Analysis II (1980/85)

Cluster 1/II (Barhain, Kuwait, Qatar, and UAE)
Cluster 2/II (Algeria, Egypt, Iran, Iraq, Jordan, Libya, Morocco, Oman, Palestine, S. Arabia, Syria, and Yemen)
Cluster 3/II (Israel, Lebanon, Tunisia, and Turkey)

Analysis III (2010/15)

Cluster 1/III (Barhain, Kuwait, Oman, Qatar, S. Arabia, and UAE)
Cluster 2/III (Egypt, Iraq, Jordan, Palestine, Syria, and Yemen)
Cluster 3/III (Algeria, Iran, Israel, Lebanon, Libya, Morocco, Tunisia, and Turkey)

Figure 3. Mapping the three different cluster analyses.

in some countries (such as Syria, Iraq, Palestine, Jordan, and Yemen), population increases with relatively high TFRs (3-4 children per woman) and their child dependency ratios are remarkable. Some countries (such as Israel, Turkey, Lebanon, Tunisia, Libya, and Algeria) have reached the last stages of the demographic transition, and thus the population rises have decreased markedly and the population has begun to age. Those countries seem to need to implement efficient social policies for both young and elderly populations. The Gulf countries have experienced a marked demographic transition in the last 30-40 years, but since 1970, they have become a region characterized by intense labour migration due to the oil-intensive capital production industry. The working population of this last group is quite large, and the sex ratios are high enough compared to elsewhere in the world. Especially in the Gulf countries there exists dominant gender inequality, but for now this problem seems to have been overshadowed by the wealth brought by oil. But for the future this could pose serious social problems for these countries.

The demographic change of the countries of the Middle East and North Africa is a process that is intertwined with social, economic, and political transformations. The 1950s saw most of the countries in a process of decolonization, followed in the 1980s by political liberalization and infitah ('*Opening door*') politics in most of the region, and then recent years have seen the process of the "Arab Spring / Awakening" with popular revolts. The 1950s were a period of decolonization for almost all MENA countries, as most Middle Eastern and North African countries began to gain their independence in this period. This process, which started in the 1950s, continued until the first half of the 1970s[5]. In the 1980s, the waves of political liberalization felt in various parts of the world had grown stronger since the second half of the 1970s, and the MENA countries were no exception, and many of the peoples of the region pursued new quests for rights and causes such as human rights, women's rights, environmentalism, and social equality. In recent years, with social media's growing role, social upheavals and internal disturbances based on social and political awakening against authoritarian regimes have been seen, particularly in the countries of North Africa.

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[5] Saudi Arabia (1932), Turkey (1923), Syria (1946), Iraq (1932), Israel (1948), Lebanon (1943), and Jordan (1946) gained their independence before the early 1950s.

They won independence through the decolonization process that ended in the early 1970s. Afterwards, many of the countries of the Middle East and North Africa adopted a top-down/Jacobinism and legacy of ex-colonial powers as a political regime. In addition to the regimes shaped by this colonial heritage, there was also sectarian and ethnic polarization, and these caused social division and a fragile cultural-political structure in the countries that won independence in the second half of the 20th century. The combination of all these factors led to political uprisings in some regional countries such as Syria, Egypt, Yemen, Iraq, and Libya. Moreover, these countries gained their independence during the Cold War era, which brought additional challenges. On a related note, political analysts say that the country's armies played a key role in Middle Eastern countries' modernization and democratization from the late 1950s to the end of the 1970s (Cook, 2007). According to these analysts, the region's armies provided the most ideal guide for the processes of industrialization and institutionalization in the countries of the Middle East (Cook, 2007). However, although those armies devoted themselves to modernization and had their own nationalistic understanding, they were also the biggest obstacles to the advancement of democratic culture in the countries of the region. This was one of the reasons for the people's movements and internal disturbances which countries experienced between the 1980s and the 2010s.

From the second half of the 1970s, various regions of the world were faced with waves of political liberalization. These waves also affected the Middle East and North Africa, but in response governments tried to reclaim control over much of the region's countries and so promised reforms to buy time, followed by small liberal changes. But in the end, the demonstrations against inadequate democratization policies were suppressed by security forces with extreme violence (Tlemcani, 1990). In addition to demands for political liberalization, many countries in the region became dependent on the oil economy in the 1970s "oil explosion". But then oil prices fell, putting oil-based economies in crisis. Due to these crises, in this period countries left behind the import substitution policies they had adopted and began to implement open-door or liberal policies (infitah policy). This process exacerbated the economic crisis, including higher prices and decreased purchasing power. This situation made life even harder for the poor and unemployed, and worsened class differences.

Thus, class tensions caused the popular uprising, also known as "bread riots." In fact we can see that many of these new public demands and the countries with the uprisings are situated in the second cluster, which was detected with Cluster Analysis III (2010/15). The demographic transition process which generated the young population predominantly since the 1950s is a determinative factor in the upheaval experienced by second-cluster countries in recent years[6]. In these countries, many young people were unable to find jobs and got stuck in years of unemployment. One of the most important actors in the "Arab Spring" popular movements were masses of young people with university degrees unable to find jobs and thus facing diminished hopes for the future. In particular, many people opposed to authoritarian regimes took to the streets and voiced their reactions to the problems that existed in their countries. Economic pressures left many households without a choice. More and more women need to work outside the home now to help support their families. For poor households, having two incomes is again the ticket to the middle class. A second factor is the high expectations of the region's now predominantly youthful population, nearly two-thirds of which is younger than 25. Successful government policies have created a generation of young, educated women who are increasingly on par with their male counterparts and want the same opportunities and rewards (The World Bank, 2004: 20-21). We believe like Brzezinski (2004) that amid the socio-political and economic changes taking place in the region, if democracy came with Islamic traditions, religious beliefs, and cultural habits, countries could complete democratic transformations and give firm foundations to democratic culture.

Acknowledgements

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[6] Although Lebanon and Tunisia faced public upheavals, they are not in the second cluster, but they also have significant young populations.

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