

Economic and Social Commission for Western Asia



Statistical Committee Fourteenth session

Webinar on localized big data for effective decision-making
in crisis situations

Online session, 10-11 February 2021



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Economic and Social Commission for Western Asia



Presidency of the Council of Ministers
Central Administration of Statistics

1- REFUGEES CASE (Lebanon) 2019-20 2- COVID19 CASE (Lebanon & Jordan) 2020-21



Feb 2021



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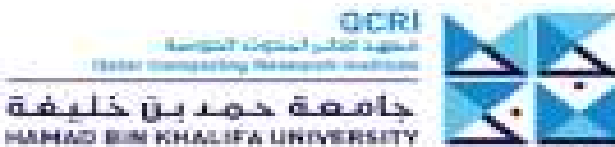


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Changing the world with data

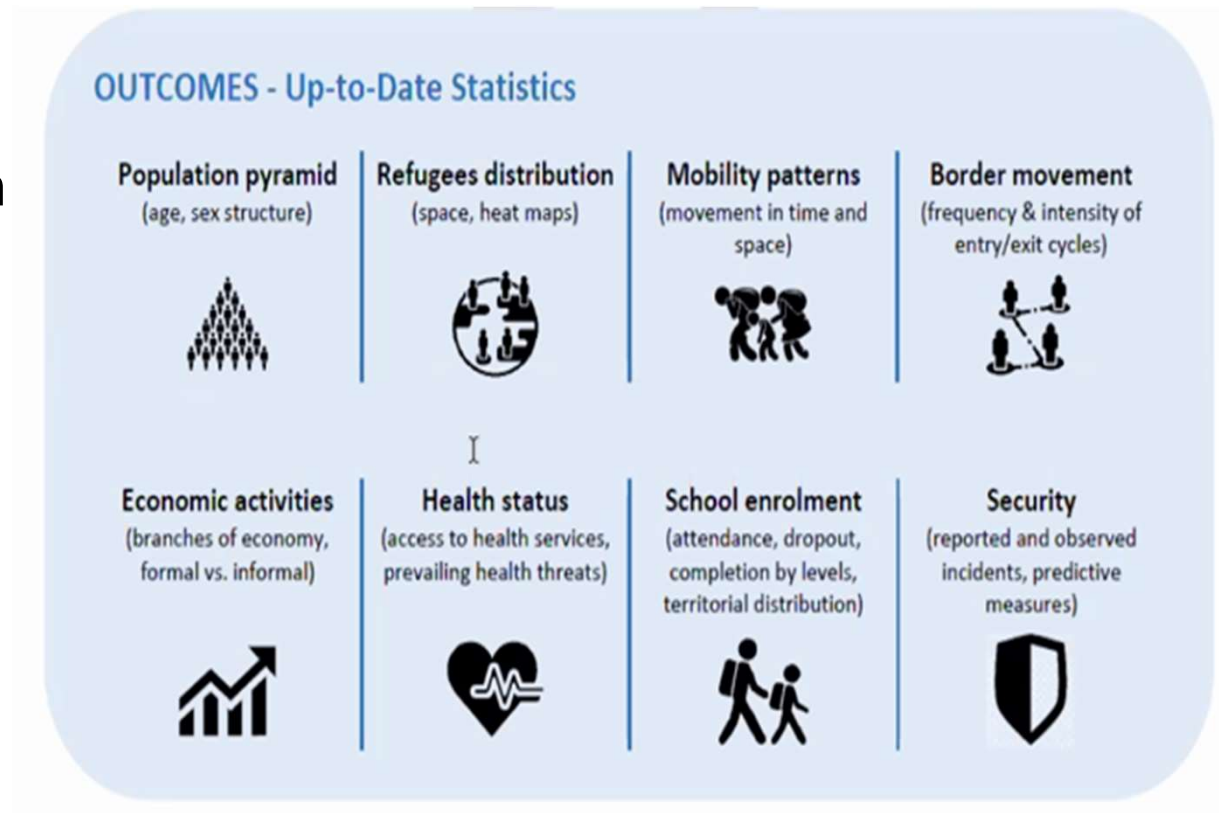


1- REFUGEES CASE (Lebanon)

Can Big Data Illustrate the Challenges Facing Syrian Refugees in Lebanon?

Explored Human Development Outcomes

1. Population Pyramid
2. Refugee Distribution
3. Mobility Patterns
4. Border Movement
5. Economic Activities
6. Security
7. School Enrollment



GOVERNANCE: CODE (council of development and ethics: Academia, Government, International Organizations, Civil Society)

Responsibilities include *providing counsel, advice and input on:*

- relevance of the project and ways to enhance expected benefit;
- methodologies and data sources;
- ethical questions and concerns regarding the data accessed and its potential uses;
- appropriateness of the project's data protection measures and overall security measures;
- ways and means to enhance the project's visibility and outreach to relevant groups;
- opportunities to engage concerned government agencies, organizations and civil society;
- recommendations for possible extension, application and improvement of the project.

Data Sources

- Traditional - references
 - UNHCR Vulnerability Assessment of Syrian Refugees (VASYR) 2012-2019
 - CAS Labor Force and Household Conditions Survey (CASLFS) 2018
- “Non-traditional”
 - Call Detail Records
 - Facebook Advertising Platform (QCRI)
 - Media GDELT
 - Twitter



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Refugees and Host Communities Lebanon

Mobile

Call Detail Records

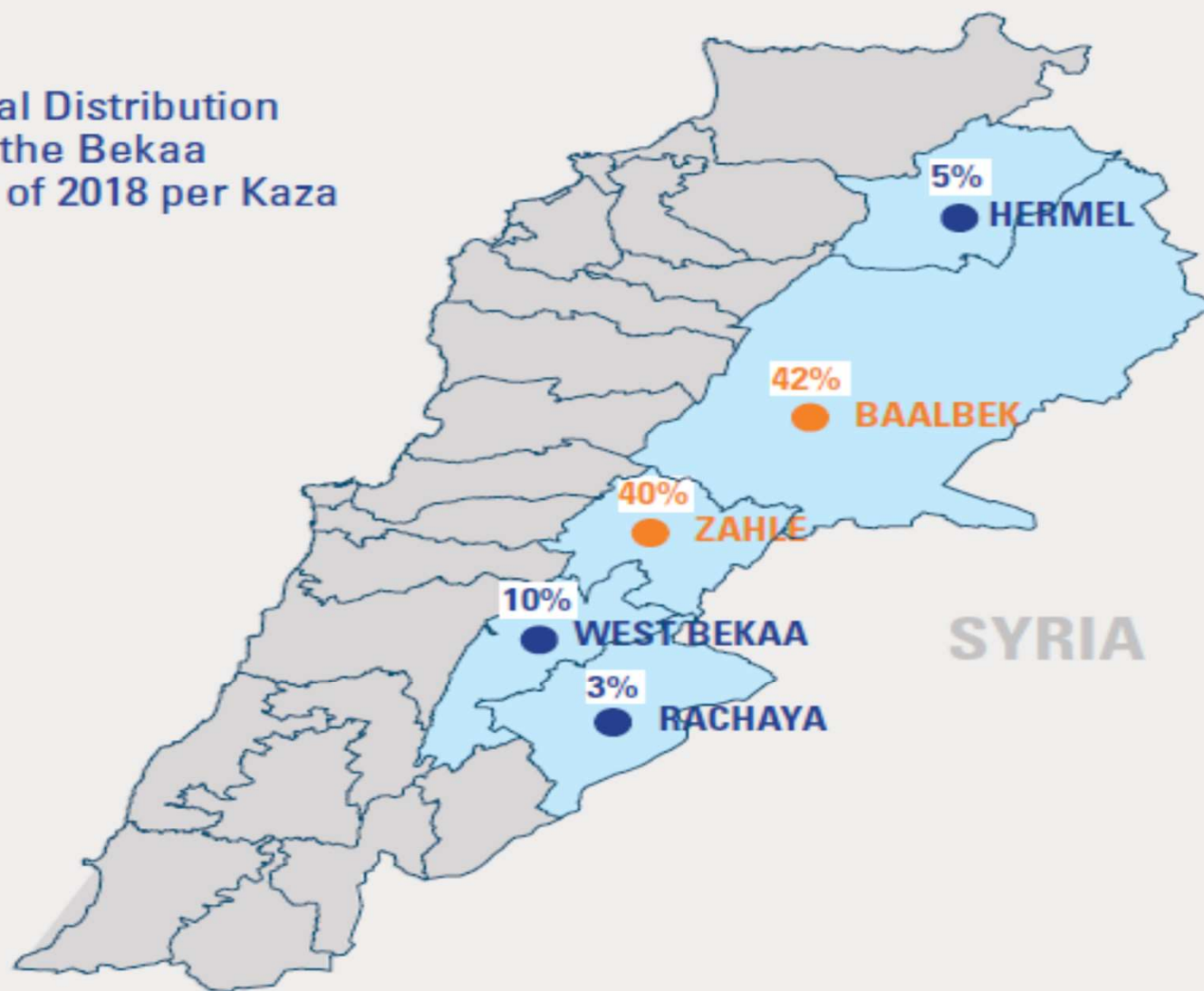
CDR

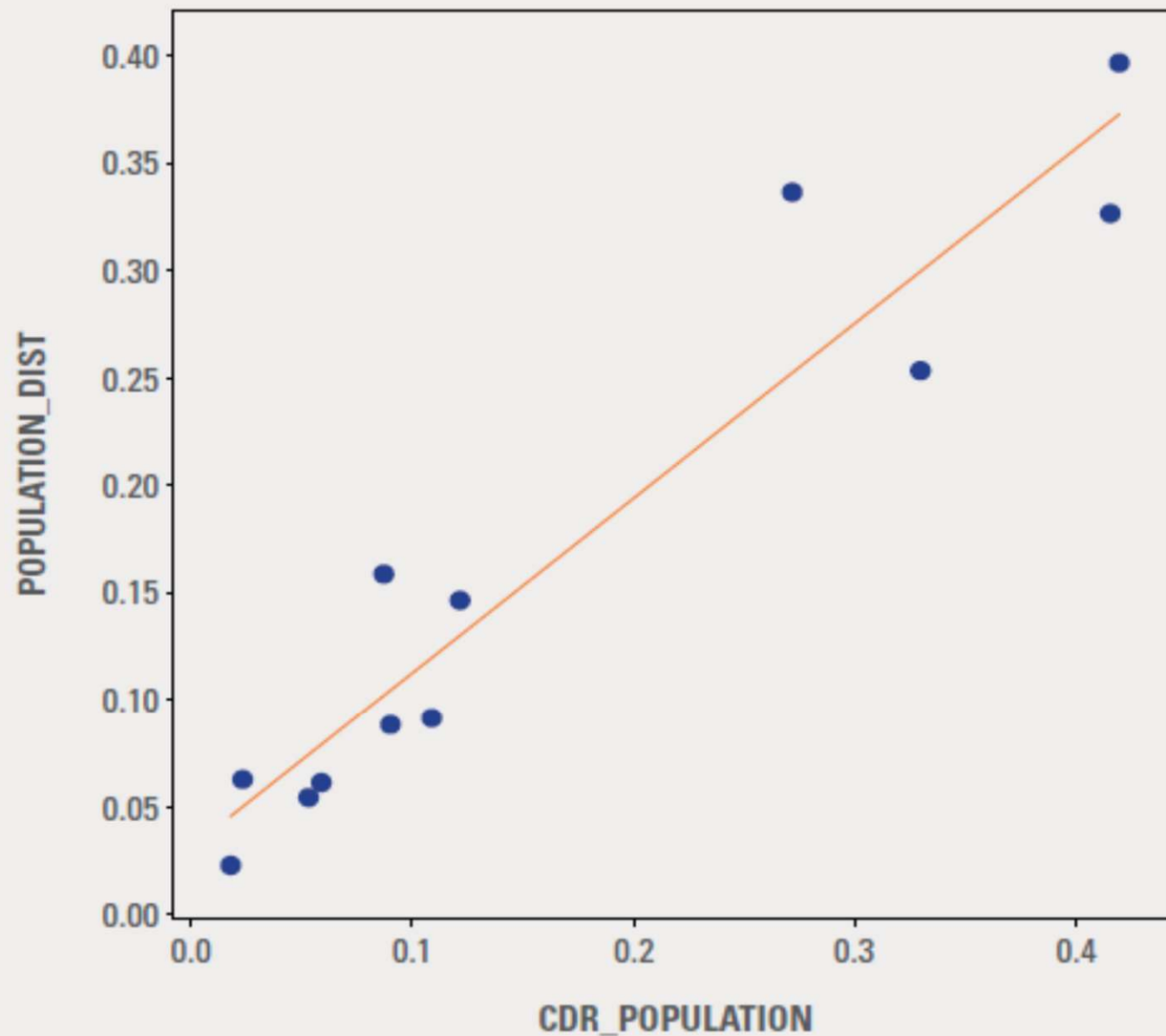
Mobile CDRs: Calculated Outcomes

April-May-June of 2016-17-18-19; North and Bekaa only;
2 Mobile Operators (Alpha and Touch)

- Variable: Residents Distribution based on total calls ratio: Kaza / Muhafaza
- Variable: Annual Mobility uses distribution, (current – prev) / prev
- Variable: Population Pyramid based on calls per age per gender
- Variable: Border Movement based on calls Tawasol (Syrian Bundle) trend 3 years
- Variables: Economic Activities based on:
 - Out & In Calls number, duration, ratio
 - Mobile Data Up & Down consumption total and ratio
- Variable: Security based on Density of Sites & Cells per Kaza

Residents Geographical Distribution
based on total calls in the Bekaa
Muhafaza for the year of 2018 per Kaza



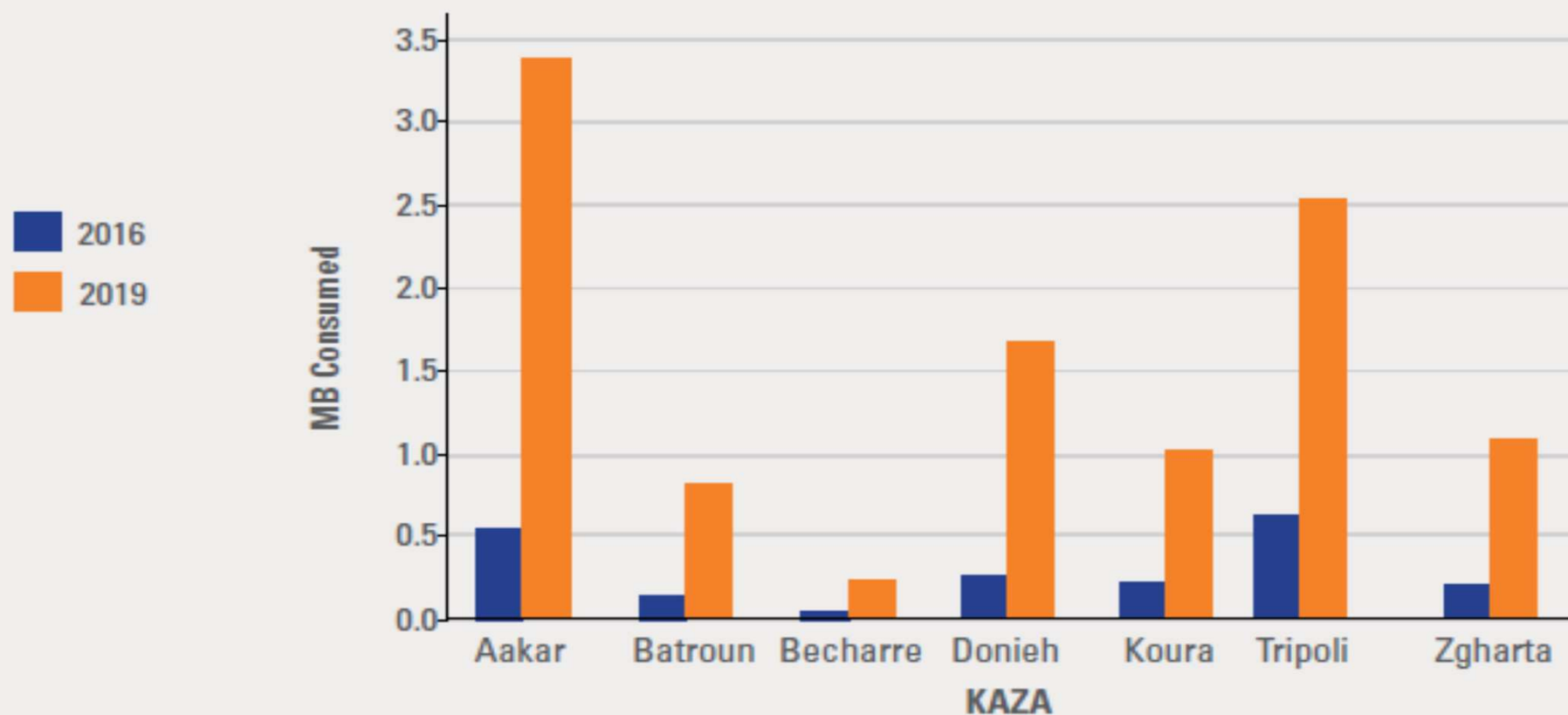


Linear regression of population distribution of the 12 Kazas (R2 score: 0.9 Mean Squared Error: 0.002) the CDR population indicator (x-axis) and the CASLFS population (y-axis).

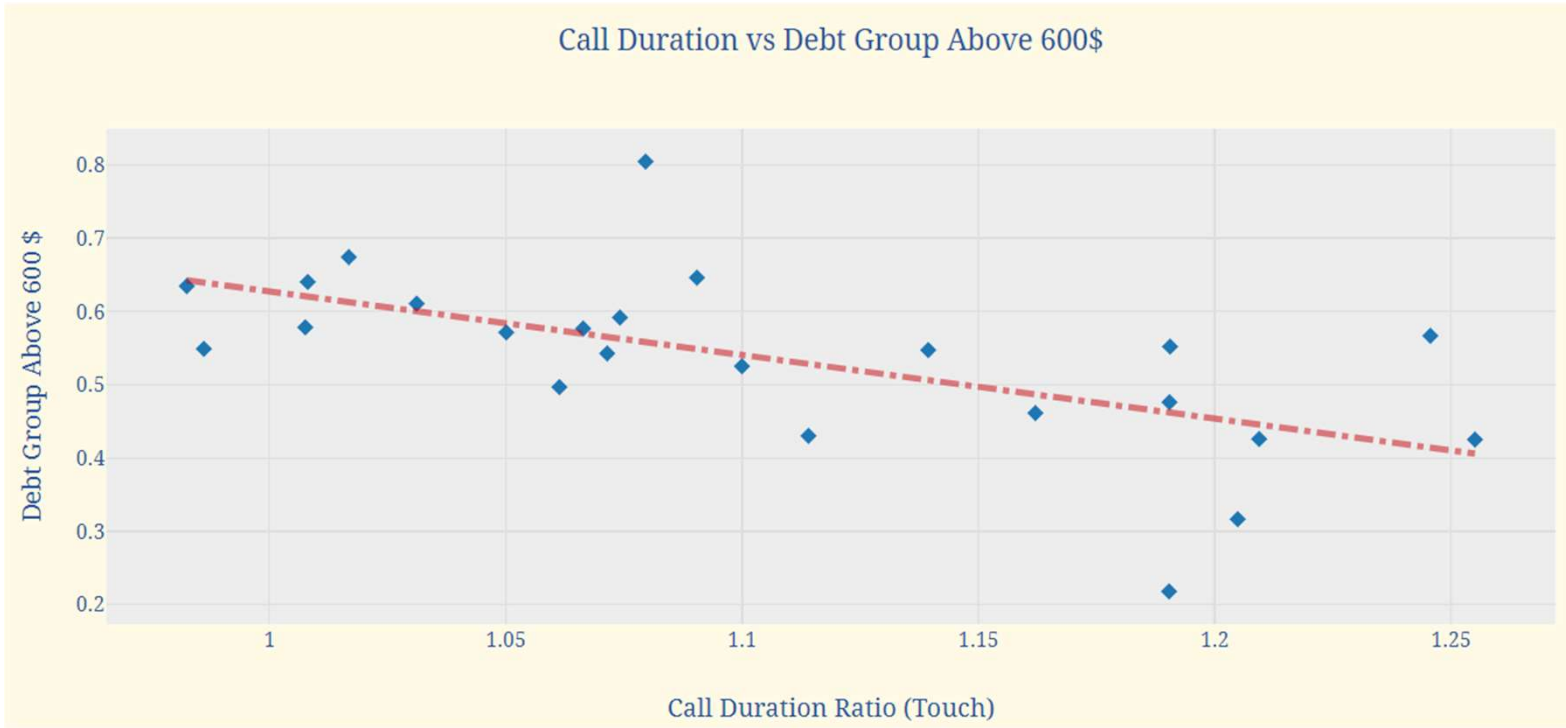


Bar graph showing the variation of the total mobile data usage (in MB) in the North Muhafaza in April 2016 and June 2019

Total MB in North Mouhafaza



Economics - Regression with VASYR



Touch OUT to IN duration ratio vs. %families with debt >600\$ Regression:

- R² Score: 0.36
- Mean Squared Error: 0.009

CDR - Security

	Pearson correlation
Alfa population indicator	0.7
Touch population indicator	0.65

Pearson correlation between CDR indicators and UNHCR VASYR security indicators



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Refugees and Host Communities Lebanon

Facebook Data

Facebook Data

- Estimates of Monthly Active Users (MAU) of Facebook.
- Syrian refugees in Lebanon were estimated (since FB not in Syria) as:
 - FB users over age 13
 - Expat (not born in Lebanon)
 - Arabic Speaking
 - Not from FB registered Arab countries (Egypt, Morocco, Qatar, KSA, ...etc)
- October 2019 and the attributes are:
 - Age / Gender self declared
 - Language / expat status
 - Education status self declared
 - Device/Network types: (3G/4G/WiFi, iOS/Android)

FB Demographics - Findings

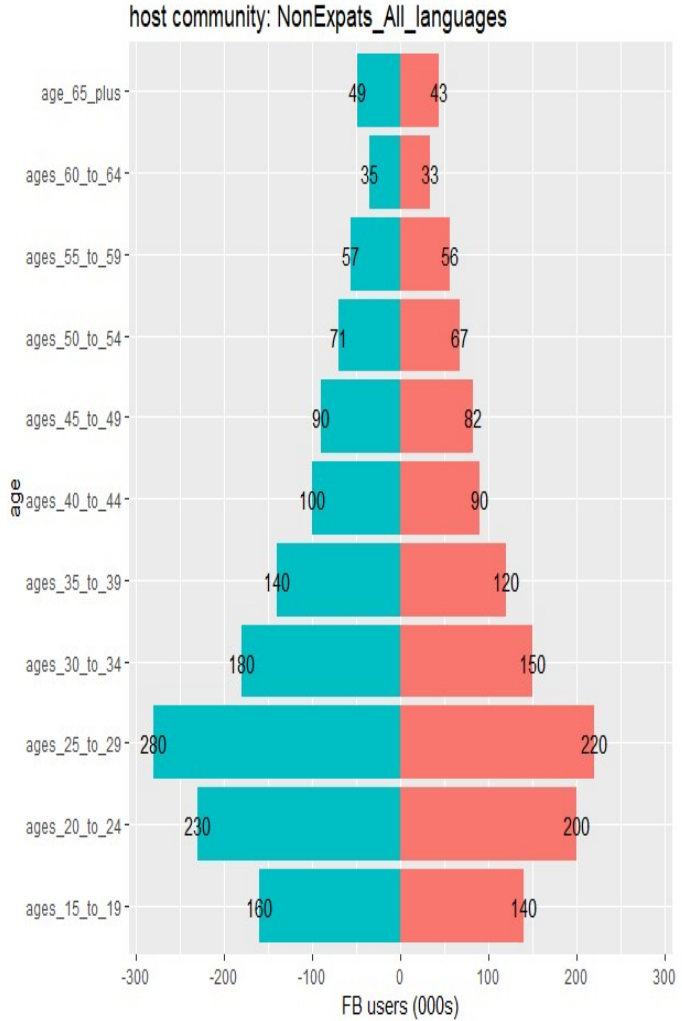
Rounded Facebook monthly active users

Oct 2019 compared to the numbers of registered refugees in UNHCR VASYR survey

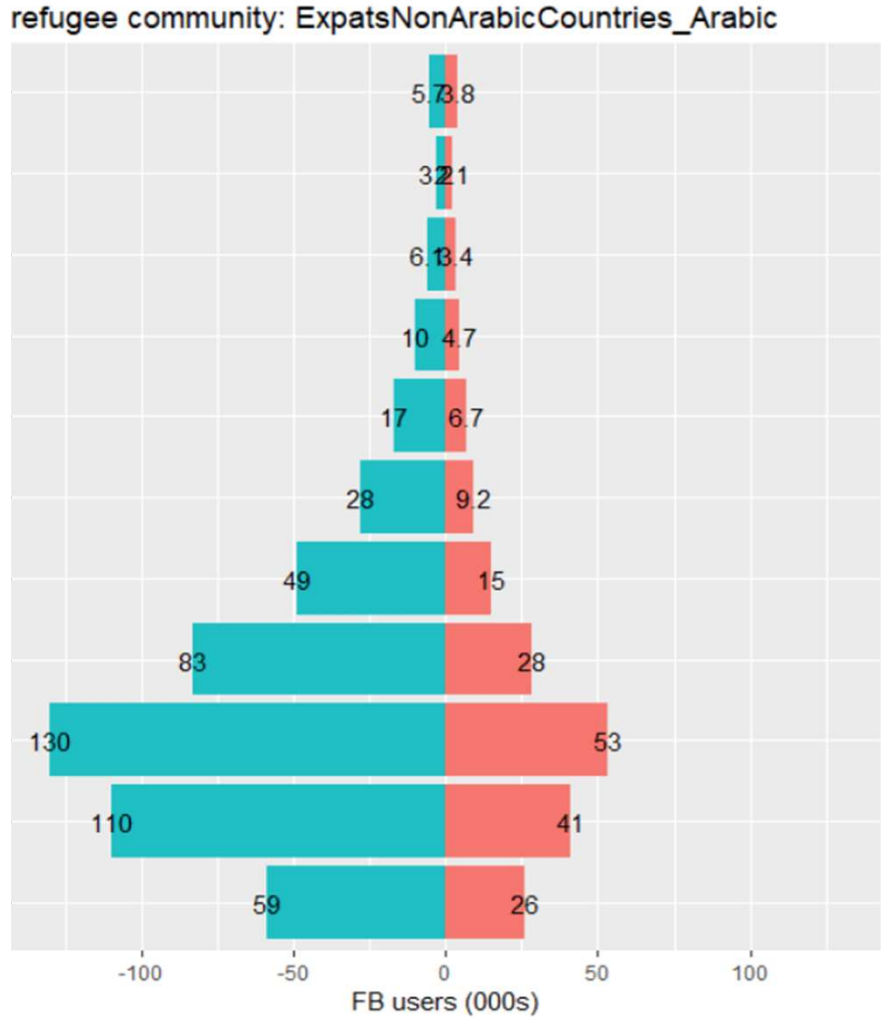
Governorate	FB users (host community) Over 13	FB users over 13 (refugee community)	Registered refugees (UNHCR) Total	Registered refugees (UNHCR) Over 13 (57.373% of Total)	Ratio (FB users over 13 refugee community / Registered refugees)
Beqaa	330,000	130,000	342,875	161,073	0.8
North	490,000	100,000	243,125	129,882	0.77

FB Gender Distribution Lebanon Oct 2019

Note:
 The number of male multiplied by the – sign for visualization purposes

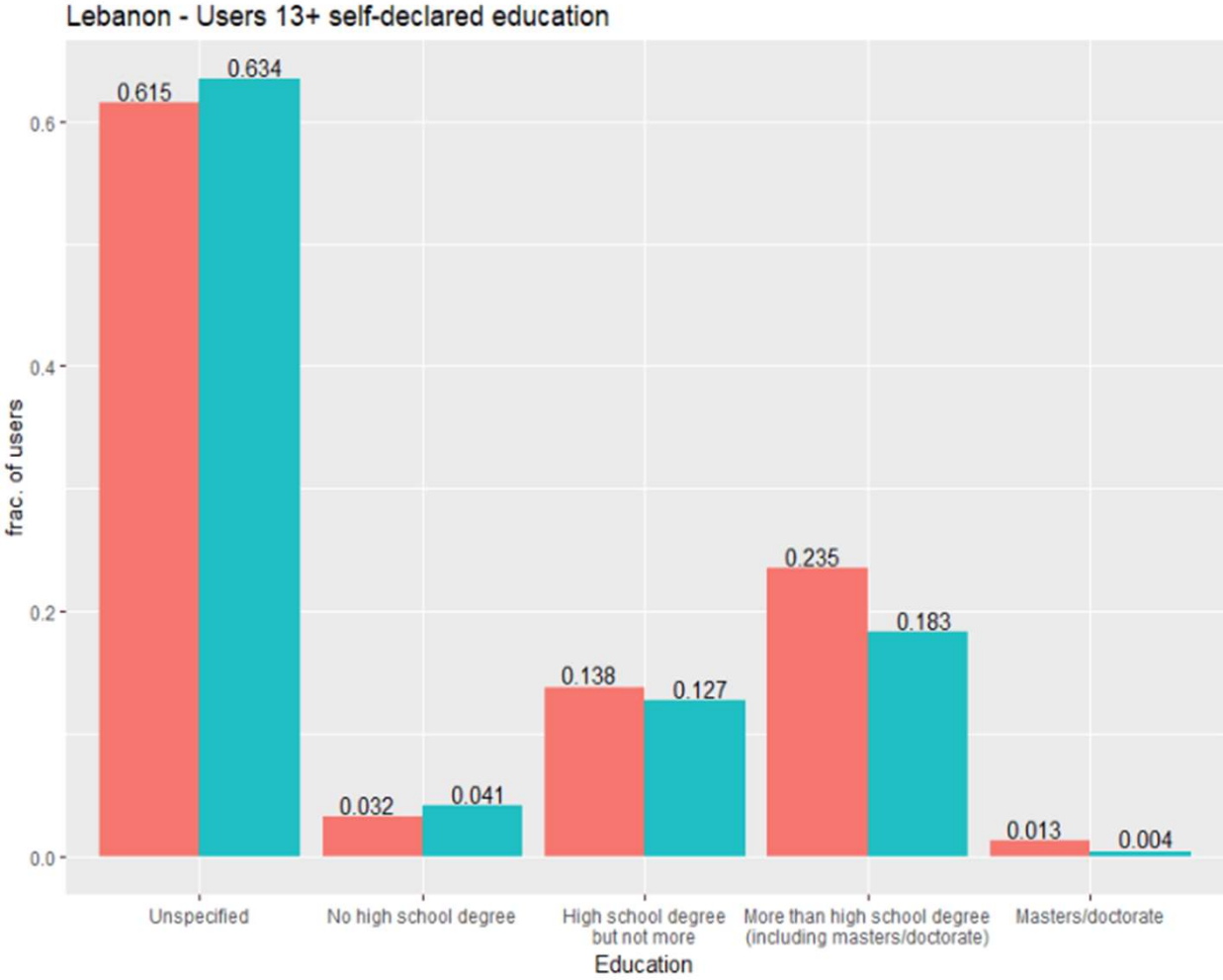


gender
■ female
■ male



FB Users: Educational Statuses

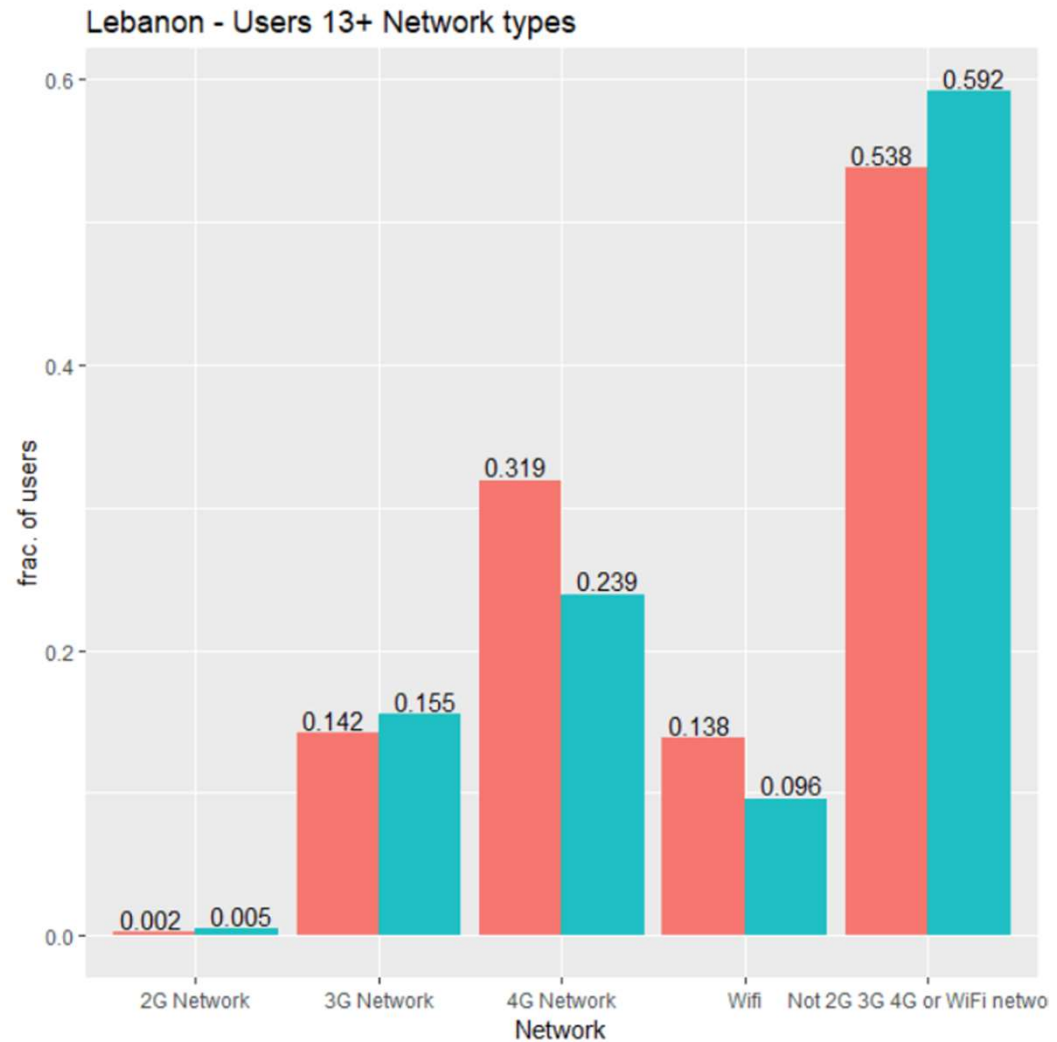
Graph showing self-declared education levels on Facebook Users in Lebanon for host (RED) and refugee (BLUE) groups



FB Users: Socio-economics

Access to devices/networks

Graph showing FB users in Lebanon by type of Network access for host (RED) and refugee (BLUE) communities.





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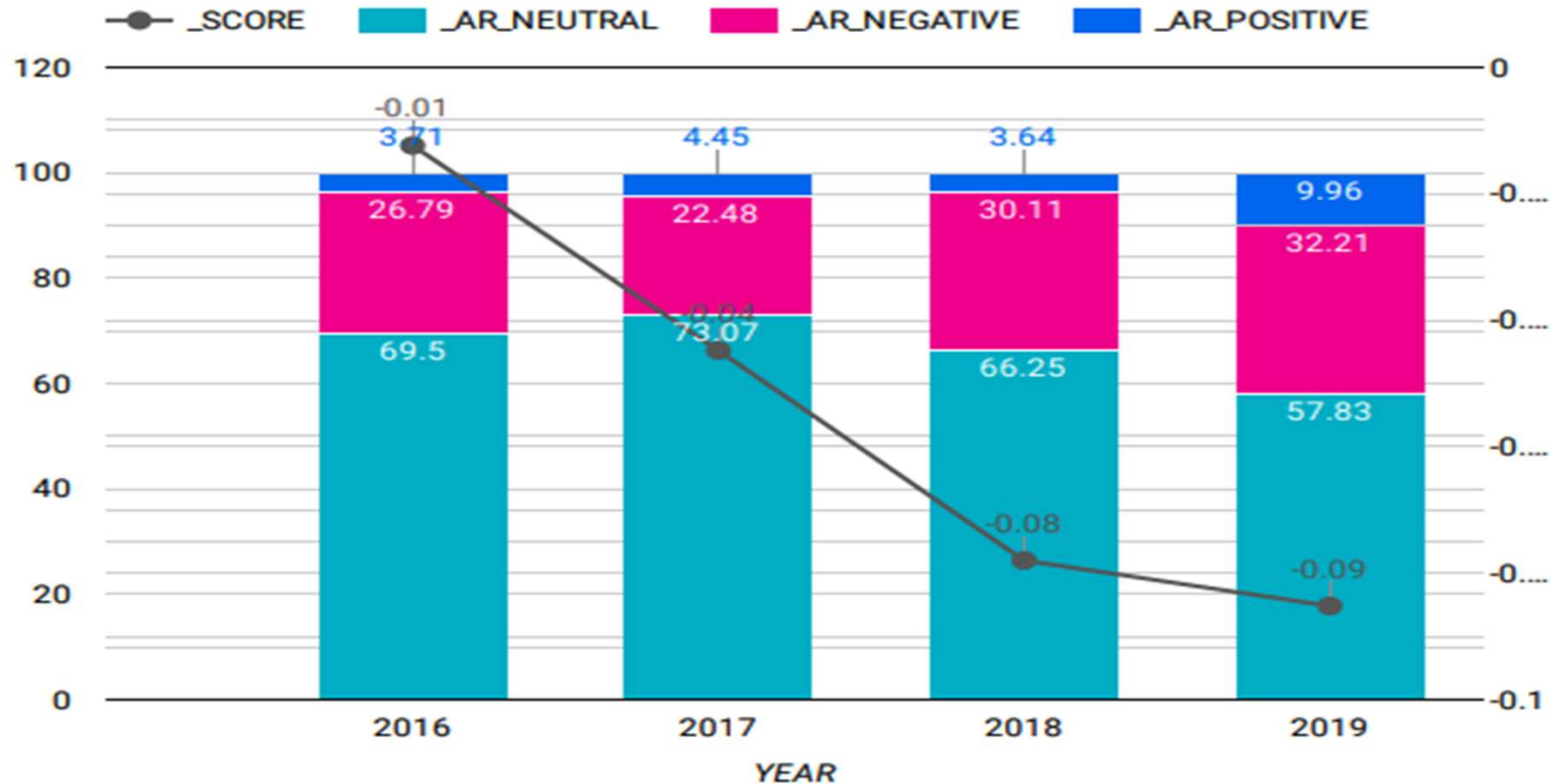


Refugees and Host Communities Lebanon

Media Sentiments Analysis

- GDELT English Articles
- Mazajak Arabic Articles
- Twiteer Postings

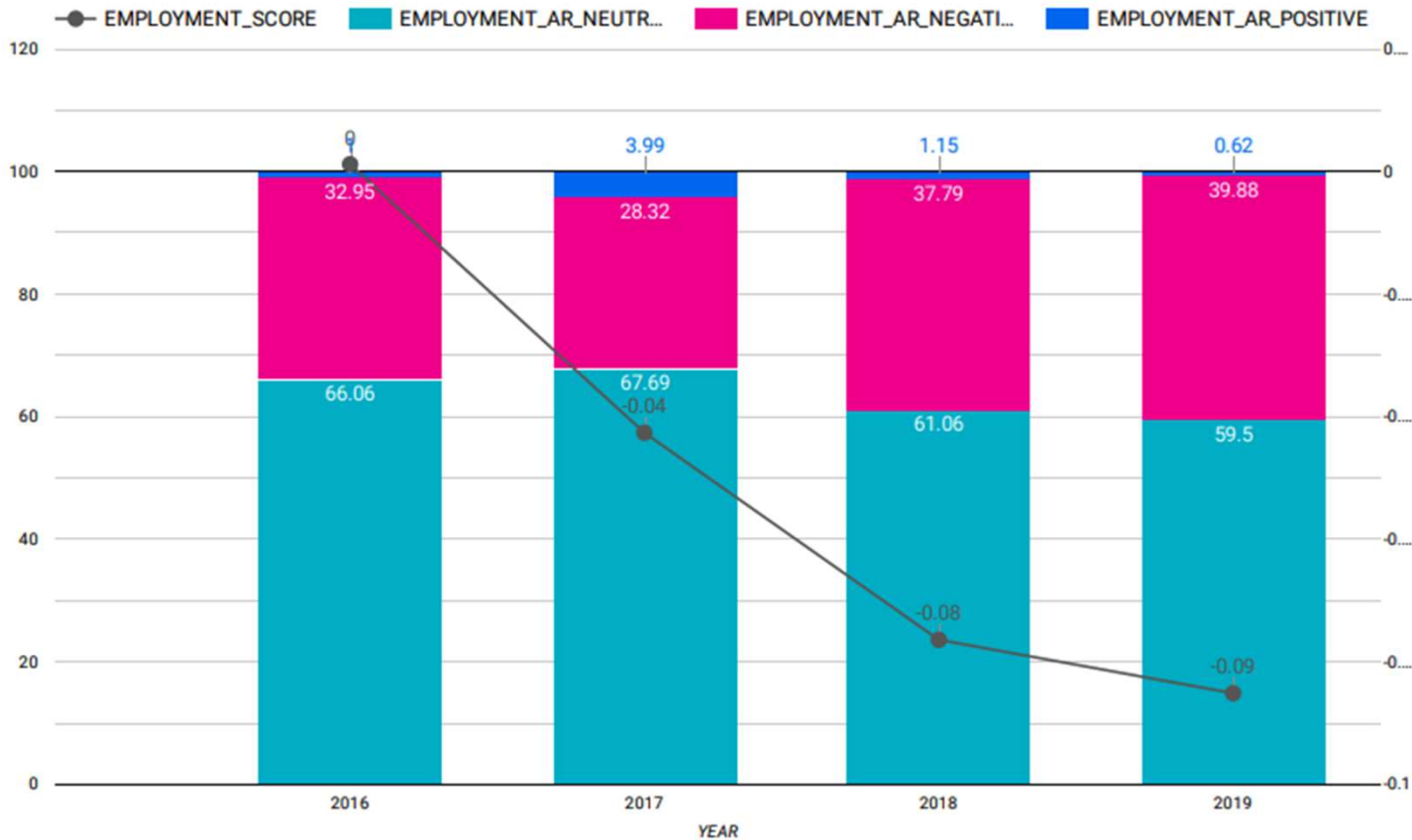
Articles About Syrian Refugees – Sentiments



Graph showing the distribution of the Arabic sentiments (% neutral, % negative, % positive); English sentiments (ranges from -1 to +1) Articles reporting about Syrian refugees from 2016 until 2019.

Total of 7400 unique articles

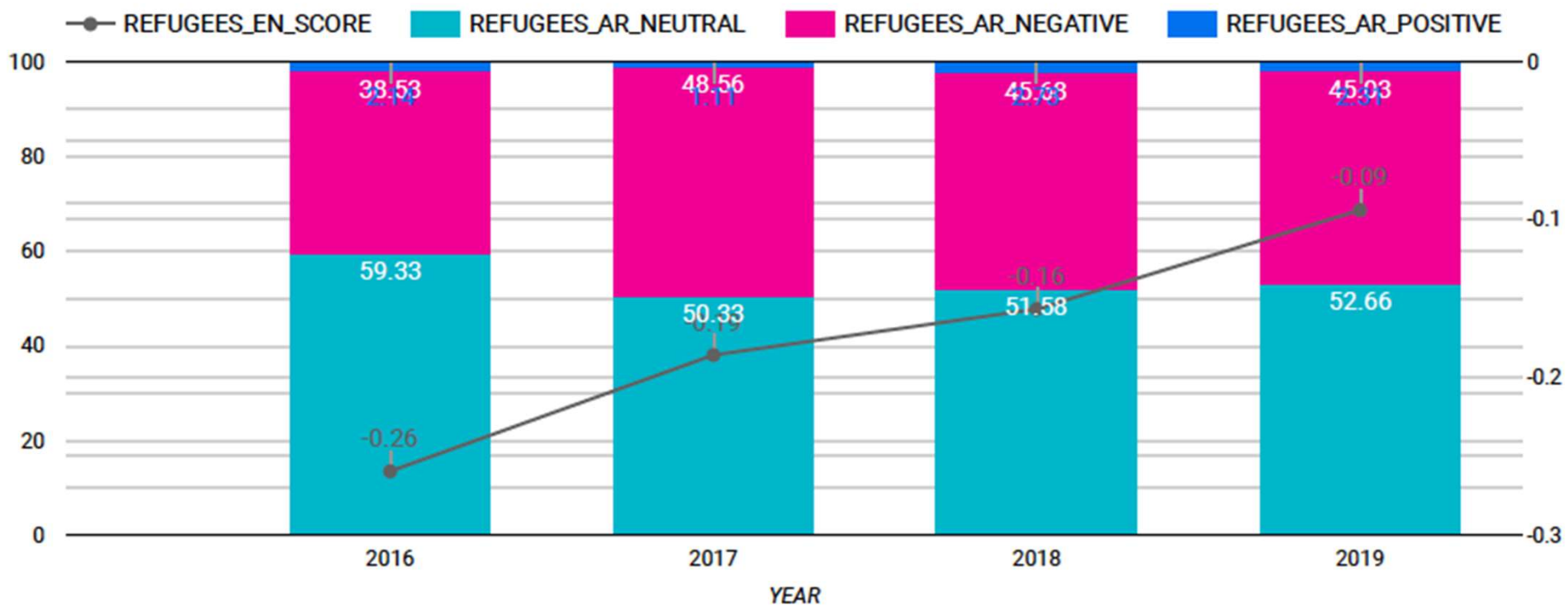
Articles About Employment - Sentiments



Graph showing the distribution of the Arabic sentiments (% neutral, % negative, % positive) and English sentiment (ranges from -1 to +1) of the articles reporting about Syrian refugees and mentioning employment from 2016 until 2019.

Total of 4466 unique articles

Tweets About Syrian Refugees - Sentiments



Graph showing the distribution of the Arabic sentiment (% neutral, % negative, % positive) and English sentiment (ranges from -1 to +1) of the tweets mentioning Syrian refugees from 2016 until 2019.

- Arabic tweets: 2126
- English tweets: 2314

Vulnerability Assessment of Syrian Refugees (VASyR) by Lebanon Crisis Response Plan

1. Currently, VASYR runs yearly, with 486 questions for approximately 8000 households, yielding nearly 5000 respondents. **BURDENS CAN BE REDUCED.**
2. BD offers innovative and novel information such as:
 - a. **Near real-time** security information.
 - b. **Timely** Connectedness/social integration information.
 - c. **Just-In-Time** Mental Health stress indicators.
3. Protection and security information in **near real-time**.
4. Dynamic populations on the move require **almost immediate** distribution information updating.



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دائرة الإحصاءات العامة
Department of Statistics



Presidency of the Council of Ministers
Central Administration of Statistics

2- COVID19 CASE (Lebanon & Jordan)

Can BD assess the effectiveness of Government Crises Responses?

I. Project: Covid-19 Crisis government response in 2020

Questions:

1. Under crisis pressure, which governmental decisions are most relevant to track?
2. Who are the owners, stakeholders, and target beneficiaries of each policy?
3. What are the activities, outputs, outcomes, and impacts of each policy?
4. What are the indicators that measures performance of change?
5. What are the available data sources for each indicator?
6. What are the motivational logic for each nontraditional data source?

Answers:

1. Select 5 relevant decisions/policies in Jordan and Lebanon
2. Dissect for each: activities, outputs, outcomes, impacts
3. Harness available and non-traditional data sources to assess effectiveness
4. Develop a platform to assess effectiveness of crises response decisions
5. Playbook for Governments to utilize platform and localize to context and crisis

National Policy Selection Criteria

- 1. How Relevant is policy measure of interest?**
- 2. What is Level of ambition & scope?**
- 3. Who are Target populations of interest? The most vulnerable/deprived in society?**
- 4. What is the Extent of coverage of the policy**
- 5. Are the policies operational to assess their impact?**
- 6. How far is there available and accessible data (traditional & non-traditional)which allows for the effectiveness evaluation of policies?**
- 7. How far does the policy relate to SDGs of interest and/or of priority?**

Selected policies for Lebanon

N°	Category	Policy description and its significance	Initiating ministry / Policy owner
LB1	Cash transfer / Food distribution	Social solidarity program within the social emergency plan to address the repercussions of the Coronavirus	Ministry of Social Affairs
LB2	E-learning	Hybrid model of return to schools: e-learning and presence	Ministry of Education
LB3	Support to SMEs (private sector)	Intermediate Circular No. 547 related to granting exceptional loans to customers who were unable to pay their payments and dues during the months of March, April, May and June 2020 due to the Covid-19 crisis	Banque du Liban
LB4	Disaster response	Solid waste removal and management plan after the Beirut port blast	Ministry of Environment, UNDP and other local initiatives
LB5	Capacity increase	COVID-19 management plan: increasing the capacity of hospital beds and isolation center beds	Ministry of Health

Selected policies for Jordan

N°	Category	Policy description and its significance	Initiating ministry/ Policy owner
JO1	Cash transfer / Food distribution	Tkiyet Um Ali - social protection for those not covered by SSC & NAF	Ministry of Planning and International Cooperation TUA
JO2	Education	'Darsak' official e-learning portal	Ministry of Education
JO3	Cash transfer / Food distribution	Jordan Emergency Cash Transfer COVID-19 Response Project	National Aid Fund
JO4	Disability	Protection and Response Measures for Persons with Disabilities	The Higher Council for the Rights of the People with Disabilities
JO5	Support to SMEs	Defense order no.9: Tadamun 1 & Tadamun 2	Social Security Corporation

Data sources & Progress

Sources	What are we measuring?	Done	In progress
Twitter Data Word Cloud analysis Sentiment analysis	topics that people are talking about the most	X	
	understand the general sentiment expressed about the topics	X	
Google search trends	policy announcement or other major events generated interest people are searching for and what are their needs and interests.	X	
	To be used as a proxy for unemployment.		X
GDELTA analysis	sentiment expressed about topics and policy	X	
Mobility analysis Facebook Data4Good Google mobility	Changes in mobility patterns since the start of the pandemic per district/region.	X	
Mobility analysis coupled with traditional socio-economic indicators (poverty, income levels, unemployment, etc).	could shed light on certain correlations or potential relationships	X	
Satellite images	Night-time lights in satellite images could be used as a proxy for poverty & economic activity.		X



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COVID19 CASE: Lebanon

Tools:

1. Twitter words and sentiment analysis
2. Mobility trends
3. Satellite Images

Lebanon 1- Cash transfer : Twitter

Top 20 most frequent Twitter words for the topics of interest for the months March till Dec 2020

Poverty



Economy and SME



Food & Medicine Security



Policy

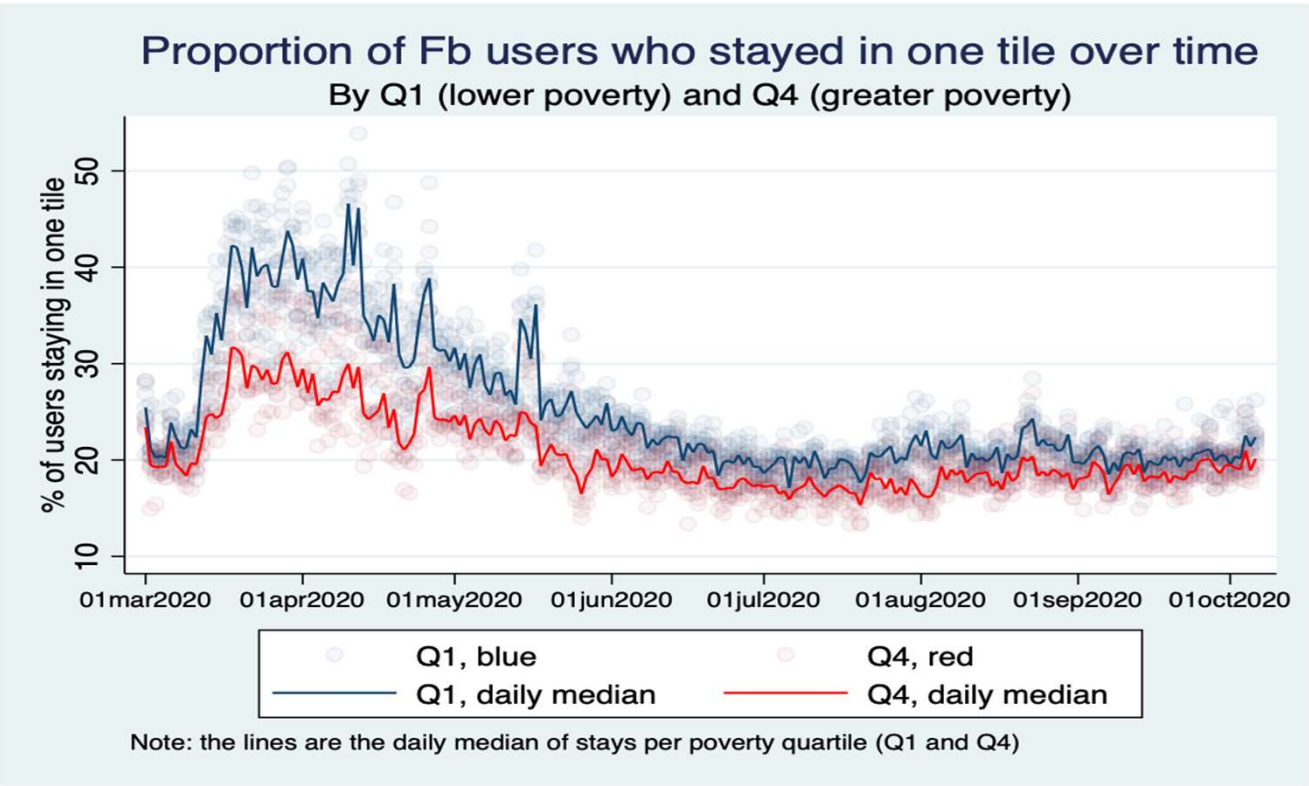


Total tweets: 65348

Total Arabic tweets: 39418

Total English tweets: 25930

Lebanon 1- Cash transfer : Mobility examples



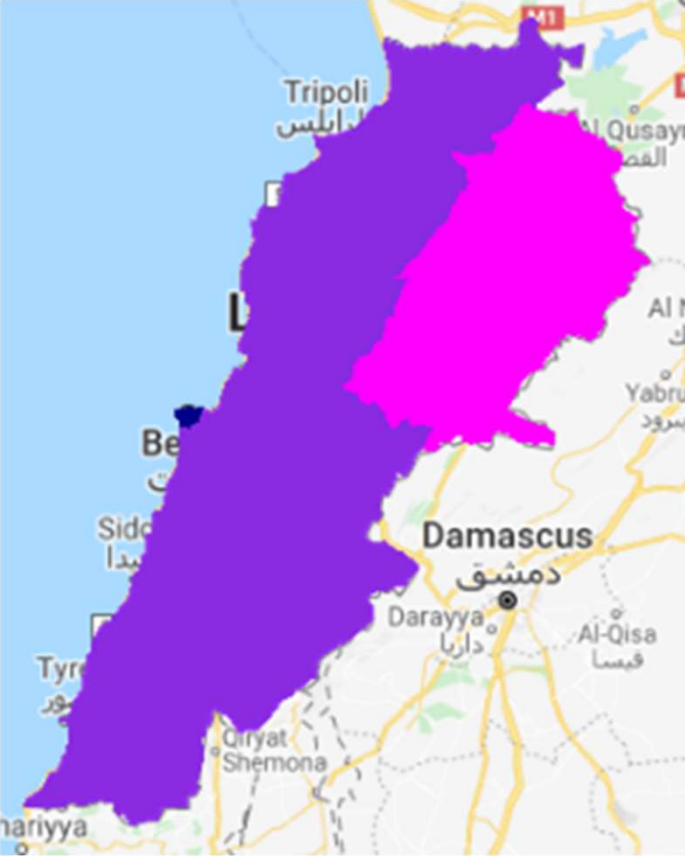
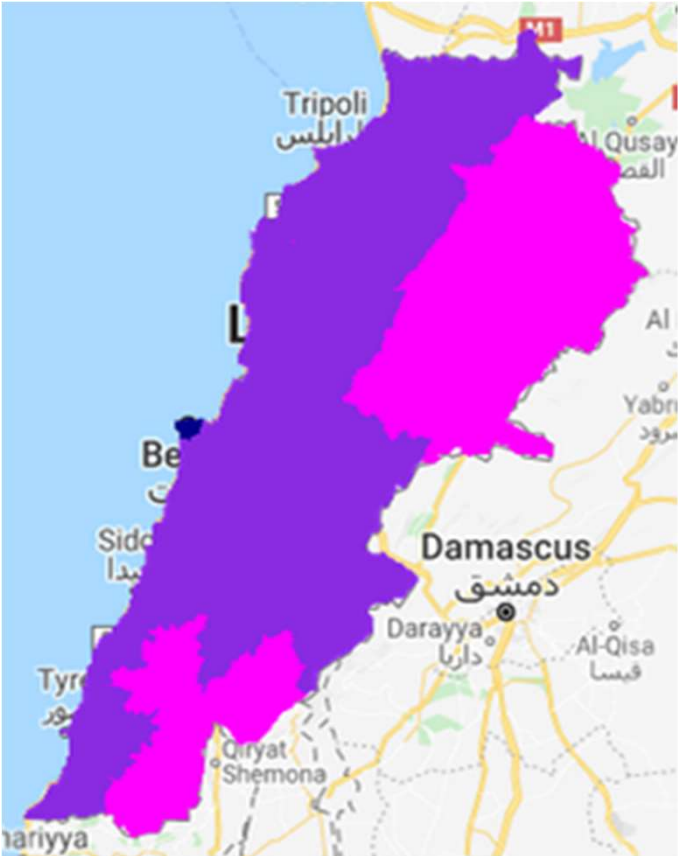
Mobility: Individuals in poorer areas had lower reductions in mobility and for a shorter period of time

Note: the poverty indicator is based on selfdeclared % of people as poor or very poor in the Labour Force and Household Conditions Survey by CAS.
Q1 qazas: Batroun, Jbeil, Bcharreh, Koura, Rachaya, Keserwan, Saida
Q4 qazas: Tripoli, Zahleh, Akkar, Baalbek, Hermel, Minieh-Danniyeh

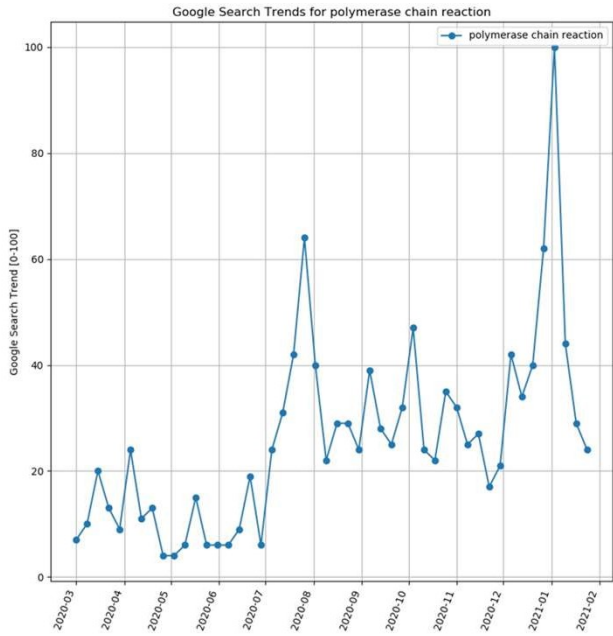
Lebanon 3-Support to SMEs: Night-time light: Change

% Change April 2020 with April 2019 % Change May 2020 with May 2019

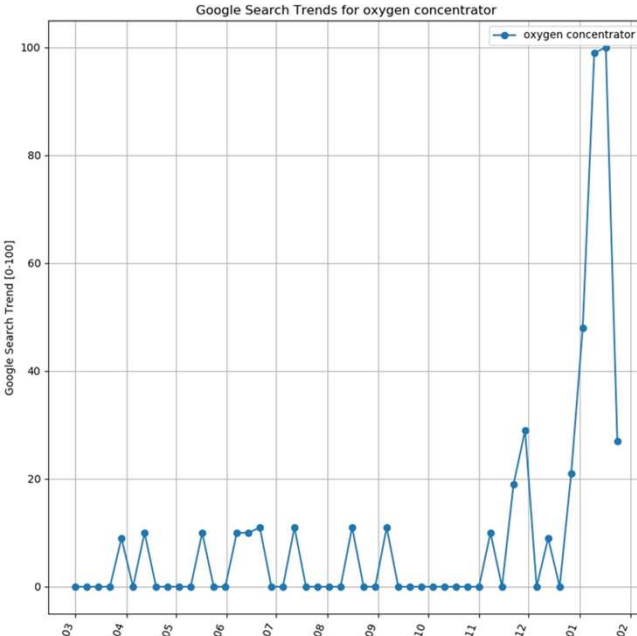
- **DarkBlue:** SEVERE DECREASE (-60% to -30%) (BEIRUT)
- **DarkViolet:** SERIOUS DECREASE (-30 % to 0%) MOST AREAS
- **Magenta:** INCREASE (0 % to 30 %) SYRIAN BORDERS



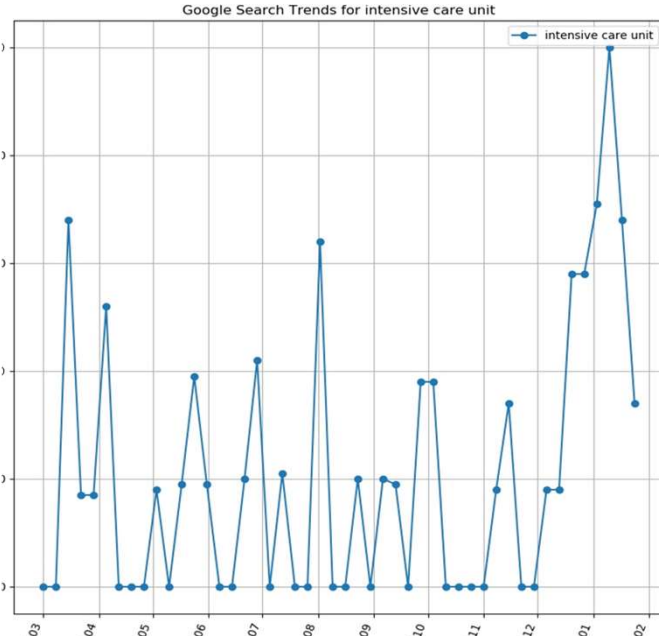
Lebanon 5- Hospital Capacity increase



PCR test



O2 concentrators



ICU



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COVID19 CASE: Jordan

Tools:

1. Website Analytics
2. Twitter Sentiments
3. Google search trends

Jordan 4 - Disability: Website Analytics - Habayebna.net

Habayebna.net platform aims to spread awareness and help for families with persons with disabilities: added habaybna.net/hcd/ for the purpose of this policy

Site Metrics Estimate ?

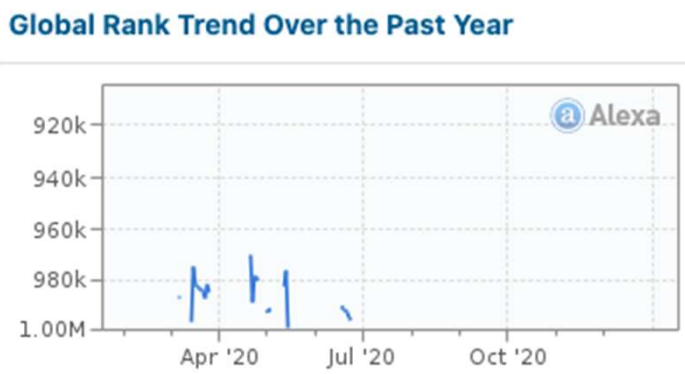
All visitors to this site

Engagement Past 90 Days

2 ↗ 30%	1:39 ↗ 58%	71.4% ↗ 33%
Daily Pageviews per Visitor	Daily Time on Site ?	Bounce rate ?

Only 2 pageviews per visit, average of less than 2 minutes on the website.

not ranked in Jordan
global rank down by 605k positions past 3 months (slight peak at announcement)



Jordan 2 - Education: Website Analytics - Darsak.gov.jo

Site Metrics

All visitors to this site

Estimate ?

Engagement

Past 90 Days

9.1 ↗ 220%

Daily Pageviews per Visitor

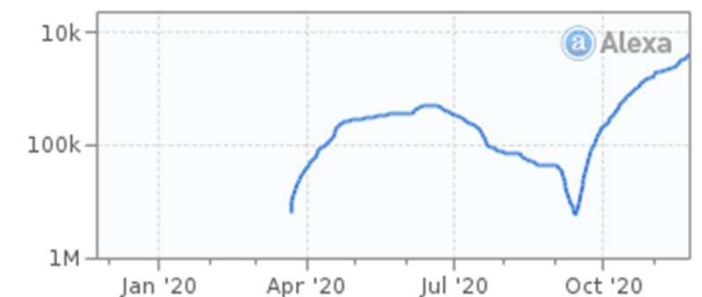
16:51 ↗ 298%

Daily Time on Site ?

9.8% ↘ 57%

Bounce rate ?

Global Rank Trend Over the Past Year



ranks 22nd in Jordan
global rank up by 134,851 positions since the beginning of this school year
(compared to last school year and summer)
approximately 206,342 unique visitors each day.

*Sources explored:
siteindices.com and
alexa.com/siteinfo*

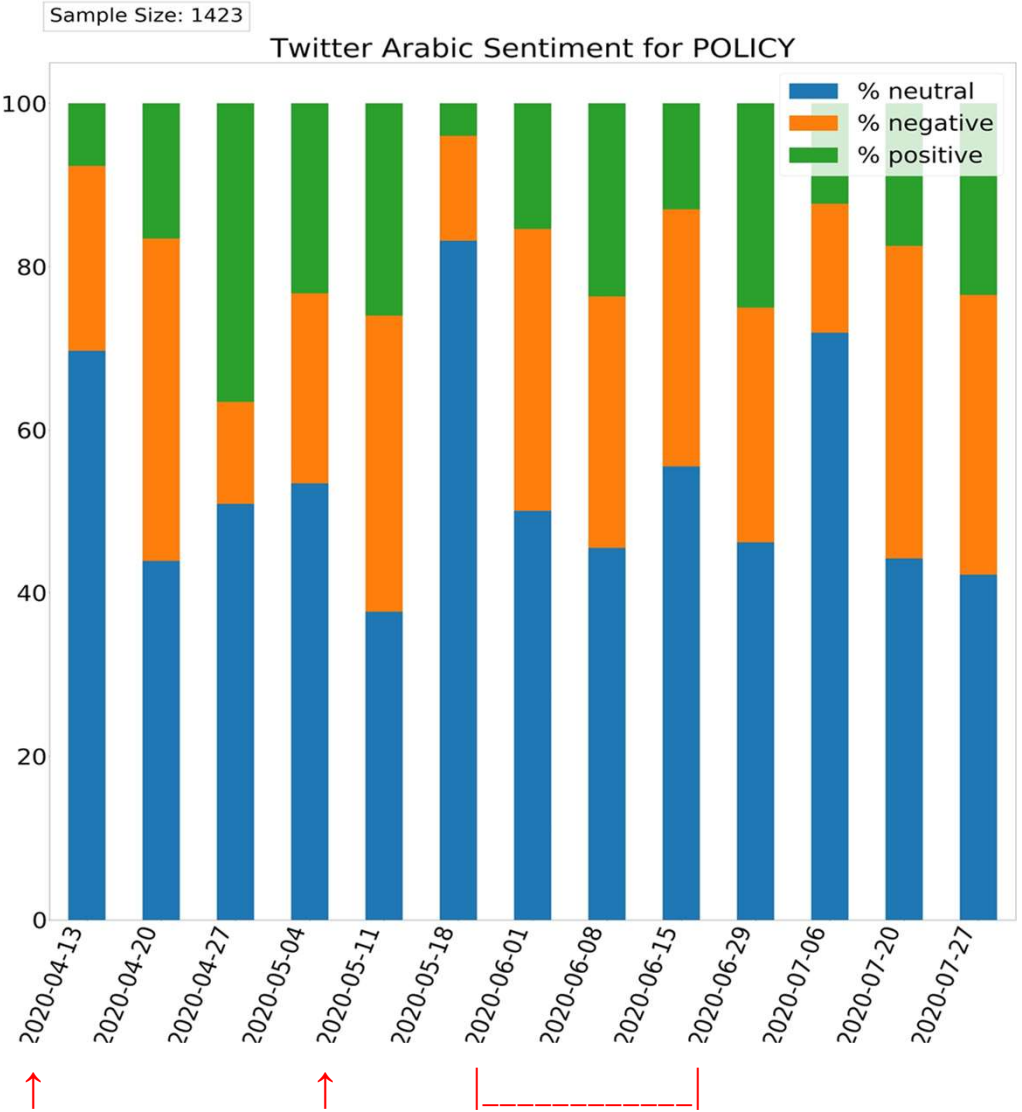
Jordan 5 - Support to SMEs: Twitter Policy Sentiment

Key dates:

- April 16: Announcement of the policy
- May 11: Additional restrictions + lockdown
- May 31: deadline for applications for Tadamun
- June: relaxed restrictions and reopened the airport
- June: Tax raids

Observation:

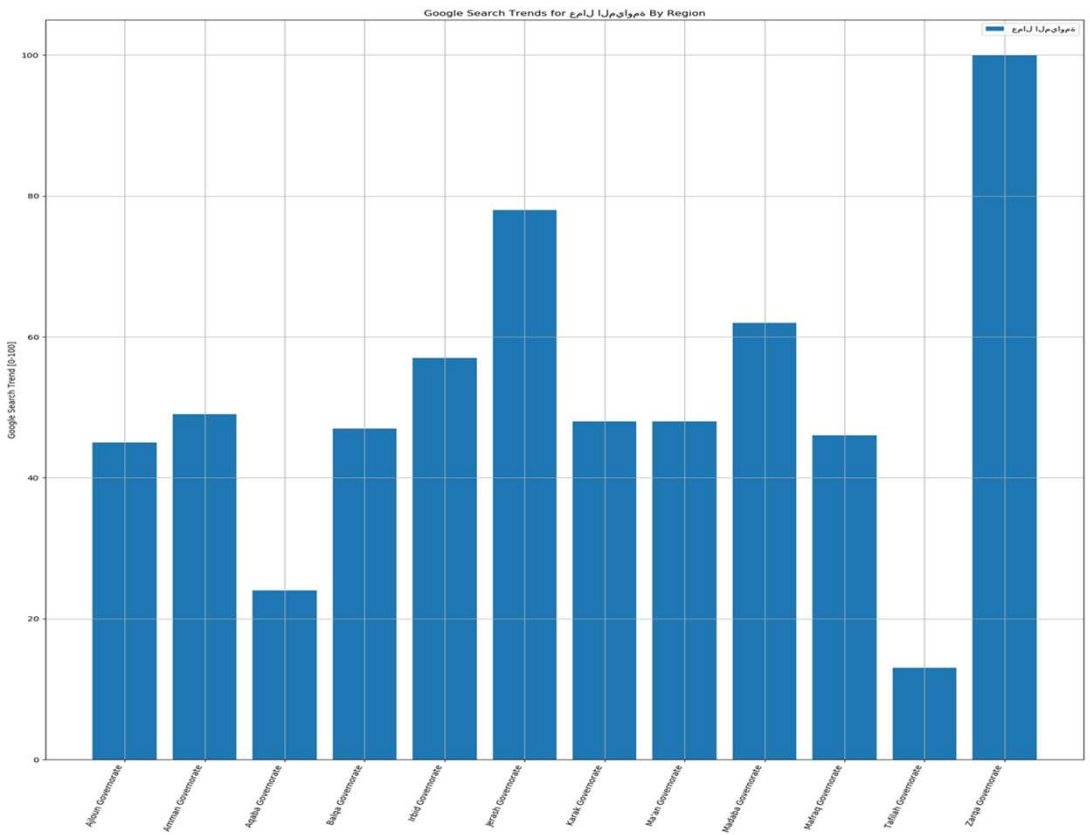
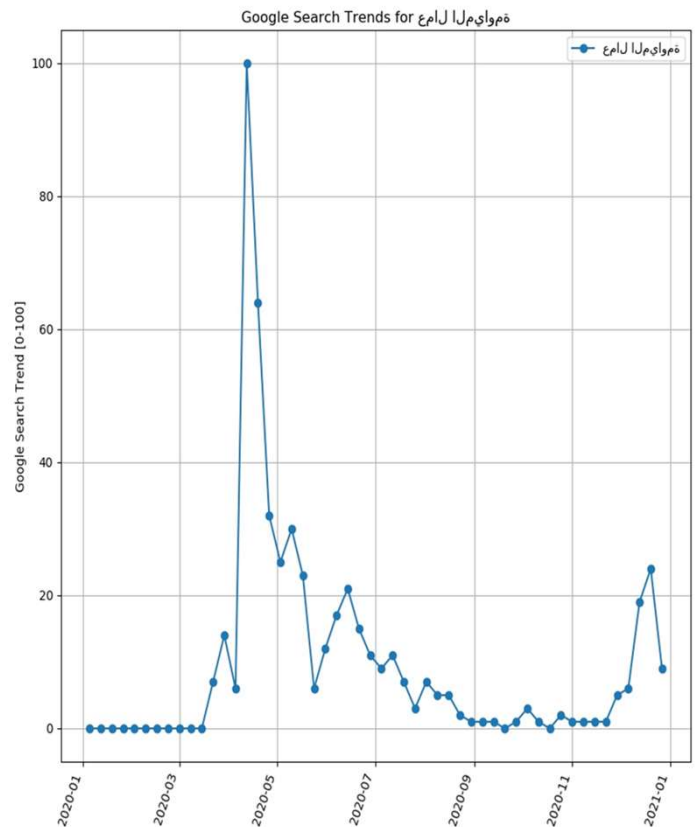
negative tweets mentioning Tadamun and Social security are general complaints about the situation of the people.



Jordan 5- Support for SMEs: Google Search Trends Results

daily wage workers (عمال مياومة) in Arabic peaked mid April 2020

Zarqa peaking for searches for daily wage workers followed by Jerash.



Conclusions

- social media and news analysis **confirm**: population is preoccupied with the current state of the economy, and the need to provide adequate financial support to the population at large.
- **Targeting**
 - mobility mapping analyses suggests that the poorer districts are less likely to strictly abide by the lockdown measures: necessity to go out to work.
 - Supporting those in need economically becomes all the more important.
 - recommended to identify populations with high urban mobility in order to advise and support them to limit and reduce the potential risk
 - recommended that contact protection equipment is provided along with the support provided to vulnerable populations.
- **Communication** about the available aid/support and the procedures should also be reinforced in these areas, as well as the communication about the disease and protection against it.
- Recommendation to compare with the data from the aid distribution campaign for the targeted districts.

Platform Development

Big Data insights for public policy decision-making

This dashboard provides Big Data-derived tools (Twitter and Google search trends) to draw near real-time insights to aid in public policy decision-making. The tools include sentiment analysis around key topics and nowcasting model to predict unemployment rates. The dashboard covers Lebanon and Jordan.

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PROJECT DASHBOARD

United Nations ESCWA | Shared Prosperity Dignified Life | DATA-POP ALLIANCE

- User Management
- Twitter Stats
- Google Search Trends
- Google Nowcasting
- Big Data For Policy Effectiveness Evaluation - Project Results

Download project report

Download platform playbook

7 days for Health in Lebanon. Total

% neutral

Date	% neutral
02-01	~35%
03-01	~35%
04-01	~45%

Key messages

Some Data sources (SM) are made available only during Crisis !!

In cyclic crisis like Covid-19, possible to “near real time” correction

Bias due to technology dependence is a calculated risk

Balanced between data richness (accuracy) and the protection of privacy

Strong partnerships: Ministry of Telecommunications / CAS

CODE - Council for the Orientation for Development and Ethics

Call Detail Records, safe research with strong privacy considerations



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