Sentiment analysis of Twitter: #Supply

chain and #Covid-19 tweets around the world between 24 March and 15 April 2020

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Research aim

- 1) to analyse how supply chains and logistics were discussed in relation to Covid-19 pandemic in Twitter
- 2) to get a picture of weekly sentiments across countries

Data collection

- 38,420 unique tweets were extracted from Twitter between 24 March and 15 April 2020
- Tweets were gathered with keywords
- supply chain OR logistics AND
- covid-19 OR covid19 OR corona
 - → Tweets had to include both supply chain/logistics and covid-19 dimension
 - \rightarrow Only tweets written in English included



Research process in a nutshell

- Data extraction
- Text pre-processing
 - Cleaning, tokenization & stemming etc.
- 3-step text classification (incl. supervised and semi-supervised learning techniques)
 - By relevancy of content
 - Naive Bayes classification model
 - By identified geographical location
 - Newsmap geographical classification algorithm *
 - By sentiment
- Data visualization



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Sentiment analysis

- Sentiment analysis is the process of determining whether a piece of writing (here: words contained in a tweet) is positive, negative or neutral
 - Each tweet is broken into words (tokenized)
 - Words are assigned a sentiment score (negative/neutral/positive) based on pre-existing sentiment libraries
 - The sentiment score of a tweet is calculated as (total number of positive words – total number of negative words)
 - The tweets are then aggregated on country level

 → country-level sentiment score (median) for each week



Some examples of tweets (1/2)

- "I don't think many Americans think about the #supplychain much during ordinary times ... but now that phrase ... is being talked about everywhere." #covid_19 #truckers #logistics https://t.co/EgdOYEKZ63
- #COVID19 will cause long-lasting supply-side shocks for Congolese #copper and #cobalt output. Read more in our latest analysis https://t.co/XgOCrYFJJE #mining #DRC #supplychain
- Measures include setting up a task force to evaluate American medical supply chains and develop a plan to address their current and potential vulnerabilities. #supplychain #coronavirus https://t.co/Vhr4Cuc2SO
- India's postal service is a vital logistics provider during a nationwide lockdown due to Covid-19. https://t.co/odxg46nqsD



Some examples of tweets (2/2)

- This video emerged on social media from Moscow's Losinoostrovsky District, reportedly showing 50 ambulances queued up at a hospital, waiting to deliver COVID-19 patients. The hospital was out of beds. It was later described as a logistics error. https://t.co/Ai7OOIACxU
- WHO's logistics hub in Dubai, staffed by a team of seven, has been working around the clock to dispatch over 130 shipments of personal protective equipment and laboratory supplies to 95 countries across all six WHO regions. https://t.co/1iWXltgZTu
- China encountered serious shortage of medical materials and equipment at the initial stage of the #COVID19 epidemic. Decisive measures were taken to increase production capacity, optimize allocation, improve logistics and call for donation. Read at https://t.co/VgJNX2KtSa



Median sentiment of week 13 (24 March – 29 March 2020)*



* Only countries that were mentioned in the tweets are shown on the map ** The higher the value of sentiment, the more positive the content of tweets, and vice versa



Median sentiment of week 14 (30 March – 5 April 2020)*



* Only countries that were mentioned in the tweets are shown on the map ** The higher the value of sentiment, the more positive the content of tweets, and vice versa

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Median sentiment of week 15 (6 April – 12 April 2020)*



* Only countries that were mentioned in the tweets are shown on the map ** The higher the value of sentiment, the more positive the content of tweets, and vice versa

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Aggregated median sentiment of March 24 – April 15 2020



* Only countries that were mentioned in the tweets are shown on the map ** The higher the value of sentiment, the more positive the content of tweets, and vice versa

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Key observations of sentiments in tweets discussing supply chains and Covid-19 (1/2)

- Geographically our results appear very concentrated on certain countries
 - 72 % USA, 15 % China, 6 % UK, 4 % India
 - Weekly sentiment changes "hidden" by the sheer volume of tweets from the above countries
 - \rightarrow Weekly changes visible only for countries not listed above (only 3 % of total)
- Sentiments in the EU area mixed
 - positive (Ireland)
 - negative (Italy, France)
 - Neutral (others)
- Sentiments concerning Russia progress from positive (w13) to very negative (w14), ending somewhat negative (w15)
- Sentiments concerning North America remain at a neutral level
- Not many observations from South-America, Brazil neutral-slightly positive

Key observations of sentiments in tweets discussing supply chains and Covid-19 (2/2)

- Sentiments concerning China and India neutral, elsewhere in Asia mostly neutral, some positive sentiments (e.g. Malaysia)
- Middle-East mixed: positive in Turkey, negative in U.A.E., elsewhere neutral
- Many African countries not mentioned in the tweets. For those included, sentiments seem to change towards more negative
- Sentiments concerning Australia between neutral and slightly positive