Modeling and controlling SNS disaster dynamics to detect, prevent, and mitigate firestorms in on-line brand communities

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1 Context

- Online firestorms pose severe threats to online brand communities. Any negative electronic word of mouth (eWOM) has the potential to become an online firestorm. Online firestorms can spread quickly, and create disproportionate and disastrous effects to any organization.
- Therefore, **detecting**,**preventing** and **mitigating** online firestorms in online brand communities constitute a critical managerial priority. Yet 72% of firms are not prepared for online firestorms (Ethical Corporation 2012). A single 466-word post by an unhappy customer in Odeon Cinemas' Facebook brand community prompted more than 94,000 likes, damaging the firm's reputation and causing it to lose thousands of customers (Dunphy 2012; in Herhausen et al. 2019).
- To avoid these catastrophic consequences, we want to understand the SNS (Social Networking Sites) disasters dynamics and find ways to control it.
- Precisely this research works consists of modeling and controlling the disasters dynamics for online brand communities such as firms social networks sites and measuring theirs effects on firms short, long term performances.

2 State of the art

Few studies have witnessed significant progress in modeling and controlling SNS (Social Networking Site) disasters dynamics. I choose these 3 main papers :

- Herhausen et al (2019) contributed in the detection, prevention and the mitigation of the online firestorms but the limitations of this paper reside in coherant theorotical foundations .
- Rudolph et al (2002) contributed on the link on how high quantity relate too disaster but the limitations of this paper are the lack of applicative cases (mathematical theory without concrete cases)
- Golmohammadi et al (2021) contributed on how response strategy can impact daily abnormal returns of the firm. The limitations about this paper is how the company is affected in the long term period (goes max 5 days after the event).

We aim to achieve three goals: (1) provide a good theory that is easy to follow for readers who are not already familiar with the subject, (2) make a comprehensive survey of the different methods, and (3) predict the virality with the OLS (Ordinary Least Square) regarding the data that lead up to the virality (SST* & LSM**).

3 Research question

- Is SST between the sender of negative eWOM and the receiving online brand community relating to greater virality? => Q1
- Is LSM between the sender of negative eWOM and the receiving online brand community relating to greater virality? => Q2

4 Objectives

- contribution to bibliographic research
- Predict the virality regarding the quantitatitive models (SST * & LSM**)

5 Methodology

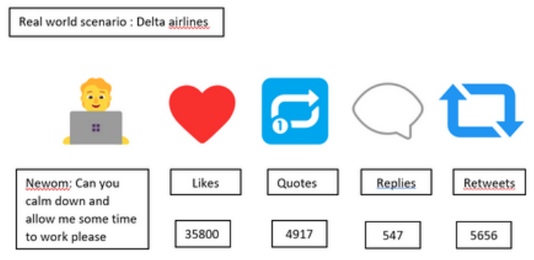
1st step:
- Scrapping twitter data(twitter API) from negative eWOM events

2nd step:
- Apply the quantitative models between the trigger and the brand community
- SST
- LSM
- FWC ***

3rd step:
- Gather as much data negative eWOM as possible

4th step:
- Ordinary Least Square (OLS)

- SST*: Strength Structural Ties => Frequency of communication
- LSM** : Linguistic Style Match =>Tendancy of all participants to use a common vocabulary and similar sentances structures
- FWC***: calculation of the distribution of words by categories on the number of total words
- 9 categories: (1)auxiliary verbs , (2)articles, (3)common adversb, (4)personal pronouns, (5)impersonal pronous, (6)prepositions,(7)negations,(8)conjuctions,(9)quantifiers



Modelisation of the virality of a Newom

$$SST_{ic} = \sum_{\tau}^{t-1} Reply\ Given_{ic}^{\tau} + Received\ Quotes_{ic}^{\tau} + Retweets\ received_{ic}^{\tau} + Likes\ received_{ic}^{\tau} + Given\ retweets_{ic}^{\tau}$$

$$LSM_{ij} = 1 - \frac{(|FWC_{ij}^{T1} - FWC_{cj}^{T1}|)}{(|FWC_{ij}^{T1} + FWC_{cj}^{T1} + 0.0001|)}$$

$$FWC_{ij}^{T1} = \frac{\sum_p FWC_{ijp}^{T1}}{\sum_p TotalWords_{ip}^{T1}} \qquad FWC_{cj}^{T1} = \frac{\sum_p FWC_{cjp}^{T1}}{\sum_p TotalWords_{cp}^{T1}}$$

Ordinary Least Square (OLS) :

$$Y(virality) = \Sigma\,(Likes + Retweets + Replies + Quotes)$$

$$Y = y0 + y1*SST + y2*LSM$$

Inputs variables (X) :
- SST
- LSM

Outputs variables ($\hat{y}$):
- Predicted the virality of the negative eWOM

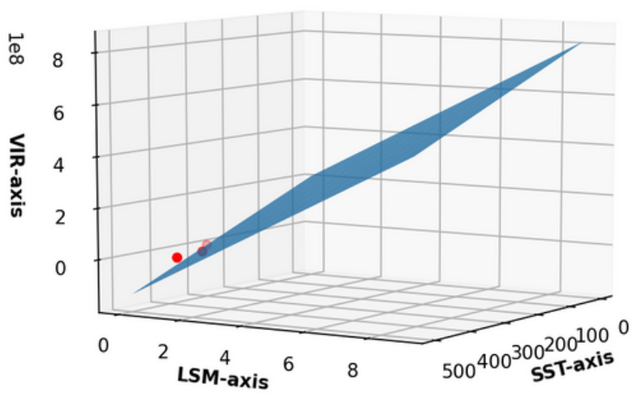
Number of data:3

Train/Test data

TRAIN : 66%

TEST: 33%

6 Results



Ordinary Least Square Regression

	SST	LSM	VIR
Mcdo	300	0.003	1177
Delta	450	0.880	46916
Uber	370	0.720	16547

Dataframe

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Gamma:
[[-124297.93955806     418.44395581  -19415.72790295]]
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Bias SST LSM

7 Discussions

- The Gamma of the LSM should be positive (Herhausen et al (2019))
- Make statistical test on the data
- Add more data and features
- Add more words into the categories of the FWC to have an improved LSM
- Why only 3 data ?
- 1 month to gather the SST with twitter API for 1 brand community (limits of 75 requests/ 15 min)

8 Conclusion

- Q1 is supported (Gamma>0), meaning that if the SST increase the virality increase as well (positive correlation)
- Q2 is rejected (Gamma<0), because if the LSM decrease the virality increase (negative correlation)

9 Perspectives

- In the future we will continue this work for the final year project (Master)
- We will add more features to the inputs for the OLS
- And continue the work to do the mitigating and the preventing parts and see how the financial status of the firm is impacted

10 References

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