university of groningen

Digital Marketing Intelligence

Erlangga H. Roesdyoko (S2667983)

Faculty of Economics and Business

Executive Summary

Instagram Influencer

@kalvijn

Youtuber - Followers: 1 M

@enzoknol

Vlogger - Followers: 2 M

@jeremyfragrance

Fragrance - Followers: 3.5 M

@juttaleerdam

Athlete - Followers: 5 M

@negin_mirsalehi

Fashion - Followers: 7 M

Nowadays, leveraging the power of social media through influencers (KOLs) is an effective way to reach targeted audiences, making it ideal for a communication channel for launching a new perfume brand in the Netherlands.
This study shows **how to effectively analyze influencers and how to maximize their engagement** to drive a high product awareness.

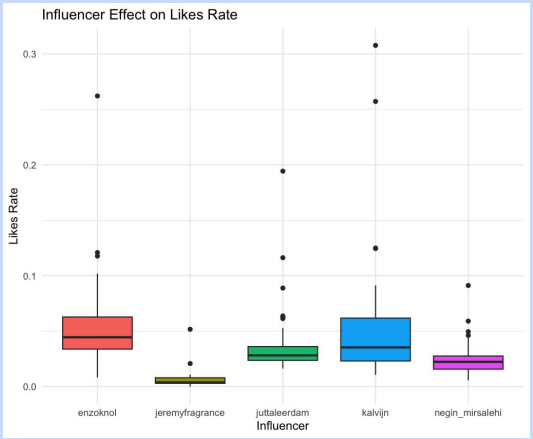
Why these KOLs?
We want to focus on the Netherlands market and we choose KOLs from different segments to analyze which type of influencer has the highest engagement rate (likes & comments / followers) and how do they differ

Key findings:
Post:
Likes: Textual feature is highly significant for likes, including word count, positive sentiment, the use of hashtag and question mark, and also emoji. On the other hand, the image composition is also significant, in this case, warmth.
Comments: Based on data, engaging comments are dominantly driven by the sentiment analysis. Neutral, Positive, and Negative captions are all very engaging based on VADER lexicon.
Overall, Likes and comments are closely related, most often than not, they goes parallel in the same direction. Meaning posts with high number of likes tend to have high number of comments.

Influencer:
There is no influencer who excel at every matrices, e.g. enzoknol might have the highest comment engagement, but negin_mirsalehi has the biggest audience, on the other hand juttaleerdam shows a promising prospect in the future as the Likes_Rate for her posts keep increasing. It depends on the goal of the brand.

Managerial Recommendations

Choosing Influencer



From the graph above, Enzoknol and Kalvijn are the best choices if the focus is create high engagement (likes) posts.

From EDA Table in Slide 4
EnzoKnol is know for a relatively high comment engagement compared to others.
Negin_mirsalehi and Juttaleerdam are good choices for increasing awareness to a bigger audience.

Maximize Engagement

Image: Features Extraction

```
Original Image Dimensions: 1800 x 1440
Original Image Dimensions: 256 x 256
Brightness: 0.5240597201328652
Saturation: 0.3749908212353201
Brightness Contrast: 0.23013541024966433
Warmth: 0.75726318359375
```

Post Engineering:

Picture:

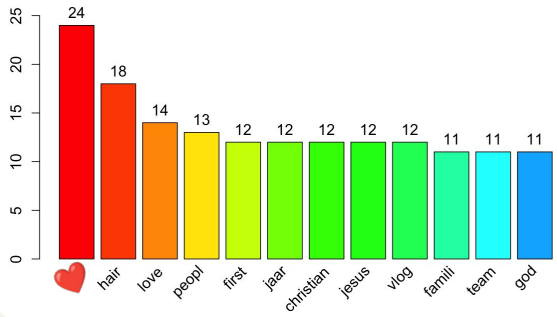
1. Focus on limited number of objects (2-5)
2. Set the tone of the picture: Warmth (0.75-0.8), Saturation (0.35-0.41), Brightness.Contrast (0.2-0.28)

Captions:

1. Use hashtag -> proven to increase engagement
2. Construct a positive sentiment, show emotion (joy, anticipation, trust)
3. Use question mark as a way to interact with the audience
4. Use emoji -> slightly affect the engagement

Data Exploration: Common Words & Influencer's Engagement

Most frequent words



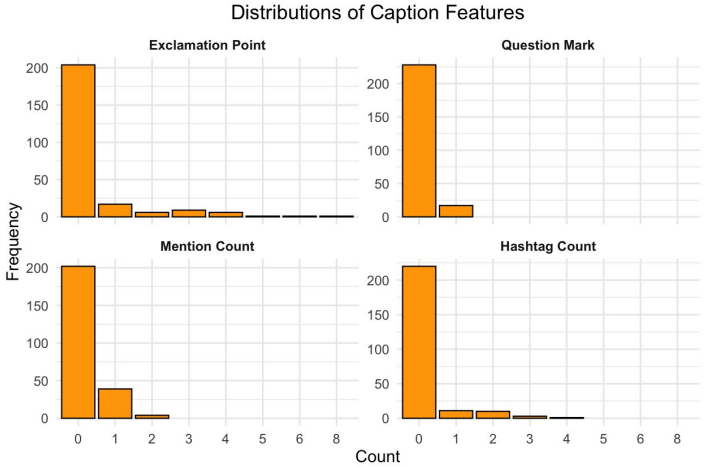
As illustrated in the word cloud and most frequent words graph, we can group the words into several **themes**: **beauty** (hair, look), **relationships** (team, people, family), **religion** (god, jesus), and **daily life** (vandaag, vlog, day). It also contains ads or brand, such gisou and celsius. It is also noticeable that emoji has been used as a way to express their feelings and emotions, in this case love and the love emoji is the most frequently used words, 24 and 14 respectively.

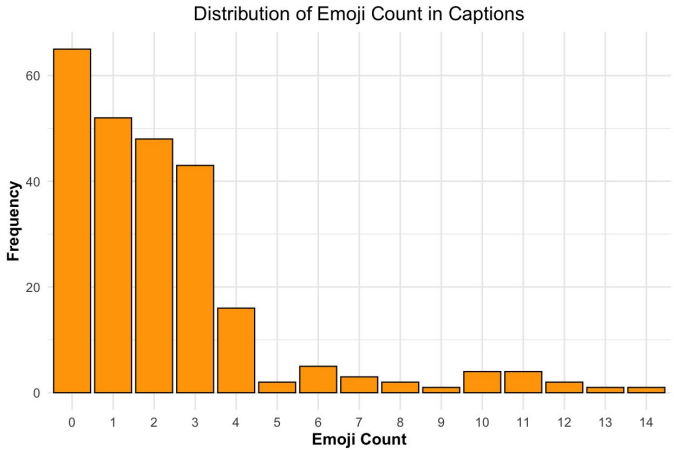
From the table below, we can deduct that **not every post is a hit** this is shown by the median comments and likes are lower than the mean. There are two caption style long and short, while the majority is using short, **enzoknol uses longer caption and it has higher engagement rate** compared to others. Related to caption, 4 out of 5 influencer uses emoji in their captions, it shows that emoji can also be used to convey a message. Overall, the data shows that engagement is not solely dependent on audience size, but also on content style, language, and emotional tone.

			Likes		Comments		Word Count		Emoji Count	
Influencer	Followers	Followings	Mean	Median	Mean	Median	Mean	Median	Mean	Median
juttaleerdam	5 M	600	184,187	140,480	951	633	15.9	5	3	2
negin_mirsalehi	7.2 M	1008	178,374	160,407	693	420	15.5	5	2.3	2
enzoknol	2 M	157	108,860	88,887	1,758	380	27.6	11.5	1.8	2
kalvijn	1 M	676	53,324	35,313	211	50	19.8	6	4.1	3
jeremyfragrance	3.5 M	0	13,473	4,340	103	59	9.5	6	0	0

EDA Table

Text Features: Caption Composition





Research indicates that the use of certain textual elements, like **question mark** and **exclamation point**, posts that begin with question words or include question or exclamation marks are often crafted to drive clicks, suggesting a strategic use of punctuation to enhance engagement (Bandy & Diakopoulos, 2021).

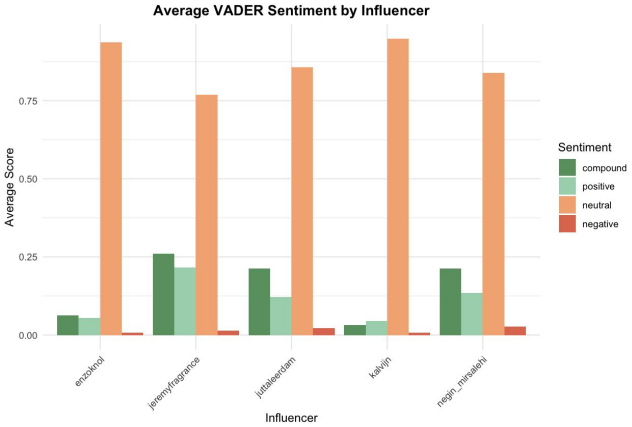
Hashtags are widely used to categorize content and expand post visibility across relevant audience feeds. They improve reachability and engagement, though their success often depends on contextual relevance and popularity (Sani et al., 2023). In this case, hashtags are used for brands, e.g. #gisou, #celsiusbrandpartner.

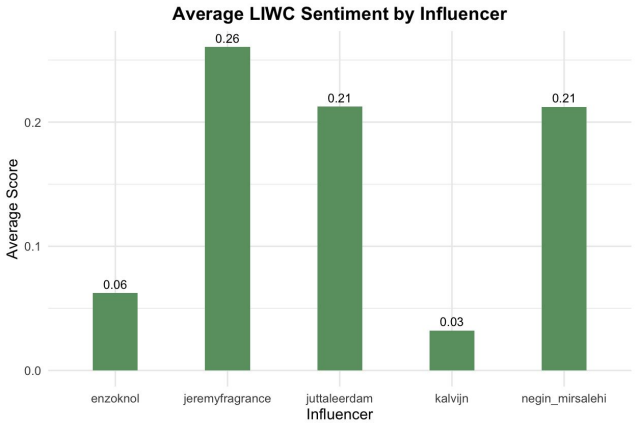
According to Davis et al. (2019), **mentions** can indicate interpersonal communication or networked interactions, which are more likely to be reciprocated or acknowledged, thus boosting visibility and interaction. In instagram, it usually uses for brand, in this case @gisou or @celsiusofficial.

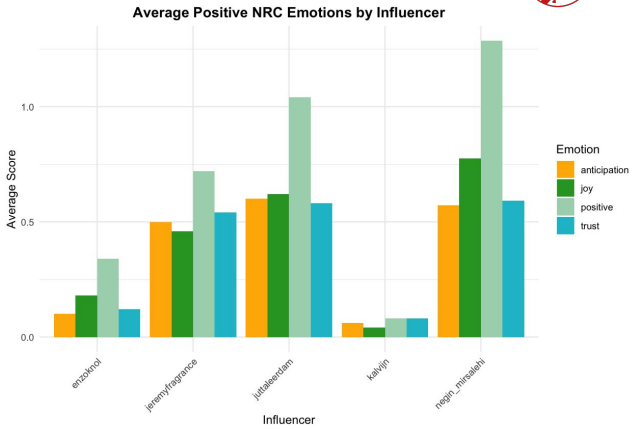
The graph shows that, **these textual elements are not commonly used anymore** by influencers. As 200 out of 250 posts are not using any of these elements or only use one 1 of the 4 elements.

Emojis enhance the expressiveness and emotional tone of a caption, making it more relatable and visually engaging. Prior research suggests inclusion of emojis in brand-related user-generated content is positively associated with consumer engagement, leading to a significant increase in the average number of likes on such posts (López & Tucker, 2022). Compare to the rest of the textual features, nowadays, emoji is more commonly used among influencers in social media.

Sentiment Analysis: VADER, LIWC, NRC Lexicons







VADER breaks sentiment down into positive, neutral, negative, and compound scores. VADER also understand the context of the sentence.

All influencers show a high level of neutrality, with kalvijn and enzoknol being the most neutral.

jeremyfragrance, juttaleerdam, and negin_mirsalehi have slightly higher compound and positive scores, indicating a more emotionally expressive tone.

Captions are generally neutral to slightly positive, with little overt negativity across all influencers.

LIWC sentiment reflects broader affective tone, often used in psychological analysis.

jeremyfragrance leads with a high average LIWC score (0.26), indicating emotionally rich or affect-laden language.

juttaleerdam and negin_mirsalehi also show elevated scores (~0.21), while kalvijn and enzoknol score notably lower.

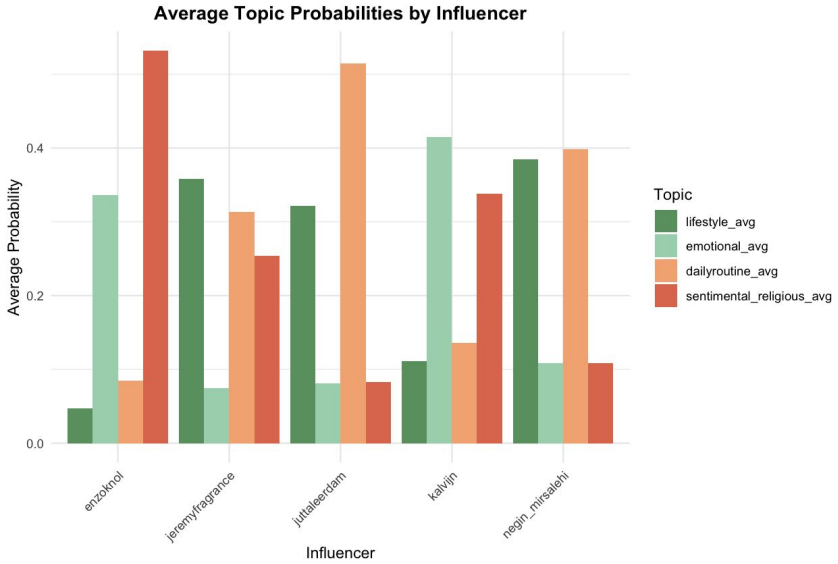
This **NRC** graph highlights positive emotional dimensions: anticipation, joy, positivity, and trust.

negin_mirsalehi stands out with the highest scores across all four emotion categories, especially trust and positive.

juttaleerdam and jeremyfragrance also score moderately well in joy and trust.

kalvijn shows a minimal emotional expression, reinforcing findings from the other two analyses.

Topic Probabilities: LDA Analysis



Average Topic Probabilities per Post

Captions that align with symbolic value, emotions, lifestyle and luxury are central in how consumers relate to perfume brands (Stewart & Carey, 2019)

Analysed captions are:

++ lifestyle: "together", "world", “work”, “champion”
++ emotional: "love", "family", "happy", "grateful"
\+ Daily routine: "vlog," "week," "season," "day,", "today",
\- Religious & sentimental: "Jesus," "Christian," "Christ," "God,"

Caption relevance per influencer

++ Jutta Leerdam: “People” , “Love”, “grateful”, “world”, “work”, “champion”, “happy”
++ Negin Mirsalehi: “family”, “season”, “day”, “year”, “late”, “dad”, “together”, “night”
\+ Kalvijn: “Fun”, “Own”, “Home”, “Friends”, “home”, “day”, “picture”*
\- Enzo Knol: “vlog” , “granddad”, “live”, “gift”, “today”
\- Jeremy Fragrance: “christian”, “jesus”, “god” , “fragrance”, “christ”

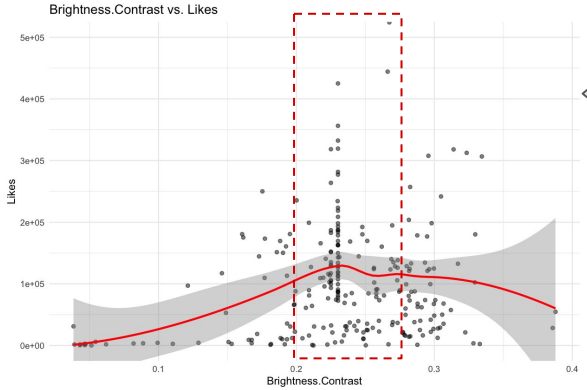
*translated to english

Lifestyle: 0.244 **Emotional:** 0.203 **Daily routine:** 0.289 **Sentimental Religious**: 0.264

Key takeaways:

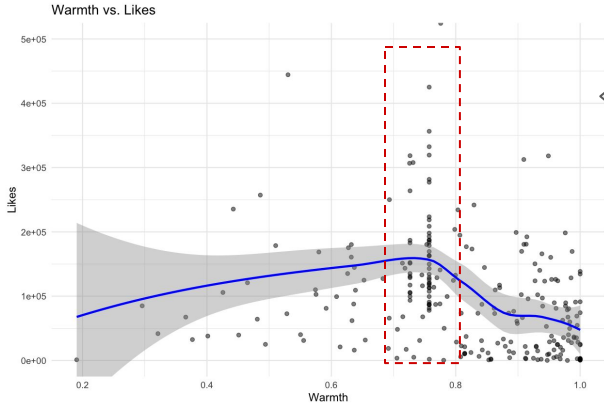
1. Enzoknol - Sentimental/Religious, his captions are likely reflective, value-driven, or emotionally expressive—possibly incorporating themes of faith or personal meaning.
2. Jeremyfragrance - Lifestyle, his content is centered on personal branding, lifestyle choices, and self-image, reflecting a curated public persona.
3. Juttaleerdam - Daily Routine, she shares structured, habit-focused content, likely related to fitness routines, training updates, or day-to-day discipline.
4. Kalvijn - Emotional, his captions are expressive and feeling-driven, potentially humorous, personal, or introspective in tone.
5. Negin_mirsalehi - Lifestyle, her content reflects fashion, beauty, and aspirational living—consistent with a polished, brand-oriented influencer image.

Picture Composition: Color Tone and Number of Object



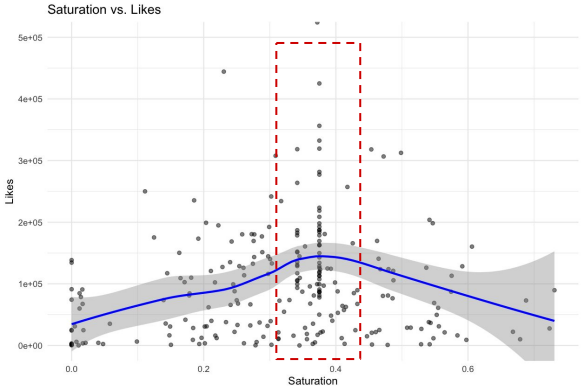
Brightness.Contrast

The optimal setting for Brightness.contrast in the posts is around 0.2 - 0.28, where the data shows it highly associated with high number of likes.



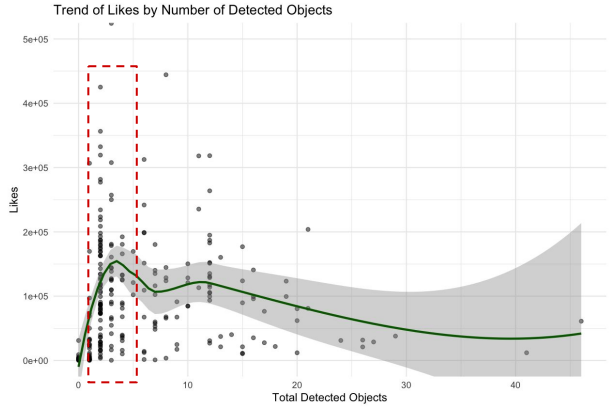
Warmth

The trend is gradually increasing until 0.75 - 0.8, beyond this there is a clear decline of number of likes associated with the posts.



Saturation

The peak for saturation setting is around 0.35 - 0.41, where it produces posts with high number of likes. Both lower or higher saturation are linked with fewer likes.



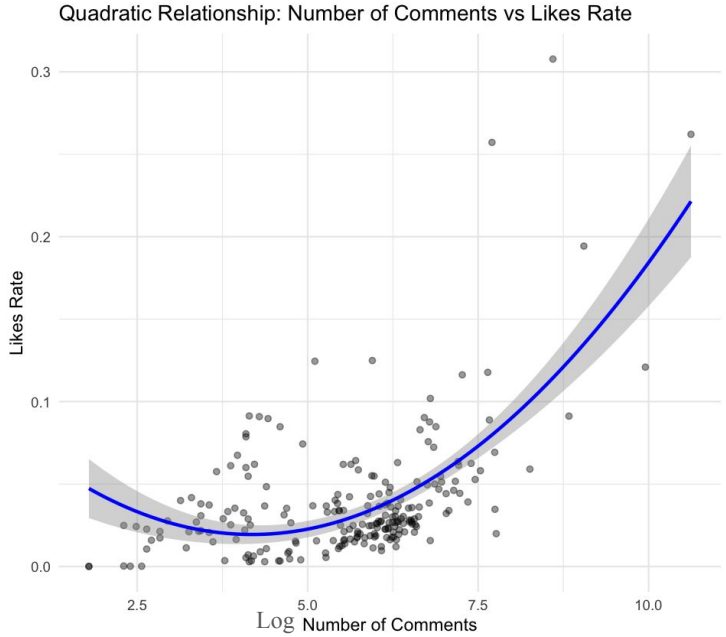
Number of Objects

Images with few identifiable objects (2-5) are more engaging. Picture with cluttered object overwhelm viewers. Thus leads to less engagement.

There is a clear inverted-U relationship in most plots: too little or too much of a visual feature tends to hurt the engagement performance.

Post's Analysis: Regression Model on Text and Picture Features

Model creation steps: Full model -> Stepwise regression model -> Quadratic model and Interaction model based on variables in stepwise model formula



The graph above derived from the significant variable (number of comments) in the quadratic model. The line in the graph has a curvature, which means the relationship between Number of Comments and Likes Rate is non-linear.

Likes

DV: Likes_Rate = Likes / Followers

Model	R2	Adjusted_R2	AIC	BIC
Full	0.5666534	0.4703542	-908.7462	-766.0234
Stepwise	0.5378717	0.5040575	-944.5349	-886.7661
Quadratic	0.6547875	0.5960279	-974.9967	-859.4592
Interaction	0.5554265	0.4932323	-929.0936	-830.5469

Stepwise formula: Likes_Rate ~ **Influencer** + **Number.of.Comments*** + **Word.Count***** + **Emoji.Count** + **hashtag_count***** + **qm_count*** + Saturation + **Warmth*** + **Number.of.Unique.Objects** + **compound** + but_count + **word_count.LIWC***** + **anticipation**** + fear + **positive**** + **emotional_probability** + Comments_Rate. **Bold**: significant variables

Comments

DV: Comments_Rate = Comments / Followers

Model	R2	Adjusted_R2	AIC	BIC
Full	0.3594986	0.217165	-2236.73	-2094.007
Stepwise	0.3170848	0.2776859	-2278.56	-2230.986
Quadratic	0.4097297	0.3507027	-2294.779	-2220.02
Interaction	0.3641036	0.2862387	-2270.325	-2181.973

Stepwise formula: Comments_Rate ~ Influencer + **Likes***** + **Word.Count***** + **pos***** + **neu***** + **neg***** + **word_count.LIWC***** + **disgust*** + **sentimental_religious_probability, Bold**: significant variables

Best performing model in terms of R2, AIC and BIC: Quadratic Model

Summary: 2x2 Matrix & Literature Review

	Expected	Unexpected
Strong	**Likes - Number of Comments** We believe that comments has higher weight towards engagement compared to likes, as it take more effort to comment compare to liking a posts. **Comment - Sentiment Analysis** Engaging captions (positive, trust) can drive audiences to engage with the influencers, also people are driven by emotion (anticipation, fear)	**Likes - Hashtags** The use of hashtags usually correlated with brands, and study shows using hashtag can drive more engagement (Choi & Sung, 2021)
Weak	**Comment - Topic Analysis** Only religious topic has small significance towards comments, which is expected. However, we initially thought that topic will be one of the driving factor of people commenting in the post.	**Likes & Comments - Emoji** Emoji only shows a relatively small significant towards likes, meanwhile emoji is commonly used compared to hashtag, mention, question mark, and exclamation point. **Likes - Picture Composition** Only warmth shows significant impact towards Likes.

Literatures:

Comments indicate a stronger user engagement because they require more time, effort, and personal opinion, unlike likes which are superficial signals of approval (Kim & Yang, 2017).

Hashtags are effective in increasing visibility and engagement, particularly in the form of likes, overusing the hashtag can dilute perceived content quality and reduce deeper interactions such as comments (Choi & Sung, 2021).

Emotionally charged messages are more effective in driving active participation such as commenting compared to neutral content (Sabate et al., 2020).

Comments are more frequently associated with topics that carry emotional, controversial, or social relevance, which trigger user's to express their response (Wang et al., 2020).

Emojis function as affective signals that enhance message clarity and emotional appeal, which increases consumers' willingness to comment and interact (Das et al., 2022).

Limitations and Next Steps

Limitations

- Only analyzing limited posts (50) per influencer, meanwhile the influencer build their image and branding since they started their account. The branding for each influencer itself can change overtime, that may result in less engagement during the transition times or due to the change itself.
- The information of the product itself still very general (“introduction of a perfume brand”), by having a more specific product information such as the price, the location, and the targeted markets, can lead to a more specific research and influencer selection.
- The analysis is based solely on Instagram posts, where most influencers use several platforms (e.g., TikTok, YouTube) to engage with their audiences, and the engagement might differ across platforms.
- The image features (e.g., brightness, saturation, number of objects) do not capture semantic meaning or emotional tone (context of the picture), which may be stronger drivers of engagement than color and featured object.
- Factors like posting day of the week, and seasonality were not modeled, although they can strongly influence engagement performance.
- The sentiment analysis is based on lexicons, which may not accurately interpret sarcasm, emojis, or multi-language captions.
- This is a static analysis and does not explore how engagement trends evolve over time and whether certain topics (e.g., lifestyle, emotional) gain or lose traction seasonally or during specific campaigns.

Next Steps

- Analyze influencers with comparable engagement level and size or in the same topic with different engagement level and size
- Analyze advertising related content, as ads related content may have different engagement performance compared to organic content
- Analyze the comments placed under the post to get a real feeling of the follower base
- Analyze the effect of cross platforms towards their engagement in Instagram
- Include whether the post was a reel, story, or carousel, as post type often influences reach and interaction behavior differently.
- Augment the dataset with follower characteristics (e.g., gender, geography, interests) to understand which influencer–audience combinations are most effective

university of groningen

Thank you!

Reference List

Bandy, J. and Diakopoulos, N., 2021. More accounts, fewer links: How algorithmic curation impacts media exposure in Twitter timelines. Proceedings of the ACM on Human-Computer Interaction, 5(CSCW1), pp.1–27.

Choi, M. and Sung, Y., 2021. Instagram marketing: The impact of hashtag use on social media engagement. Computers in Human Behavior, 119, p.106713.

Das, G., Wiener, H.J. and Kareklas, I., 2022. To emoji or not to emoji? Examining the influence of emoji on consumer reactions to advertising. Computers in Human Behavior, 128, p.107123.

Davis, C.A., Varol, O., Ferrara, E., Flammini, A. and Menczer, F., 2019. How do text characteristics impact user engagement in social media? Journal of Computational Social Science, 2(1), pp.1–14.

Kim, A.J. and Yang, S.U., 2017. Like, comment, or share? The roles of interactive features in social media advertising engagement. Journal of Communication, 67(4), pp.521–544.

López, M. and Tucker, C., 2022. Influence of emojis on user engagement in brand-related user-generated content. Computers in Human Behavior, 134, p.107333.

Sabate, F., Berbegal-Mirabent, J., Cañabate, A. and Lebherz, P.R., 2020. Factors influencing popularity of branded content in Facebook fan pages. Computers in Human Behavior, 61, pp.688–696.

Sani, S.M.S., Azizan, N.A., Hasan, M.K. and Ramasamy, S., 2023. Hashtag recommendations using content-based approaches and social popularity. PLOS ONE, 18(1), p.e0280483.

Stewart, A. and Carey, L., 2019. Luxury perfume brands and millennial consumers. In: Palgrave Advances in Luxury. Cham: Palgrave Macmillan, pp.147–173.

Wang, Z., Ye, X. and Zhang, Q., 2020. What drives users to comment on social media? A topic-based analysis of YouTube videos using deep learning techniques. Computers in Human Behavior, 104, p.106164.