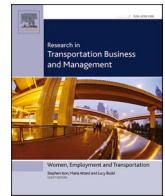




Contents lists available at ScienceDirect

Research in Transportation Business & Management

journal homepage: www.elsevier.com/locate/rtbm

Decoding brand perception through online customer reviews: A comparative study across geographical locations

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ARTICLE INFO

Keywords:

Online reviews
eWOM
Web scraping
Branding
Text mining
Sentiment analysis

ABSTRACT

Analyzing online reviews is essential for measuring reputation due to the rich availability of data, cost-effectiveness, and time efficiency compared to traditional survey methods. This study details brand perception and customers' experiences of Nordic logistics in 2023, aiming to elevate reputation and gain deeper insights into customer expectations and satisfaction to guide improvements in service delivery and communication strategies. A custom-developed web scraper collected unsupervised data from Trustpilot, utilizing advanced text mining techniques, Term Frequency-Inverse Document Frequency (TF-IDF), Latent Dirichlet Allocation (LDA) topic modeling, and sentiment analysis. Key service attributes, emotional tones, and positive and negative themes valued in user-generated content are uncovered in electronic word of mouth.

Findings reveal that customers prioritize fast, reliable services with clear communication. Negative feedback highlights issues with delivery accuracy, damaged packages, and inconvenient pickup locations. Satisfaction with home delivery, parcel shops, and parcel lockers is higher in Denmark than in Sweden. Dao Denmark showed the best net sentiment scores, followed by GLS Denmark, Instabox, Bring Denmark, and Bring Sweden. PostNord Sweden showed a negative trend. This research contributes to academic literature and provides valuable insights for logistics companies to enhance service delivery, ultimately leading to better customer experience and stronger brand loyalty. Regional differences and customer priorities offer implications for business practices and strategic planning.

1. Introduction

Analyzing online reviews has become a strategic imperative for businesses, offering a cost-effective and time-efficient alternative to traditional survey-based methods for measuring reputation. Online reviews provide rich, unstructured data that allows companies to gain deeper insights into customer preferences, satisfaction, and expectations, particularly within the logistics industry. Despite the growing importance of online reviews, research on customer preferences for package deliveries and logistics services in the Nordic region remains a significant gap. While general trends in customer satisfaction have been extensively studied in e-commerce and service industries, region-specific insights in the logistics sector, particularly in Denmark and Sweden, remain underexplored.

The inherent advantage of online reviews lies in their rich availability of data to capture authentic customer opinions at scale, enabling faster and more accurate reputation measurement compared to traditional survey methods (Loke and Reitter, 2021; Moro and Rita, 2022). In

contrast, the absence of bias in online reviews contributes to a genuine representation of public perspectives, thereby raising the reliability of the data collected (Brzustewicz and Singh, 2021). The work of Ismagilova et al. (2020) underscores the reliability of e-commerce platforms, showing that they outperform the efficiency of traditional survey methods in building and establishing trust with potential and current customers. Furthermore, conventional interview methods carry the risk of bias and subjectivity, and the predetermined notions of the interviewers may influence the respondents and the responses obtained.

Alongside this, online rating platforms offer a unique window into organizational performance and customer perspectives, providing different viewpoints compared to traditional face-to-face interactions (Al-Htaybat and von Alberti-Alhtaybat, 2022). The rise of online reviews aligns with the broader trend of user-generated content (UGC) in social media, enabling users to voice their opinions about products and services (Viviani & Pasi, 2017). In this context, companies invite reviews, respond, and actively engage with their customers, fostering a dynamic customer interaction (Littlechild, 2021).

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<https://doi.org/10.1016/j.rtbm.2026.101624>

Received 12 August 2024; Received in revised form 23 April 2025; Accepted 4 February 2026

Available online 7 February 2026

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This study uses Posten Bring AS, a leading Nordic postal and logistics group, as a case study to explore brand perception and customer satisfaction through online reviews. With over 100,000 customer reviews on the Swedish Trustpilot review page and a staggering 550,000 customer reviews on the Danish counterpart, Bring provides a valuable opportunity to analyze customer sentiment in the Nordic logistics market. Despite its prominence, Bring faces lower trust scores from 0 to 5 compared to competitors in Sweden and Denmark. By leveraging web-scraped customer reviews, this research provides a detailed analysis of Bring's performance in these regions in 2023, offering theoretical contributions and practical implications for logistics providers.

While existing studies on UGC predominantly focus on volume, rating, and other non-textual features, less attention has been given to exploring the textual aspects for understanding brand image and positioning (Alzate et al., 2022). This study aims to address this research gap by presenting a detailed analysis of the textual content of online reviews in the Nordic logistics market to get deeper insights into customer perceptions and brand positioning. Of particular significance are the sentiments embedded in online reviews, surfacing as a crucial complement to star ratings, as they reflect the true sentiment, authentic tone, and emotion underlying the customer feedback (Al-Natour and Turetken, 2020).

As this study unfolds, the guiding research questions explore the complexity of addressing customer preferences and opinions. The perception and attitudes towards the brand Bring among Danish and Swedish customers will be analyzed and compared against competitors such as PostNord, Instabox, DAO, and GLS. Using web-scraped data from Trustpilot, a developed web scraper, and textual and non-textual data will be highlighted. The study aims to find similarities and differences across geographical locations, positive and negative themes, and emerging topics in the online review texts, bridging these findings into tangible, data-driven strategic decisions.

This study aims to analyze and understand the factors influencing brand perception within the logistics industry. A central focus is identifying and systematically comparing the key attributes of logistics services most valued and prioritized by customers across different geographical locations. Additionally, the study seeks to identify the main positive and negative themes highlighted by users, focusing on Denmark and Sweden. An essential aspect of the research involves exploring the relationship between online reviews and the geographical location of customers, as well as the pick-up methods used by different logistics service providers in these countries. Ultimately, the objective is to provide data-driven insights to inform marketing strategies, enhance customer engagement approaches, and optimize service offerings in the Nordic logistics market.

These objectives lead to several research questions. First, what are the critical determinants of customer satisfaction in logistics service providers in Denmark and Sweden? Second, what are the main positive and negative topics highlighted by users who leave reviews in Denmark and Sweden? Third, how can analyzing these similarities and differences contribute to data-driven strategic decisions, such as informing marketing strategies, enhancing customer engagement approaches, or optimizing service offerings? Finally, are customer perceptions and topics identified in reviews related to key aspects of logistics services, such as delivery speed, delivery method (e.g., parcel shop, home delivery, parcel locker), customer service, or pricing?

This study's contribution is theoretical as well as empirical. By mapping lexical cues (e.g., "fast", "km away", "damaged") onto the Expectancy-Disconfirmation framework, we demonstrate how user-generated text makes the latent speed-versus-reliability trade-off observable. The Nordic logistics setting serves as a testbed. Still, the procedure - identify dominant service attributes in text, comparing their sentiment-weighted prevalence across contexts—can be applied to any industry where online reviews are abundant.

The upcoming literature review will provide insights into online reviews, the methodology presents the tools used in the study, and the

results showcase the findings, paving the way for a nuanced understanding of the evolving landscape of online reviews.

2. Literature review

Understanding and investigating the relationship between online customer reviews and brand perception within the logistics sector is the central focus of this study. The exploration begins by examining how delivery methods influence customer acceptance and trends.

2.1. Delivery methods on acceptance and trends

Market success for logistics providers, in addition to financial aspects and maturity for technology, is also formed by user acceptance of various delivery options (Punakivi and Tanskanen, 2002). The last mile, often referred to as the final leg of the delivery process, where the package reaches its ultimate destination, plays a critical role in market differentiation due to its potential to offer flexibility and convenience to customers (Lim et al., 2018). As it is the last touchpoint in a customer journey, it has the potential to impact brand perception significantly. By 2030, the last mile is projected to experience a 78% increase globally (World Economic Forum, 2020).

The concept of user acceptance is relevant and applicable to how customers react to and adopt innovative methods. Despite empirical insights into factors influencing user acceptance, there remains a prevalent skepticism among customers regarding the adoption of innovative delivery methods (Felch et al., 2019). In recent years, dynamic and innovative changes in the last-mile logistics (LML) market have rapidly influenced customers' behavior and habits. The adoption of automated self-service parcel lockers expedited during the pandemic, resulting in a fast acceptance of new last-mile delivery options (Wang et al., 2023a, 2023b). This adoption indicates a positive trend in accepting parcel lockers as a convenient last-mile delivery method. While not an analyzed delivery method in this study, robotic autonomous delivery vehicles (ADVs) garner higher expectations than traditional trucks. Both show similar sensitivity to delivery costs, but there is an indication that ADVs may be perceived as less secure than drones in specific contexts in the study by Said et al. (2023). A study by Kasper and Abdelrahman (2020) underscores the significance of price sensitivity as a primary driver for ADVs' acceptance, followed by factors like social influence and perceived risk.

Regarding drone delivery, customers' acceptance remains uncertain despite the potential benefits, including speed and environmental friendliness. Yoo et al. (2018) revealed that perceptions of drone delivery are influenced by usability, risk of malfunctions, perceived advantages, and privacy concerns. An investigation by Osakwe et al. (2022) into customers' intentions to use drones for last-mile delivery found that expected outcomes, alignment with lifestyle, and awareness positively influence customer attitudes and intentions. Interestingly, the study suggests that delivery risk does not significantly diminish the impact of attitudes and desires on intentions, contrasting with expectations.

These studies shed light on the dynamics influencing customer acceptance of various delivery methods. As we navigate a rapidly evolving landscape where parcel lockers have gained widespread adoption while autonomous delivery vehicles and drones are still in the preliminary stages of implementation, customer preferences and emerging technologies are shaping the future of logistics.

As customers increasingly demand several factors, such as convenience, speed, and flexibility in their delivery experience, logistics providers are forced to adapt and innovate. This demand has led to the rapid adoption of delivery options like automated self-service parcel lockers, where customers can receive packages at their convenience and outside regular business hours. Emerging technologies such as autonomous delivery vehicles and drones have the potential to revolutionize LML. Their acceptance by customers depends on factors like security,

usability, and risk, but they also promise faster, more efficient, and environmentally friendly delivery options. The interplay between customer demands, technological innovations, and logistics strategies will be central in shaping the industry's future.

2.2. Critical attributes influencing customer satisfaction across geographies

During the checkout process in online stores, customers in the Nordic region are presented with multiple delivery options, empowering them to select the most reliable and satisfactory service they perceive. This decision-making process reflects three dominant priorities: delivery speed, reliability, and convenience. These attributes align with other geographies' findings and highlight universal and region-specific determinants of customer satisfaction in logistics.

Despite the critical role of logistics services in shaping customer satisfaction, studies focusing on delivery preferences and logistics service quality in the Nordic region remain scarce (see Table 1). This study draws on findings from other geographies, such as Indonesia, the United States, Poland, and Spain, to provide contextual insights and identify universal patterns in customer preferences. These studies from other regions offer valuable benchmarks and highlight key attributes influencing customer satisfaction, many of which may have parallels in the Nordic context. While cultural and market-specific differences are acknowledged, these findings serve as a foundation for better understanding and addressing the research gap in Scandinavia.

Restuputri et al. (2022) underscore six key attributes significantly influencing customer satisfaction in Indonesian logistics services: delivery service quality, delivery speed, courier attitude, order information, condition of goods, and warehouse location. Among these, the most critical factors were the state of the delivered goods, such as undamaged and safe goods, polite and professional couriers, and delivery speed, emphasizing the universal significance of reliability in LML. Similarly, Uvet (2020) investigated logistics service quality in Texas, identifying delivery speed, staff professionalism, and problem-solving effectiveness as key drivers of customer satisfaction. The study found that effective operational information communication significantly improved staff professionalism and customer satisfaction. At the same time, poor issue resolution negatively impacted delivery speed and overall perceptions of service quality.

In contrast, studies in Poland and Spain reveal a stronger emphasis on cost and free delivery over service-related factors. Kiba-Janiak et al. (2022) found that Polish e-commerce customers prioritized cost-free home delivery above all other factors, followed by parcel lockers as a preferred low-cost alternative. Similarly, Villa et al. (2023) found that Spanish customers prioritized fast and free delivery over sustainability concerns. However, generational differences were observed—younger consumers were more willing to pay extra for green and sustainable delivery options, while older consumers prioritized affordability.

Across all regions, delivery speed and reliability consistently emerge as top priorities, reinforcing their universal importance. However, regional variations exist. In Indonesia and Texas, staff professionalism and courier behavior are critical to customer satisfaction, whereas cost-free delivery dominates consumer preferences in Poland and Spain. Sustainability, while relevant, tends to be a secondary concern, with some generational differences influencing its perceived importance.

Given these findings, this study examines whether similar trends exist in the Nordic region and whether customer satisfaction in Scandinavian logistics aligns more closely with cost-driven preferences in Poland and Spain or service-driven expectations in Indonesia and Texas.

2.3. Factors influencing brand perception

Insights on e-commerce behavior from Wang et al. (2023a, 2023b) emphasize that trust and attitude play crucial roles in positively shaping brand perception. The study reveals that customers' perceived value

Table 1
Service-quality factors reported in last-mile logistics literature (2014–2024).

Factor (service attribute)	Typical impact on customer experience (CX)	Representative studies	Notes/relevance to Nordic context
Delivery speed	Fast delivery reduces waiting anxiety, which is the strongest positive driver of satisfaction.	Restuputri et al., 2022; Uvet, 2020	Emerges as the single highest-weighted term ("fast") in our corpus
Reliability/delivery accuracy	Missed or wrong deliveries trigger steep drops in trust.	Lim et al., 2018; Wang et al., 2023a, 2023b	"Wrong pick-up point" is a core complaint in DK & SE reviews
Convenience/proximity of pick-up location	Short travel distance and extended opening hours raise perceived ease of use.	Felch et al., 2019; Kapser and Abdelrahman, 2020	Terms like "km away" or "too far" show high co-occurrence with 1–2-star ratings
Cost / free delivery	Free or low-cost options outrank service factors in price-sensitive markets.	Kiba-Janiak et al., 2022; Villa et al., 2023	Less salient in DK/SE, where many e-shops bundle shipping costs
Tracking transparency/information quality	Real-time updates mitigate uncertainty and increase perceived control.	Uvet, 2020; Littlechild, 2021	"Good info" / "inform" frequently cited in 5-star Nordic reviews
Staff professionalism/courier attitude	Polite interaction lifts overall satisfaction, even when minor delays occur.	Restuputri et al., 2022; Uvet, 2020	Mainly reflected indirectly through "service" & "super service"
Package condition/damage avoidance	Damaged goods produce negative word-of-mouth and returns.	Hendayani and Dharmawan, 2020	"Broken", "hole in box" cluster strongly with negative sentiment
Customer-service responsiveness	Fast, helpful replies can recover from service failure episodes.	Bakharev et al., 2022; Hendayani and Dharmawan, 2020	Long call-centre wait times are a common complaint in SE reviews.
Sustainability / green delivery options	Growing segment values low-emission transport, especially among younger cohorts.	Villa et al., 2023; Lim et al., 2018	Still secondary in Trustpilot texts, but may rise with Nordic climate focus.
Technology adoption (parcel lockers, ADVs, drones)	Novel options can boost convenience but face acceptance barriers	Kapser and Abdelrahman, 2020; Yoo et al., 2018	Parcel-locker acceptance is high in DK; drones/ADV are scarcely mentioned.
Flexibility (time-window, rescheduling)	Choice of time slots reduces perceived effort and drives premium willingness.	Lim et al., 2018; Wang et al., 2023a, 2023b	Nordic carriers are still limited in same-day/time-window offers
Risk/security of delivery	Safe drop-off lowers perceived purchase risk and boosts brand trust	Wang et al., 2023a, 2023b; Tang et al., 2014	Security concerns surface around unattended home deliveries

towards a brand or a product increases if the risk associated with online purchase is low. Conversely, brand perception is adversely affected when the subjective risk of online purchases is high.

The landscape of online shopping experiences has undergone significant transformations in the post-pandemic years, especially during customers' online checkout processes, wherein they choose both the

delivery methods and delivery companies. Convenience has emerged as an additional influential factor, complementing the role of risk (Kunytska et al., 2021). A study by Yadav et al. (2024) emphasizes the importance of online customer reviews and eWOM in decreasing perceived risk for experience-dominant services.

Online customer reviews are UGC, meaning content shared with others (Langaro et al., 2019; Tang et al., 2014). This information and opinions about companies and services through UGC can also influence new potential customers in choosing a logistics company in the last mile, or help customers avoid it (Kumar et al., 2023).

In the context of LML, brand perception became exceptionally important in shaping the overall customer experience (CX), characterized by the demand for personalized, user-friendly, and secure delivery services (Bakharev et al., 2022).

2.4. Textual analysis of user-generated content (UGC)

The landscape of online reviews, eWOM, and UGC is evolving, and Trustpilot, one of the most significant commercial online review pages globally, has a pivotal role in this evolution. Acknowledging the 167.5 million reviews on Trustpilot since the startup in 2007, this exponential growth underscores the pressing demand for active review and online reputation management. The online review platform includes 2.8 million reviews from Denmark and 1 million from Sweden, with a significant portion contributing to the analysis of Bring's performance and reputation in these regions (Trustpilot, 2022). As the market burgeons, companies across various industries increasingly rely on actively managing reviews to foster openness and build trust in their brand towards their customers.

It becomes evident that a comprehensive understanding of a brand, from its perception and image to its positioning, requires a closer examination of textual dimensions within UGC. In particular, Alzate et al. (2022) propose utilizing web scraping techniques, emphasizing their capacity to unveil patterns in data collection, providing valuable insights into how customers perceive brands. The Artificial Intelligence (AI) technique of Natural Language Processing (NLP) automates real-time customer insights. AI empowers marketers throughout the customer journey by allowing computers to understand customers' wants and needs in text-based data (Rodgers & Nguyen, 2022). Further advancements in NLP, Latent Dirichlet Allocation (LDA), text analytics, and topic modeling contribute to a comprehensive understanding of customer sentiments.

By employing opinion mining or sentiment analysis, researchers can highlight customer attitudes, emotions, and sentiments (Fang and Zhan, 2015). Unraveling customer emotions provides rich insights into brand perception, offering a holistic perspective beyond numerical evaluations (Al-Natour and Turetken, 2020). Integrated into this context, web scraping involves automatically extracting valuable data from websites, such as structured information from Hypertext Markup Language (HTML) text. It can gather information in real-time, making it a precious tool in various modern fields (Khder, 2021).

Recent advancements in NLP have also introduced state-of-the-art models like BERT (Bidirectional Encoder Representations from Transformers) and RoBERTa (Robustly Optimized BERT Approach), significantly enhancing the depth of textual data analysis. Unlike traditional techniques, BERT processes text bi-directionally, allowing it to consider preceding and following words in a sentence. This contextual awareness enables a more nuanced understanding of sentiment, themes, and intent in user-generated content (Devlin et al., 2019). RoBERTa builds on BERT's foundation by optimizing training methods, such as removing the next-sentence prediction task and using larger datasets, resulting in improved accuracy for text classification tasks (Y. Liu et al., 2019).

In analyzing online reviews, BERT and RoBERTa have proven particularly effective in uncovering subtle variations in sentiment and extracting actionable insights from large-scale datasets. For example, these models can differentiate between satisfaction with delivery speed

and dissatisfaction with customer service, providing granular insights into customer priorities. Their application offers significant potential for understanding brand perception and refining customer engagement strategies in logistics.

In exploring strategies for strengthening the quality improvements of logistics services, Hendayani and Dharmawan (2020) used sentiment analysis with Naïve Bayes and Support Vector Machine to assess sentiments and dimensions, thereby contributing to the service quality and prioritizing critical issues within the logistics company. Additionally, Liu et al. (2024) delved into operational efficiency within e-commerce express services. Using advanced techniques such as web scraping, text data processing, and big data technology, their study provided valuable insights into service evaluation. It facilitated targeted improvements in the operational efficiency of e-commerce express services.

3. Methodology

The methodology was designed to give insights into the dataset on extracted reviews from Bring Denmark and Sweden versus their respective competitors operating in the same market. The study aims to identify the strengths and weaknesses of logistics services and provide recommendations for improving customer satisfaction and brand perception within the industry through variables and their interrelationships.

3.1. Research design

The fundamental phases in the research design include five steps, as presented in Fig. 1. The framework is centered around online reviews, serving as a valuable source of customer feedback. The key variables include brand perception, customer sentiments, service attributes, and geographical location (See Fig. 2)

Brand perception is a multi-dimensional construct shaped by various elements, including delivery speed, service quality, and overall customer satisfaction. This study builds on previous findings from Restuputri et al. (2022) and (Uvet, 2020) highlighting these factors' universal importance in logistics services. Furthermore, the research by Kiba-Janiak et al. (2022) underscores the role of convenience and delivery method choice in shaping customer perceptions, particularly in online shopping contexts. Sentiments are captured through the emotional tone and attitude in the reviews. Service attributes include specific aspects of the service, including delivery experience, customer support, and reliability. Geographical location is analyzed to understand how regional differences hold different expectations and influence attitudes towards logistics services.

3.1.1. Data collection

The data was collected using a custom-developed web scraper to transform unstructured data into structured data for further analysis. The web scraper was explicitly designed by parsing the HTML code of several web pages using Python programming within the Jupyter Notebook environment. Trustpilot was selected as the primary data source because customers share experiences and opinions and are frequently invited to leave reviews.

The data collection period was chosen to capture trends and patterns over time and includes reviews with experience dates from January 1, 2023, to December 31, 2023. The dataset has 22,672 reviews, and the information attributes include company, rating, review text, review title, review date, review date, experience date, and user location.

The data collection follows ethical and legal guidelines to ensure responsible data usage. Reviews were extracted exclusively from publicly available Trustpilot data without bypassing access restrictions. To ensure compliance with data protection regulations, all names were replaced with the generic term "customer", ensuring complete anonymization.

This approach aligns with ethical research practices and legal



Fig. 1. Research design.

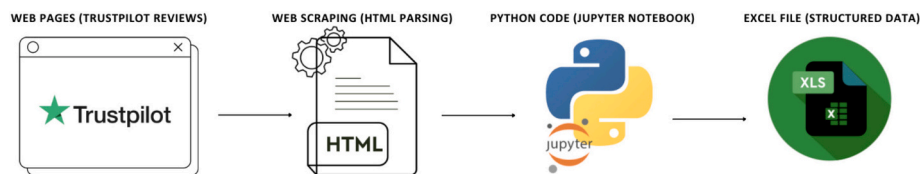


Fig. 2. Web scraping model.

frameworks such as the General Data Protection Regulation (GDPR) by removing personally identifiable information (PII). The methodology follows established research practices, as previous studies have used Trustpilot for academic analysis. Trustpilot's terms of use allow public reviews to be accessed for research purposes, making this data collection legally permissible. The extracted data is used for academic purposes, with proper source citation, ensuring responsible data handling.

3.1.2. Data preparation

The collected data underwent data preparation before the analysis, including tokenization, lowercasing, character removal, lemmatization, and stop word removal using the Natural Language Toolkit (NLTK). These steps were taken to standardize textual data and improve the dataset's quality before the analysis. Tokenization divides the text into tokens or individual words. Lowercasing transformed all uppercase letters into lowercase. Special characters, including commas, exclamation points, quotation marks, and punctuation marks, were removed to eliminate noise. Lemmatization transformed words into their base forms. For example, 'deliveries', 'delivered', and 'delivery' were lemmatized to 'deliver', while 'packages', 'packaging', and 'packaged', were lemmatized to 'package'. Lastly, stop words such as 'is' and 'the' were removed as they do not contribute to the analysis and may introduce noise. By removing them, the analysis becomes more focused and meaningful.

3.1.3. Topic modeling

The analysis employed the TF-IDF (Term Frequency-Inverse Document Frequency) scheme to calculate the importance of each word by considering its frequency of words within a document (term frequency) and the frequency of words across the entire corpus of documents (inverse document frequency) (Blei et al., 2003). The TF-IDF mean score, expressed as a percentage, identifies the most frequently used words across the entire dataset of customer reviews and uncovers key themes and topics.

In addition to TF-IDF, the generative probabilistic topic modeling technique LDA was employed to identify clusters of underlying topics characterized by sets of related words in the dataset. LDA operates as a hierarchical Bayesian model on three levels (Blei et al., 2003): document, topic, and word. The LDA is recognized as the best-performing method within topic modeling algorithms due to its established trustworthiness. (Ramage et al., 2010). The algorithm is unsupervised and known for its robustness, and through repetitive word patterns, it effectively detects latent themes in large text corpora. These techniques were chosen to uncover a deeper understanding of customer preferences, service attributes, and geographical variations in brand perception.

The Coherence Score metric was employed to evaluate the coherence of the topics generated, which measures the semantic similarity of high-frequency words within a topic. The analysis was conducted using Python's genism library, with a coherence score threshold of 0.5 set to ensure topic interpretability. Coherence scores were calculated

iteratively while varying the number of topics, allowing the selection of an optimal model that balanced interpretability and diversity of the topics.

Additionally, Intertopic distance was visualized using pyLDAvis, which provides a two-dimensional map of topic clusters. The visualization was instrumental in refining the model parameters and ensuring minimal overlap between topics. The visualizations highlighted distinct clusters of themes, confirming the selected topics' reliability.

3.1.4. Sentiment analysis

The emotional tone of customer reviews was evaluated through sentiment analysis, which combines text mining, NLP, and computational language processing techniques to extract subjective information from textual data rather than objective facts (Batrinca and Treleaven, 2015). A lexicon-based approach was employed, using the AFINN sentiment dictionary, which was extended with logistics-specific terms in English, Swedish, and Danish. This approach ensured that the sentiment analysis accurately classified commonly used logistics-related expressions.

The sentiment score for each review was determined by summing the sentiment values of all words in the review and normalizing the score by review length to prevent bias towards longer texts. Reviews were classified as positive, negative, or neutral based on an aggregated sentiment score threshold. Positive sentiment was assigned to reviews with a score above the threshold, negative sentiment to those below, and neutral sentiment to those within the defined range. To enhance classification accuracy, additional domain-specific words were incorporated into the lexicon. Terms such as 'fast,' 'reliable,' and 'efficient' were assigned positive sentiment values (+2), while words like 'slow,' 'damaged,' and 'unreliable' were assigned negative sentiment values (−2). This refinement allowed for a more industry-relevant sentiment classification than a general-purpose dictionary. A lightweight lexicon method was retained because it is fully transparent, runs in less than two minutes on a CPU-only laptop, and can therefore be adopted by our industry partners, who operate without cloud-GPU access.

Sentiment analysis was conducted using rating and topic to understand variations in customer sentiment across distinct aspects of the customer experience. Sentiment by rating examined the distribution of sentiment scores across different star ratings (1–5) to assess how explicitly stated ratings aligned with the computed sentiment scores. Sentiment by topic linked sentiment values to the results of LDA topic modeling, allowing an analysis of how different service aspects, such as delivery speed and customer service, were perceived. Sentiment values were aggregated for each topic to determine whether specific themes were generally associated with positive, negative, or neutral sentiment.

While lexicon-based sentiment analysis offers efficiency and interpretability, it has limitations in capturing context, sarcasm, and sentiment intensity. Future research could explore Aspect-Based Sentiment Analysis (ABSA) to classify sentiment more granularly or incorporate machine learning models, such as Support Vector Machines (SVM) or Random Forests, to improve classification accuracy. Although deep learning models like BERT and RoBERTa provide promising alternatives, their implementation was beyond the computational scope of this study.

3.1.5. Data comparison

The dataset was segmented for comparative analysis across different dimensions, including delivery method, delivery location, and rating. The segmentation of the delivery methods includes home delivery, parcel shops, and parcel lockers, while segmentation is based on delivery location and identified regional variations. Moreover, reviews by ratings (1-star to 5-star) facilitated an exploration of the relationship between customer satisfaction levels.

A comparison of topics and keywords was conducted using Jaccard similarity to measure the degree of overlap and similarity between reviews based on common topics and keywords, identifying patterns and relationships among reviews, thereby enhancing the understanding of

customer preferences and perceptions. The analysis pinpointed areas that need refinement to better customer expectations.

3.2. Summary statistics

The summary statistics provide an overview of the dataset's characteristics, including rating distributions and user locations. The information includes the count of reviews, unique users, top mentions, and frequency. Company performance highlights the average rating for each company, along with descriptive statistics such as mean, standard deviation, minimum, maximum, and quartiles, to demonstrate variability in ratings across different companies.

3.2.1. Reviews characteristics

As illustrated in Tables 2 and 3, the dataset features 19,161 unique users. The predominant user identified as "kunde" appeared 287 times, referring to customers who mentioned themselves as customers instead of by name. Due to data privacy concerns, all names were replaced with "customer" to protect the individuals' data.

The first review was written on January 2, 2023, and the last on February 14, 2024, with an experience date from January 1, 2023, until December 31, 2023. The length of review texts reveals an average of 10.16 words per review. The titles of these reviews, on average, consist of approximately 3.66 words.

Regarding user locations, reviews predominantly originate from Denmark, with 13,933 reviews, 5360 from Sweden, and 1956 from Norway. Additionally, there are reviews from other regions, including the United Kingdom and Germany. It is noteworthy that while experiences are with Scandinavian companies, the diverse user locations suggest the possibility of international travel beyond the customer's homes after their delivery experiences. The overall sentiment towards the reviewed logistics companies is positive, and the ratings have a mean value of 4.40 and a standard deviation of 1.30. The ratings distribution is broad, ranging from 1 to 5, with a significant portion, 17,785 reviews rated as 5, signifying high customer satisfaction levels.

3.2.2. Comparison of company performance

Dao Denmark stands with the highest average rating of 4.80 from 2023. Competitors GLS Denmark and Instabox also received good average ratings of 4.56 and 4.66, respectively. Bring Denmark maintains a respectable average rating of 4.14, closely followed by Bring Sweden, with a rating of 4.05. In contrast, PostNord Sweden is the lowest-rated company, with an average rating of 2.44.

Table 2
Reviews characteristics.

Variable	count	unique	top	freq
Company	22,672			
User	22,667	19,161	kunde	287
Rating	22,672			
Rating counts	22,672			
1.0	2359			
2.0	590			
3.0	545			
4.0	1393			
5.0	17,785			
Review text	22,672	11,822	Fast delivery	35
Review title	22,672	14,263	Fast delivery	414
Review date	22,672	22,669	Tuesday, April 4, 2023, at 01:41:37 PM	2
Experience date	22,672	705	December 13, 2023	116
User location	22,672	2	DK	13,936
DK	13,933			13,933
SE	5360			5360
NO	1956			1956
GB	284			284
DE	140			140

Table 3
Comparison of company performance.

Descriptive statistics for all numeric columns grouped by "Company"									
Company	count	mean	std	min	25%	50%	75%	max	
Bring Denmark	4712	4.144	1.493	1.0	4.0	5.0	5.0	5.0	
Bring Sweden	5096	4.055	1.537	1.0	4.00	5.0	5.0	5.0	
Dao Denmark	4091	4.797	0.738	1.0	5.0	5.0	5.0	5.0	
GLS Denmark	5919	4.563	1.137	1.0	5.0	5.0	5.0	5.0	
Instabox	2663	4.655	0.994	1.0	5.0	5.0	5.0	5.0	
PostNord Sweden	198	2.444	1.859	1.0	1.0	1.0	5.0	5.0	
Count of ratings per company									
Ratings	1.0	2.0	3.0	4.0	5.0				
Bring Denmark	702	193	172	301	3344				
Bring Sweden	826	239	208	375	3446				
Dao Denmark	114	23	28	251	3674				
GLS Denmark	459	88	79	330	4960				
Instabox	141	37	56	132	2296				
PostNord Sweden	117	10	2	4	65				

4. Results and discussion

This study uses qualitative and quantitative methods to identify dominant themes, topics, and sentiments within online customer reviews. The analysis highlights the dynamics of customer satisfaction and service perception within the logistics sector, emphasizing customer expectations and experiences. The findings reflect the customers' subjective opinions and provide comparative insights into the operational strengths and weaknesses of the sector from the year 2023.

The most used words across the dataset were identified using keyword extraction with TF-IDF, as presented in Table 4 and illustrated in Fig. 3. When customers leave reviews on Trustpilot, their experience is expressed in the review title, text, or a combination of both. Therefore, the review titles and texts were merged into one column for further analysis. The TF-IDF mean score identifying the most significant terms in customer reviews relative to the others in the analysis is presented with the highest percentage in descending order and leads us to the first research question: What are the critical determinants of customer satisfaction in logistics services providers in Denmark and Sweden?

Notably, the attribute 'fast' has the highest TF-IDF score of 12.75%, indicating that it is the most uniquely significant term in customer reviews and a key area of customer satisfaction. Other significant terms include 'service', 'good', 'super', and 'god' (meaning 'good' in Danish), reflecting the consistent importance of good service, timely, easy, and informative deliveries throughout the analysis. The terms 'delivery' and 'package' and their variations were excluded from the analysis despite their high frequency across the dataset. This exclusion is because they provide minimal discriminative value. Consequently, they were added to the list of stop words in the code, given the context of online reviews of package delivery.

These findings align with Uvet (2020) and Restuputri et al. (2022), who identified delivery speed and service quality as critical determinants of customer satisfaction in logistics services, underscoring

the universal importance of timely deliveries. Contrary to the findings of Yoo et al. (2018), suggesting a higher acceptance of innovative delivery methods such as drones primarily based on environmental friendliness and speed, the themes revealed in this study are based on already existing delivery methods, more specifically home deliveries, parcel shops, and parcel lockers.

The most frequently mentioned words that are combined by two or three words, either in bi-grams or tri-grams, are illustrated in Fig. 4. The analysis highlights relationships between words rather than isolated terms by examining bi-grams and tri-grams. The bi- and tri-grams show similar findings as key service attributes in Table 4. Customers value fast, good, and informative deliveries when they order and receive packages, represented by 'fast', 'good', 'super', 'service', 'inform', and 'communication' often together in reviews.

Delivery service characteristics by ratings, presented in Appendix A, were identified using LDA and the most prevalent n-grams for each rating scale from 1 to 5 and answers research question 2, what are the main positive and negative topics highlighted by users who leave reviews in Denmark and Sweden? Lower ratings from 1 to 2 stars often mention bad service and CX, delayed or wrong deliveries, and distant pick-up points far from where the customers live. In contrast, topics associated with higher ratings, from 4 to 5 stars, reflect high satisfaction with good, great, and super service, including timely, fast delivery, and easy CX. The higher ratings indicate that customers value high service standards and fast deliveries. In comparison, the lower ratings show that customers appreciate a seamless, straightforward, and reliable experience when interacting with logistics service providers. In addition, the quality of the information provided throughout the customer journey plays a crucial role in achieving high satisfaction levels, where customers expect to be well-informed about their deliveries, evidenced by the terms 'inform' and 'good information'.

The most used words across different geographies and companies were identified with LDA, as presented in Appendix B and C. The topic

Table 4
TF-IDF analysis for key service attributes.

Term	fast	service	good	super	god (good)	time	easi*	hurtig (fast)	quick	great
TF-IDF Mean (%)	12.75%	11.69%	8.78%	7.78%	7.51%	6.49%	5.63%	5.28%	5.25%	3.38%
Std Dv (%)	8.39%	6.68%	6.78%	6.67%	6.00%	6.10%	5.70%	5.52%	5.66%	4.57%
Term	pick	inform	home	god servic* (good service)	fin	day	good servic*	order	arriv*	receiv*
TF-IDF Mean (%)	3.25%	3.19%	3.19%	2.88%	2.74%	2.35%	2.29%	2.04%	1.77%	1.75%
Std Dv (%)	4.17%	4.08%	4.40%	3.80%	4.38%	3.58%	3.43%	3.39%	3.23%	3.16%

* This is correct. The words were stemmed.

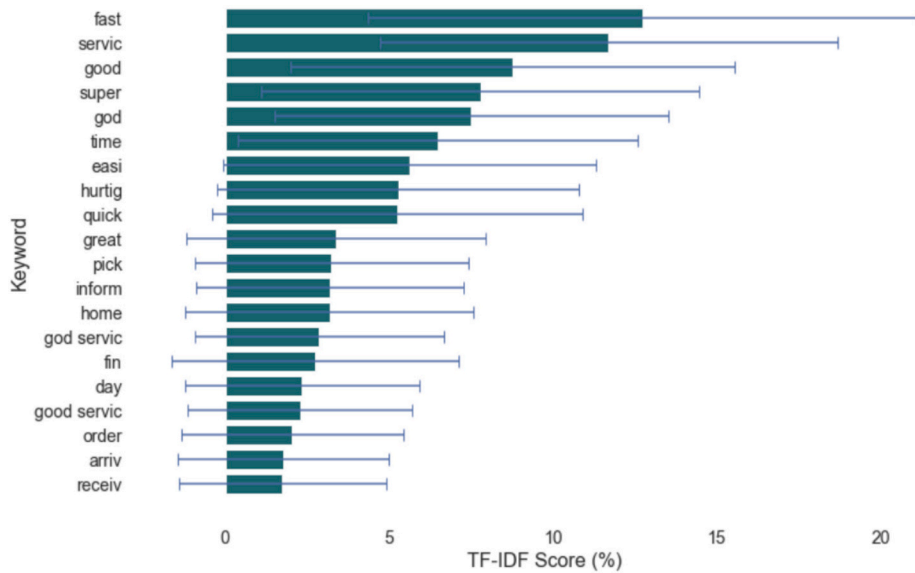


Fig. 3. TF-IDF analysis for key service attributes.

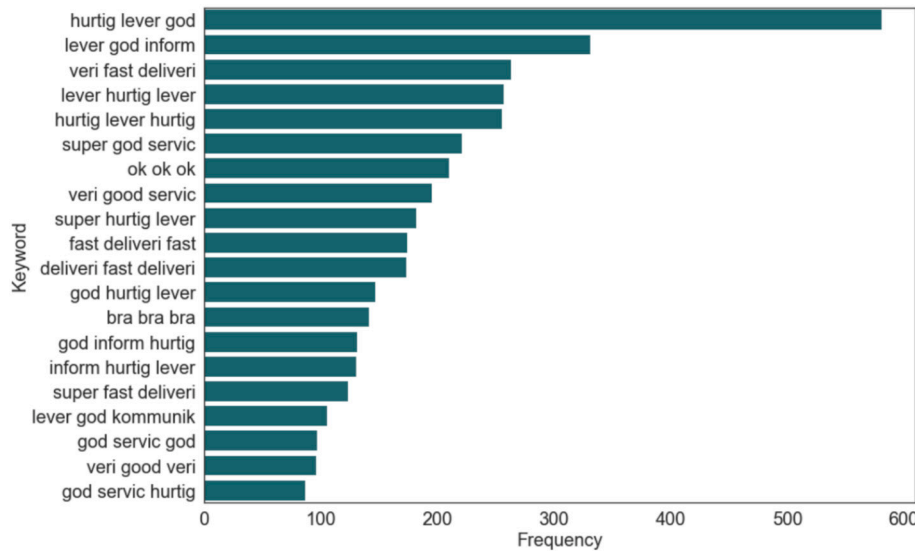


Fig. 4. Top tri-grams from review titles and texts merged.

dimensions across regions and companies are similar, with keywords not differing significantly. However, as seen in Appendix C, PostNord stands out with more specific keywords related to contacting customer service and errors related to delivery.

The most used bi-grams and tri-grams in TF-IDF throughout the year were segmented by quarters to reveal trends over time and by ratings to show how perceptions vary across different satisfaction levels. To capture a broad spectrum of influential terms, the maximum features were set to 20, and the ratings were divided into two rating levels: high and low. The higher ratings reflect positive customer feedback, and the terms in these are consistent indicators of positive experiences, reflecting operational strengths for the logistics firms. Conversely, lower ratings reflect negative experiences or challenges customers face. These experiences negatively impact customer perceptions, so analyzing them for improved ratings is essential and gives insights into research question 3: how can analyzing these similarities and differences contribute to data-driven strategic decisions, such as informing marketing strategies, enhancing customer engagement approaches, or optimizing service offerings? Several terms in the lower ratings for Bring Denmark are

notably consistent throughout the year, mentioning distant and inconvenient pickup points, poor customer service, and delivery delays. In Q1, specific dissatisfaction with delivery times and locations appeared. In Q2, there were complaints about the inconvenience of inaccessible or closed pickup points. Q3 saw issues with returned packages and collection points; in Q4, there were more frustrations with payment issues.

In the lower ratings for Bring Sweden, distant and inconvenient pickup points, poor customer service, and delivery delays were consistent throughout the year, like Bring Denmark. In Q1, specific dissatisfaction with distant pickup points and service appeared. In Q2, complaints about inaccessible or closed pickup points and slow service were noted. Q3 saw issues with returned packages and location problems, and in Q4, there were more frustrations related to payment issues and pickup points. Common complaints throughout the year for Dao Denmark include poor customer service, incorrect addresses, and packaging issues. In Q1, there were notable mentions of plastic bag usage and delivery to the wrong locations. In Q2, problems with poor service and long delivery times were prominent, and in Q3, complaints

about primitive tracking and communication issues. Lastly, in Q4, there were frustrations with incorrect addresses and damaged goods. Recurring terms in the lower ratings for GLS Denmark include home delivery issues, poor customer service, and the necessity to pick up packages from distant locations. In Q1, there were specific mentions of poor customer service and delivery to incorrect addresses, and in Q2, there were complaints about home delivery failures and extra charges. Q3 highlighted issues with damaged packages and poor service, and in Q4, there were more complaints about home delivery failures and customer service issues. For Instabox, poor customer service and delivery delays were consistent. In Q1, specific issues included long delivery times and difficulties with locker access. Q2 saw complaints about late deliveries and incorrect items sent. In Q3, there were notable mentions of poor customer service and delivery delays. Q4 highlighted problems with late deliveries and inaccessible lockers. PostNord Sweden had complaints with lower ratings of poor customer service, delays, and issues with post office accessibility. In Q1, there were specific mentions of poor service and inaccessible post offices. Q2 saw complaints about poor service and unresponsive customer support. Q3 highlighted problems with access to delivery buildings and poor service. In Q4, complaints were about poor service, inaccessible post offices, and delays.

The most frequently mentioned negative adjectives were identified and categorized for Bring Denmark and Bring Sweden. Fig. 5 presents the frequency of negative sentiments expressed by customers.

A significant observation is that many negative reviews are related to incorrect deliveries or packages. The negative reviews lead to frustration. For example, one review of Bring Denmark related to the term ‘poor’ expressed that “My parcel was delivered to pick up kiosk far away from my address. The *strangest* part was that I was home all day, when they claimed they tried to deliver home. Very *poor* experience”. Another review mentioning wrong deliveries explained, “For the third time in one month I got my package to the wrong pickup place, but the delivery was acceptable.” Additionally, the terms ‘broken’, and ‘miss’ suggest that damaged goods and missed deliveries are also notable sources of dissatisfaction. The terms ‘poor’, ‘hard’, and ‘useless’ indicate that customers perceive the quality of service to be difficult or unhelpful. Experiences causing frustration highlight areas where the logistics companies need to improve. Companies must meet their customers' expectations so that customers will again choose the company to deliver their packages to their preferred delivery point.

Sentiment analysis revealed insights into customer satisfaction and

dissatisfaction regarding the logistics services provided in the Nordic market. The customer reviews were divided after their emotional tone, as presented in Table 5, and illustrated in Fig. 6. The review classified as positive indicates satisfactory or excellent CX, neutral suggests experiences that did not sway towards either satisfaction or dissatisfaction, and negative reflects dissatisfaction with the services provided. The Net Sentiment Score stands at 26.39%. The sentiment analysis revealed different results when the review titles and texts merged. The updated Net Sentiment Score for the merged reviews is 57.86%, an even more favorable perception of the logistics delivery companies by the customers in the dataset.

The sentiment distribution was analyzed by individual countries, companies, and competitors, as seen in Table 6. Reviews from Denmark showed slightly better net sentiment scores than those in Sweden, as shown in section A. In addition, it was found that Danish and Swedish had a Jaccard similarity of 0.47, meaning a 47% overlap in the words used in reviews from both countries. In sentiment by company in section B, Dao Denmark had the best net sentiment score of 67.64%, closely followed by GLS Denmark with 65.43%. PostNord Sweden, however, demonstrated a concerning trend with a net sentiment score of -14.65%, suggesting polarized CX due to more negative and neutral reviews than positive ones. By comparing Bring with the competitors in section C, Bring showed lower net sentiment scores of 50.12% compared to competitors' 63.81%.

Sentiment by delivery method, presented in Figs. 7 and 8, revealed that all delivery methods in Denmark have more positive sentiments than in Sweden. Specifically, for Bring Sweden and Bring Denmark,

Table 5
Overall sentiment distribution.

Category	Negative	Neutral	Positive	Net Sentiment Score	Total reviews
Overall sentiment distribution review texts	1552	13,585	7535	26.39%	22,672
Overall sentiment distribution review texts and review titles merged	1933	5688	15,051	57.86%	22,672

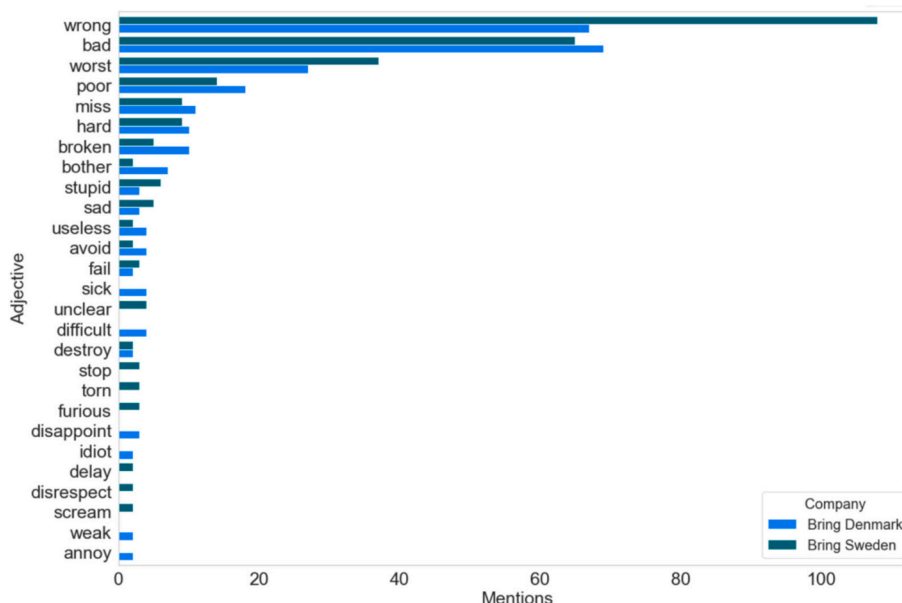


Fig. 5. Top negative adjectives Bring.

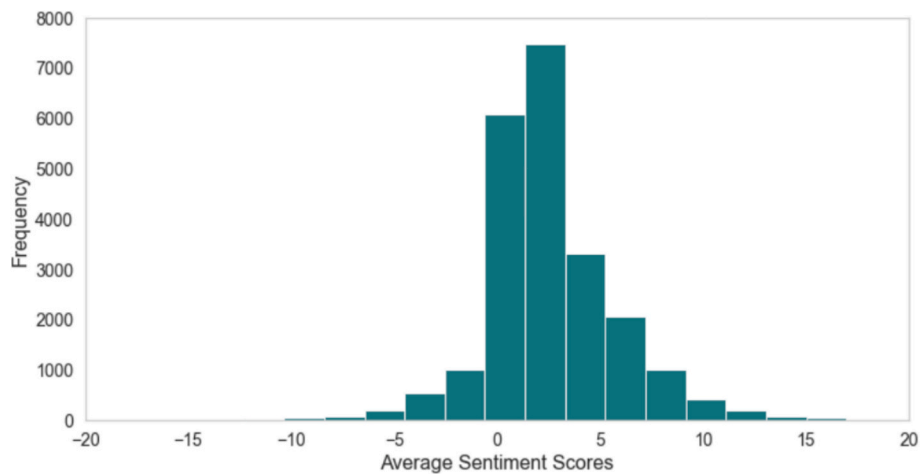


Fig. 6. Distribution of overall sentiment scores.

Table 6
Sentiment by company, country, and competitors.

Category	Negative	Neutral	Positive	Net Sentiment Score	Total reviews
(A) Sentiment by Country					
Denmark	1156	4389	11,835	61.60%	17,380
Sweden	777	1299	3216	46.08%	5292
(B) Sentiment by Company					
Bring	528	1210	2974	51.90%	4712
Denmark					
Bring Sweden	678	1270	3146	48.51%	5094
Dao Denmark	127	1063	2900	67.64%	4090
GLS Denmark	359	1319	4238	65.43%	5916
Instabox	142	797	1723	59.48%	2662
PostNord	99	29	70	-14.65%	198
Sweden					
(C) Sentiment Bring versus Competitors					
Bring	1206	2480	6120	50.12%	9806
Competitors	727	3207	8931	63.81%	12,866

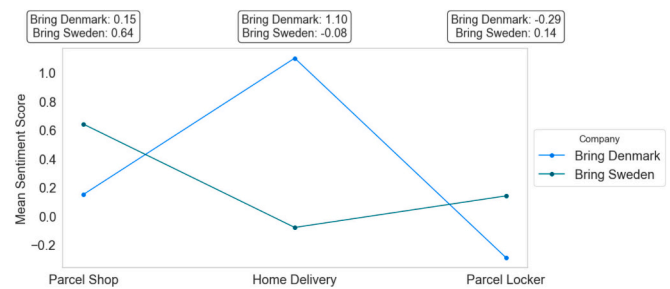


Fig. 8. Sentiment by delivery method: Bring Denmark and Sweden.

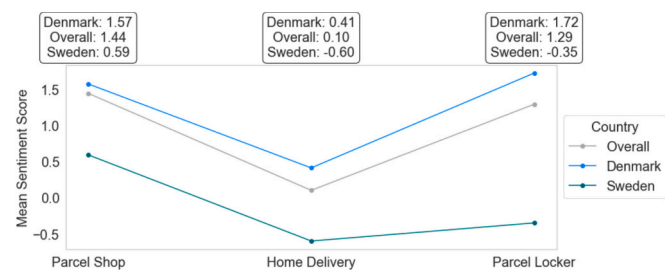


Fig. 7. Sentiment by delivery method and country.

improvements are needed in in-home deliveries and parcel lockers.

The main topics discussed by customers in the reviews were uncovered through LDA topic modeling, illustrated in Fig. 9. The analysis revealed seven topics that achieved the highest coherence score of 0.58, providing the best representation of the data. Out of all the reviews of the different logistics companies, these topics reveal what was most expressed by the customers in 2023. Customers frequently discuss the order process, including the need for clarity, communication, and punctuality of deliveries, presented in topic 1. This topic has a balanced sentiment distribution with 34.11% negative, 32.35% neutral, and 33.54% positive reviews.

When customers express positive experiences with the logistics companies, it is often based on their experience of high-quality service, informative and fast deliveries. ‘Service’ is the most representative term (0.263) in topic 2 and other positively loaded words. This topic shows a predominantly positive sentiment, with 71.77% of the reviews being positive, only 2.03% negative, and 26.20% neutral. The main finding from this topic is that high-quality service significantly contributes to positive customer experiences. Sometimes, customers express their need to call the logistics companies when issues arise during delivery. This can lead to mixed customer experiences, as in topic 3, which has 33.04% negative, 23.05% neutral, and 43.91% positive sentiments.

Customers value simple pickup processes, highlighted in topic 4, with a sentiment distribution of 17.26% negative, 60.41% neutral, and 22.33% positive. The high percentage of neutral reviews suggests that while easy pickup processes are satisfactory, they might not strongly impact overall customer sentiment or might be seen as self-evident to customers.

Fast and convenient package deliveries are emphasized in topic 5, with 3.39% negative, 47.77% neutral, and 48.84% positive reviews. In addition, customers appreciate safe and secure deliveries. A study by Wang et al. (2023a, 2023b) reveals that brand perception is affected when the subjective risk related to an online purchase is high. If the trust in the deliveries is strengthened, the attitude towards the delivery companies is positively affected. Timeliness, good, and quick delivery experiences are presented in topic 6. This topic shows 8.03% negative, 36.57% neutral, and 55.40% positive sentiments. However, the presence of the terms ‘problem’ and ‘damage’ suggests areas for improvement in service performance to reduce negative experiences. Parcel lockers are often discussed along with the term ‘best’ (0.026), as seen in topic 7, and gives insights into research question 4: are customer perceptions and topics identified in reviews related to key aspects of logistics services, such as delivery speed, delivery method (e.g., parcel shop, home

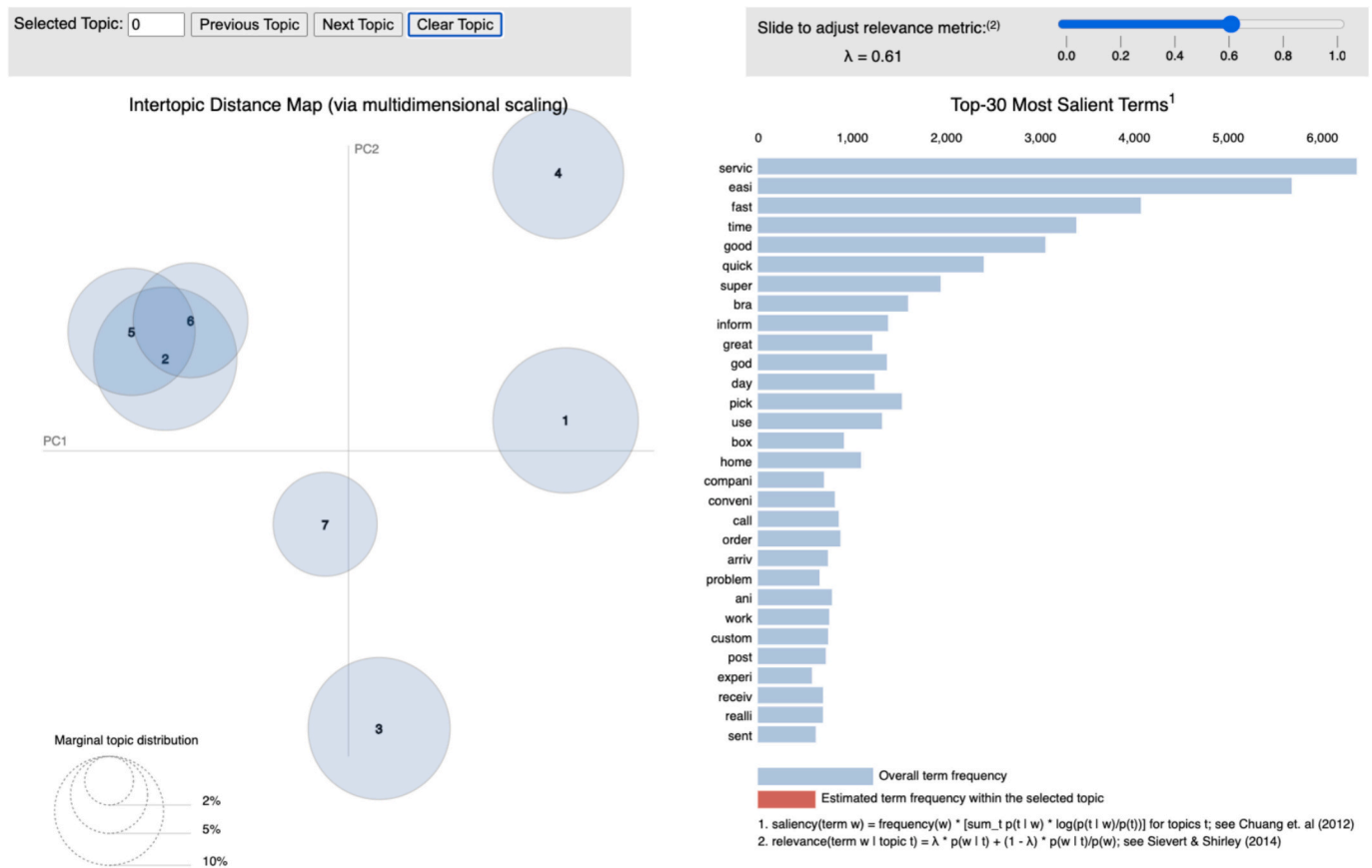


Fig. 9. Overall intertopic distance map.

delivery, parcel locker), customer service, or pricing? This topic has a sentiment distribution of 26.72% negative, 25.19% neutral, and 48.09% positive. Although there are concerns related to returns and lost packages, the significant proportion of positive reviews indicates customer satisfaction with parcel lockers.

The Intertopic distance map suggests that topics 2, 5, and 6 are interrelated. Topic 2 emphasizes high-quality service, closely related to topic 5, which focuses on fast and convenient package deliveries, and topic 6, which focuses on timeliness and quick delivery experiences. These topics collectively underline the importance of efficiency, reliability, and service quality for customers in Denmark and Sweden. Areas for improvement are addressing delivery issues and enhancing customer service interactions.

The main topics discussed in the reviews for Bring Denmark are presented in Fig. 10. Six topics achieved the highest coherence score of 0.52. Deliveries are often described as great by customers of Bring Denmark, with ‘great’ as the most prominent term in topic 1. Along with largely positive feedback, with a sentiment distribution of 55.32% positive reviews, occasional delivery issues are also expressed, reflected by 12.39% negative and 32.29% neutral sentiments. Mentions of home deliveries during the day are frequently mentioned in topic 2, with terms indicating customers’ absence during the delivery time. The sentiment for this topic is 13.09% negative, 33.13% neutral, and 53.78% positive, reflecting some challenges with home delivery but generally positive feedback.

Topic 3 highlights fast and easy services, showing 11.06% negative, 32.66% neutral, and 56.27% positive sentiments. This topic emphasizes the efficiency and reliability of Bring Denmark’s services, even when problems occur. Topic 4, with a sentiment distribution of 14.10% negative, 31.54% neutral, and 54.36% positive, shows that customers appreciate timely and good deliveries, although there are mentions of damaged packages. This indicates an area for potential improvement in

handling packages.

Occasional issues with broken packages are also mentioned in topic 5. With that said, quick, smooth, and efficient services are the focus of this topic, with 14.03% negative, 32.13% neutral, and 53.85% positive sentiments. Topic 6 highlights good information and fast deliveries through the term ‘god’ (meaning ‘good’) along with ‘inform’ and ‘hurtig’ (meaning ‘quick’), with a sentiment distribution of 13.04% negative, 30.00% neutral, and 56.96% positive. The term ‘ekspedit’ (meaning ‘expedited’) indicates that this topic concerns packages from parcel shops, showing similar alignments as Uvet (2020), highlighting staff professionalism.

The Intertopic distance map suggests that topics 1 and 2 are interrelated, as well as topics 5 and 6. Topic 1 emphasizes great deliveries, which is closely related to topic 2, focusing on home deliveries. Topics 5 and 6 focus on quick, smooth, efficient services, good information, and fast delivery to parcel shops. These topics collectively underline the importance of high-quality service, fast and easy deliveries, reliability, and good communication for customers of Bring Denmark. Areas for improvement include addressing issues with delivery timing and investigating the reasons behind the many damaged packages, reducing instances of these to enhance the overall CX.

For Bring Sweden, thirteen topics were chosen with the best coherence score of 0.48, presented in Fig. 11. Customers of Bring Sweden discuss the logistics of receiving orders at home or the delivery point nearest their home. They mention that collecting packages at the delivery points can be far away, highlighted by the term ‘km’, as seen in topic 1. This topic has a sentiment distribution of 30.24% negative, 35.14% neutral, and 34.63% positive, indicating a mix of experiences regarding the convenience of delivery points. Topic 2 shows that customers discuss interactions with the delivery company and use parcel lockers as a delivery method they like and find simple. However, there is mixed feedback on this delivery method, with the topic having 43.28%

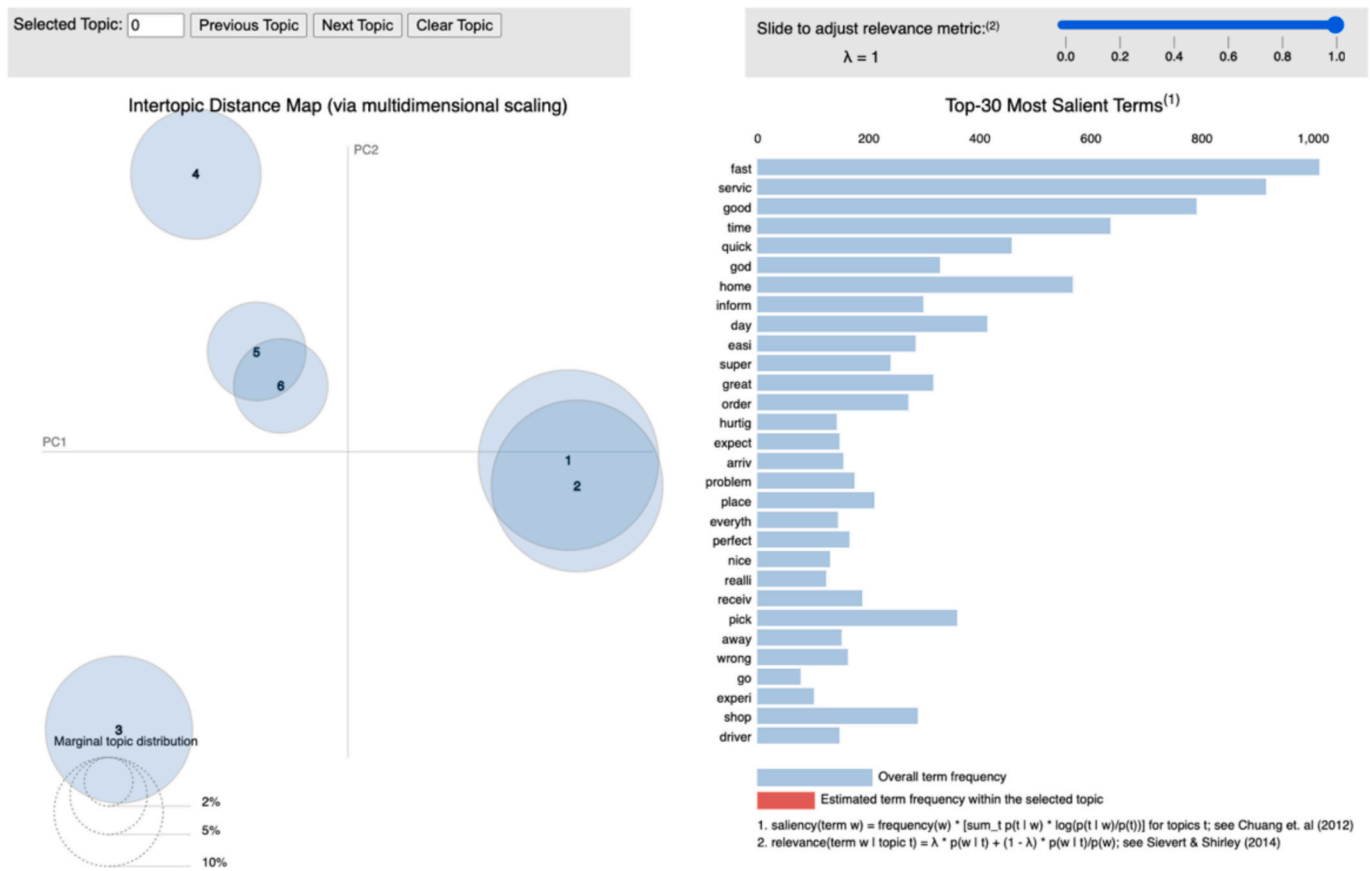


Fig. 10. Intertopic distance map Bring Denmark.

negative, 32.39% neutral, and 33.33% positive sentiments.

Customers value fast, smooth, nice, and great service, presented in topic 3. They also mention the occurrences of damaged packages delivered with holes. With a sentiment distribution of 3.69% negative, 46.89% neutral, and 49.42% positive, a generally positive perception of service speed and quality is presented despite some issues with package conditions. The issue with broken packages is a significant customer concern, also highlighted in topic 4. The sentiment distribution consisting of 46.64% negative, 24.81% neutral, and 32.56% positive, with ‘problem’ as the most prominent term followed by ‘broken’ suggests that a notable portion of customers experience problems with damaged deliveries.

Topic 5 presents customers discuss challenges with pickup locations and delivery accuracy, with a sentiment distribution of 38.42% negative, 38.71 neutral, and 22.87% positive. Timely deliveries are presented in topic 6, including customers using Bring Sweden for the first time who had a good experience, as seen through 5.43% negative, 41.67% neutral, and 52.90% positive reviews. Codes related to the pickup of packages and choices available to customers are shown in topic 7, with 7.81% negative, 71.88% neutral, and 20.31% positive sentiments. Topic 8 emphasizes that fast deliveries meet customer expectations, with 3.33% negative, 67.92% neutral, and 28.76% positive sentiments. This topic suggests that while fast deliveries are appreciated, there is still a significant proportion of neutral feedback. Customers expect what is promised regarding delivery price and quality, presented in topic 9, with a sentiment distribution of 1.61% negative, 10.08% neutral, and 88.31% positive. High satisfaction and gratitude are expressed when customer expectations are met. The reviews often express clear information and updates communicated to the customers, as shown in topic 10. This topic has 1.51% negative, 62.12% neutral, and 36.36% positive sentiments, highlighting the importance of clear communication and information.

Deliveries that work well and are reliable are highlighted in topic 11, along with the term ‘bankid’, a secure method for signing a delivered package online provided by Swedish banks. The term ‘work’ is used for either the delivery method that works or the Bring application on their phones works. This topic has a mixed but generally positive perception of reliability, with 19.44% negative, 44.44% neutral, and 36.11% positive sentiments.

Topic 12 shows that customers appreciate tracking systems that are easy to use. ‘Hemk’ could refer to packages delivered to parcel shops, specifically in the Swedish supermarket Hemköp. The sentiment distribution of the topic consists of 7.94% negative, 25.40% neutral, and 66.67% positive. Lastly, topic 13 shows customers who value their delivery experience as perfect, fine, and fantastic. ‘Fetch’ could refer to experiences where a friend or another person receives their package for them. This topic reflects high satisfaction, with 6.38% negative, 8.51% neutral, and 85.11% positive sentiments.

The Intertopic distance map revealed that topics 1 and 5 are closely related, focusing on the logistics of receiving orders at home or delivery points far away and challenges with pickup locations and delivery accuracy, respectively. Topic 3 stands apart, highlighting fast, smooth, and high-quality service. The map suggests that the remaining topics 2, 4, 6, 7, 8, 9, 10, 11, 12 and 13 are interrelated.

Overall, customers of Bring Sweden value reliable and timely deliveries, clear communication, and easy-to-use tracking systems. Areas of improvement include issues with damaged packages and improving the convenience of pickup locations to enhance customer satisfaction.

5. Conclusions and future research

Factors influencing brand perception within the logistics industry are analyzed, and customers’ top priorities and expectations in Denmark and Sweden when they order packages are identified and compared. The

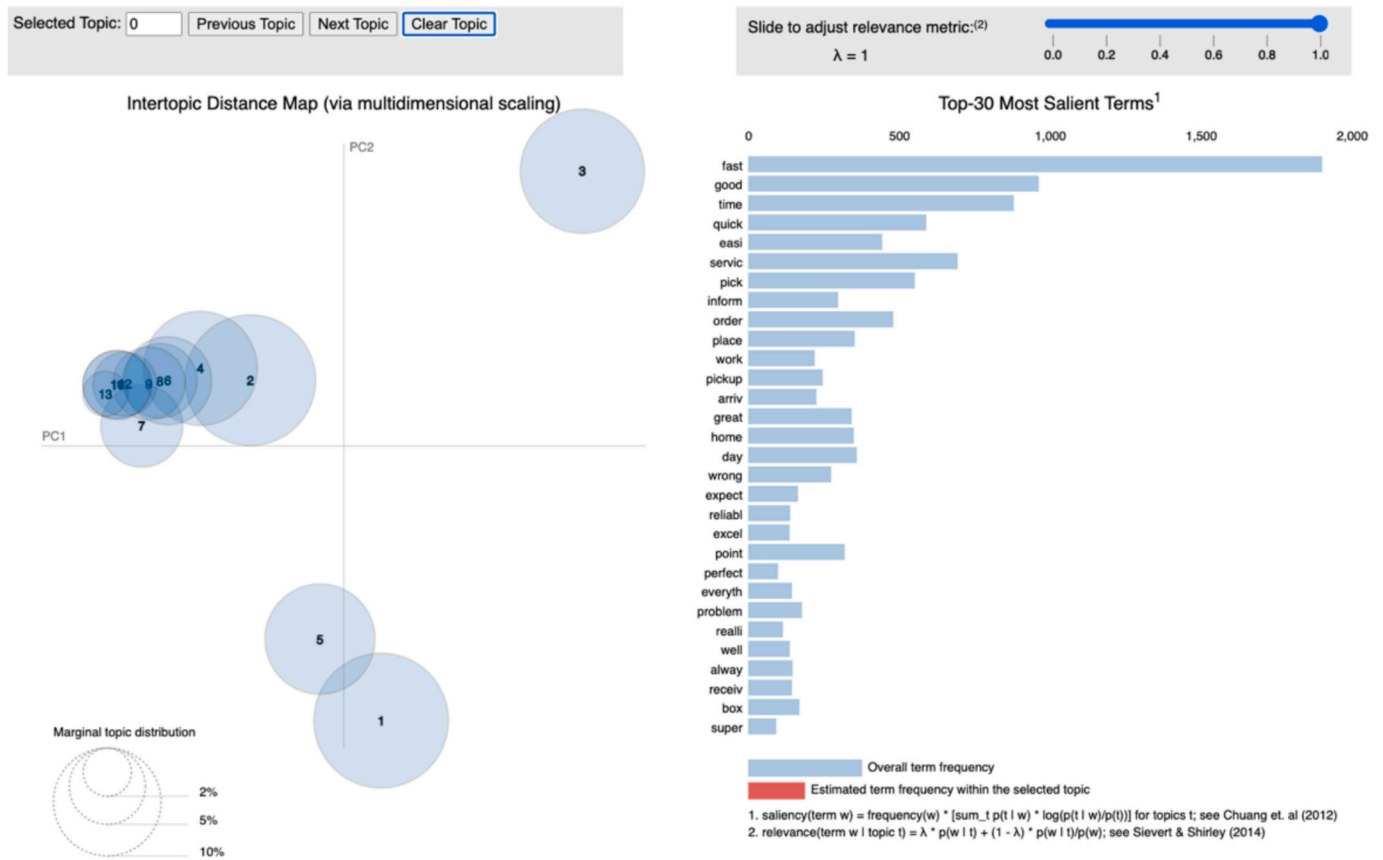


Fig. 11. Intertopic distance map Bring Sweden.

research investigates the customers' experience throughout the delivery process until their package is received through UGC. Specific attributes most valued by customers in these two regions are uncovered, and the main positive and negative themes highlighted by the users are identified. The research explores the relationship between online customer reviews, geographical locations, and the pickup methods used by these countries' different logistics service providers. Ultimately, the study provides data-driven insights for logistics companies, especially in the Nordic logistics market.

Through TF-IDF and LDA topic modeling, it was revealed that timely and fast service is of utmost importance. Quality of service, including good customer service and effective communication, significantly influences positive perceptions. Easy and reliable pickup processes are crucial. These critical determinants of customer satisfaction emerged from the analysis, resonating highly with happy customers.

The main themes and sentiment analysis clearly illustrate customer satisfaction and dissatisfaction levels. Customers frequently mention fast delivery times and good service quality as positive experiences with the logistics companies. Clear information throughout the delivery process is highly satisfactory, reinforcing the importance of good communication in all parts of the CX. Negative mentions were expressed related to issues with delayed deliveries, broken or harmed packages, and incorrect or distant locations. Customer service caused frustration, including long waiting times and ineffective responses.

These findings highlight key areas for improvement. Companies can invest in route optimization technologies and real-time tracking updates to reduce delivery delays to keep customers informed. Improving customer service response times through automated chat support and shorter waiting periods can address frustrations related to poor service interactions. In addition, expanding pickup locations in Denmark and Sweden to reduce customer travel distances can mitigate dissatisfaction with inconvenient collection points. Lastly, companies can minimize

complaints about damaged packages by enhancing packaging guidelines and handling procedures throughout delivery.

Reviews from Denmark show better net sentiment scores compared to Sweden, and among companies, Dao and GLS Denmark had the highest net sentiment scores, while PostNord Sweden showed a concerning negative trend. Bring had lower net sentiment scores than its competitors in 2023, and there is room for improvements in customer satisfaction and, thereafter, better ratings. It was found that the reviews that mentions home deliveries in Sweden and parcel lockers in Denmark had lower sentiment scores.

5.1. Theoretical contributions

The study contributes to and advances the analysis of online customer reviews in the package delivery sector by integrating sentiment analysis and topic modeling to understand brand perception. The results offer significant insights into what customers of the leading logistics companies in Denmark and Sweden express in their online reviews, their expectation, preferences, and frustrations, paving the way for a data-driven approach to analyzing and presenting brand perception. The study reveals key themes and sentiments in eWOM through public data. It also offers comprehensive competitor analysis highlighting similarities and differences across companies and geographical locations. The research enriches existing literature with information and details on how customers express their experiences and satisfaction levels regarding ordering and receiving packages.

A key contribution is the enhancement of the AFINN sentiment dictionary with logistics-specific terms and language-specific words. While general sentiment analysis methods often fail to capture industry nuances, they lack specificity for the logistics industry. Therefore, this study developed a specialized sentiment analysis approach by merging the AFINN dictionary based on literature with additional terms specific

to logistics. The following terms were added with their corresponding sentiment scores: 'fast', 'quick', 'reliable', 'efficient', 'snabb', 'pålitlig', 'hurtig', 'pålitelig', 'god', 'bra', 'effektiv' (all with a score of 2), and 'slow', 'delayed', 'unreliable', 'inefficient', 'långsam', 'opålitlig', 'langsom', 'upålitelig', 'ineffektiv' (all with a score of -2).

Methodologically, this research demonstrates the value of combining lexicon-based sentiment analysis with topic modeling for logistics studies. However, it is acknowledged that lexicon-based methods do not fully capture contextual nuances. Future research should explore the application of deep learning-based sentiment analysis techniques such as transformers (BERT, RoBERTa) or aspect-based sentiment analysis (ABSA) to refine sentiment classification. These approaches could allow for a more detailed understanding of customer sentiment by analyzing emotions tied to specific logistics service attributes rather than treating reviews holistically. Implementing these models would enhance the ability to distinguish between sentiment variations across logistics service dimensions and improve contextual sentiment interpretation beyond keyword occurrences.

This new enhancement improves the accuracy of sentiment analysis of package delivery services, where terms specific to logistics are assigned appropriate sentiment scores. This tailored approach represents a novel advancement and provides a deeper understanding of customer satisfaction and dissatisfaction, serving as a valuable source for future research within logistics fields. This research offers a foundation for future studies to explore advanced NLP models (e.g., BERT, RoBERTa) for sentiment classification or extend the analysis to other markets. By refining sentiment analysis tools for logistics, this study contributes to brand perception and eWOM research in service industries.

To facilitate transfer to other service industries we outline a three-step protocol: (1) extract the domain's core service attributes via TF-IDF or expert input; (2) augment the base sentiment lexicon with attribute-specific synonyms and language variants; (3) run the sentiment–topic pipeline unchanged, interpreting attribute weights considering industry benchmarks. For example, this lightweight recipe can be executed in food delivery or ride-hailing contexts where review data are abundant.

5.2. Managerial implications

Several implications for the Nordic logistics industry are presented in the study. Understanding customer expectations is crucial, and reliable and timely deliveries cannot be highlighted enough. Optimizing delivery processes to ensure that packages arrive on time and as expected should be a top priority for managers in logistics companies, as this significantly influences customer satisfaction and brand perception. Effective communication in customer service is critical to ensure that customers receive timely and accurate information about their deliveries when they need help or information in the package delivery process. Focusing on customer service can enhance the customer's overall experience and trust in the company. Subsequently, minimizing the risks related to delivery maximizes the likelihood of customers choosing the logistics company to deliver their package the next time they are at the checkout of a website about to order a package to their preferred delivery location and method. Additionally, implementing robust tracking systems and responsive customer service can reduce customer frustrations that might arise.

The study highlights the need for convenient and efficient pickup methods. Logistics providers should consider the strategic placement of parcel lockers and ensure they are accessible and easy to use. Addressing concerns such as the placement of upper hatches can improve the use of these services for all customers, including people with disabilities or those who cannot reach the packages placed in the upper hatches.

5.3. Limitations of the study and future research

The dataset is limited to online reviews from Bring Sweden, Bring Denmark, and two of their biggest competitors in each country, analyzing data from January to December 2023. Future studies might consider expanding the dataset by analyzing more logistics companies and reviews from additional countries for a more representative analysis, as this narrow scope only captures some experiences and perspectives.

Another limitation is the lack of detailed geographical information about customers' locations from the Trustpilot data. While the web scraper could capture the reviewer's country, more specific location data, such as city or postal codes, was unavailable. This limitation hinders granular geographical analysis and understanding of regional differences in customer experiences and satisfaction levels. Future researchers should consider capturing detailed geographical information directly from the companies' Trustpilot pages or collaborating with the companies to access this data.

While robust, this study's sentiment analysis and topic modeling techniques have limitations. Although existing literature presents sentiments that capture the true tone and underlying emotion (Al-Natour and Turetken, 2020), the sentiment analysis may not capture the full nuance of customer sentiments, especially in cases of irony, sarcasm, or complex linguistic structures, since the analysis relies on a dictionary-based approach. Future researchers should explore the use of machine learning models and more advanced NLP techniques trained specifically on logistics-related data to enhance sentiment detection accuracy. Transformer-based sentiment models (e.g., mBERT) may yield marginally higher accuracy, but at the cost of interpretability and hardware requirements that exceed those available to most logistics' practitioners; future work can revisit this trade-off as low-carbon, on-premise solutions mature.

In addition, while language detection and processing techniques were used, there may still be instances where the sentiment must fully capture language nuances and mixed use of multiple languages in reviews. More comprehensive models and language-specific sentiments are suggested for future research.

Customer expectations and perceptions evolve, and the findings based on historical data from 2023 may have changed after that. Continuous monitoring and analysis of online reviews in the logistics industry are necessary for understanding changing trends and preferences. While Khder (2021) presents web scraping that can gather information in real-time, future researchers might advance the HTML to enable logistics companies to use automated longitudinal approaches. This approach would advance customer feedback analysis, track short- and long-term trends, and facilitate service improvements, marketing strategies, and operational changes impacting customer satisfaction and brand perception.

CRedit authorship contribution statement

Gabriella Holm: Writing – review & editing, Visualization, Software, Methodology, Data curation, Writing – original draft, Validation, Resources, Formal analysis. **Nuno Antonio:** Writing – original draft, Supervision, Investigation, Writing – review & editing, Validation, Methodology, Conceptualization. **Paulo Rita:** Writing – review & editing, Validation, Methodology, Conceptualization, Writing – original draft, Supervision, Funding acquisition.

Funding

This work was supported by national funds through FCT (Fundação para a Ciência e a Tecnologia), under the project - UID/04152/2025 - Centro de Investigação em Gestão de Informação (MagIC)/NOVA IMS - <https://doi.org/10.54499/UID/04152/2025> (2025-01-01/2028-12-31) and UID/PRR/04152/2025 <https://doi.org/10.54499/UID/PRR/0>

4152/2025 (2025-01-01/2026-06-30).

interests or personal relationships that could have appeared to influence the work reported in this paper.

Declaration of competing interest

The authors declare that they have no known competing financial

Appendix A. Delivery service characteristics by ratings

Rating scale	Delivery service characteristics associated with customer rating
1.0	Custom service, pick point, far away, home day, pickup point, paid home, home address, first time, bad service, km away
2.0	Far away, pickup point, pick point, paid home, collect point, km away, pick place, wrong pick, go pick, custom service
3.0	Pick point, pickup point, far away, too far, pick place, open hour, pickup location, home address, pickup place, too far away
4.0	God service (good service), good service, god inform (good information), good good, hurtig god (fast good), super god (super good), fast fast, fin service (nice /good service), bra service (good service), quick easy
5.0	God service (good service), good service, god inform (good information), hurtig god (fast good), super service, super god (super good), fast easy, great service, fast fast, quick easy

Appendix B. LDA topic dimensions across regions

Region	Keywords
Denmark	service, god (good), fast, super, hurtig (quick), good, time, god-service (good service), home, inform
Sweden	Fast, service, good, time, bra (good), quick, pick, home, easy, great
Overall	service, fast, time, good, home, pick, god (good), easy, day, hurtig (fast)

Appendix C. LDA topic dimensions by companies

Company	Single-word keywords	Bi-gram and tri-grams keywords
Bring	Service, fast, good, time, god (good), home, super, pick, quick, day	Good service, god service (good service), god inform (good information), hurtig god (fast good), fast fast, great service, super service, fast good, pick point, custom service
Bring Sweden	Fast, good, service, time, quick, pick, home, easy, point, bra (good)	Good service, bra bra, fast fast, bra service, pick point, great service, fast easi, good good, bra bra bra, custom service
Dao Denmark	God (good), super, service, hurtig (fast), fin (good), inform, good, alt (everything), time	God service (good service), hurtig god, god inform (good information), super god (super good), super service, super hurtig (super fast), hurtig god inform (fast good information), hurtig hurtig (fast fast), intet klage (no complaints), super god service (super good service)
GLS Denmark	Service, fast, god (good), good, super, hurtig (fast), time, home, quick, inform	God service (good service), good service, god inform (good information), hurtig god (fast good), great service, super service, super god (super good), fast fast, super fast, hurtig god inform (fast good information)
Instabox	Easy, fast, service, good, quick, time, use, pick, bra (good), great	Fast easy, easy use, quick easy, easy pick, easy fast, easy, quick, easy easy, bra bra (good good), good service, bra service (good service)
PostNord Sweden	Service, time, home, call, company, custom, day, wait, receive, sent	Customer service, bra service (good service), phone number, post nord, don't know, text message, port code, good service, worst company, first time

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