Social Media Integration in Public Transportation: A Case Study of Sweden

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Abstract— **In the past twenty years, social media has completely transformed the way businesses interact with their customers. Social media's massive reach and resources have opened new and exciting possibilities for companies to connect with their audience and build strong relationships. This research paper explains how social media is used for public transportation in Sweden. As digital platforms become increasingly important in modern society, transportation systems have sought new ways to engage with passengers and improve their services. Drawing on communication studies and transportation management theories, this study examines how Facebook can be used as a communication channel for public transportation in Sweden. The paper evaluates the strategies employed by the Swedish transportation authority to leverage Facebook to disseminate real-time information, foster community engagement, and address passenger concerns. It reviews existing literature, surveys 106 people in Sweden, and analyzes the most commonly used social media pages. The findings of this study offer insights and highlight opportunities and challenges associated with using social media platforms within public transportation. This research paper provides valuable information for transportation policymakers, practitioners, and researchers who want to improve the efficiency and accessibility of urban mobility systems.**

Keywords—Social Media, Public Transportation, Facebook, Sweden

I. INTRODUCTION

Social media refers to a collection of internet-based applications and websites that enable people to create, share, and exchange information, ideas, and interests. These platforms allow users to interact with each other by creating and sharing content such as text, images, videos, and audio files [1]. Some popular social media websites and applications include Facebook, Twitter, YouTube, and LinkedIn. These platforms have become essential to modern communication and have revolutionized online interactions. They provide a range of features, such as messaging, commenting, liking, sharing, and following, which allow users to connect with others who share their interests and ideas. Hence, the shared data on these platforms can help improve the information and knowledge of researchers and organizations to analyze the current situation and peoples' concerns and needs to enhance their goals and customer satisfaction [2]. For instance, transit agencies increasingly use networking tools to share transit information with their users. This information can range from public service announcements and timely updates to employee recognition and entertainment [3]. In this paper, we aim to address how social media is used by providers and users of public transportation in Sweden. To answer this question, we have divided this study into three phases. In the first phase, we conducted a literature review to gain insights into social media usage in research, focusing on understanding people's satisfaction and requirements in Sweden. In the second phase, we surveyed to understand how people in Sweden use social media for public transportation. Finally, in the third phase, we analyzed the most common social media platform used in Sweden based on the results of the second phase of this study.

II. THEORETICAL BACKGROUND

A. Usage of Social Media in Sweden

Social media is a communication technology, and its potential is to foster more significant interaction between citizens and municipalities. Therefore, municipalities should have adequate social media policies that enable them to leverage the full potential of this technology. In addition, social media usage in Sweden as a case study is noteworthy for three reasons. Firstly, the country has generally been an early adopter of social media. Secondly, Sweden has a well-organized national and municipal administrative system, pioneering new regulatory issues, including social media policy. Thirdly, Sweden's laws on freedom of access to official records are some of the most generous in the world. This means that everything produced by civil servants that is not classified is freely available to all citizens. However, this idea of public access creates specific and severe challenges when creating social media policies. Some argue that the democratic principles of Sweden's freedom of access to official records are turned upside down when applied to social media policies [4].

According to [4], municipalities' various Swedish social media policies were analyzed to understand better how the conflict between transparency and interaction is dealt with in practical guidelines (see Fig. 1). Consequently, four distinct foundational positions have been identified based on social media being viewed as a problem/possibility or homogeneous/heterogeneous. A clear trend is evident across all the materials analyzed in establishing command and control routines to define specific goals and practices for individual social media activities. Furthermore, social media activities are disciplined to remain within the intended framework, which explicitly prohibits adapting activities to meet the needs arising from interactions with citizens [4].
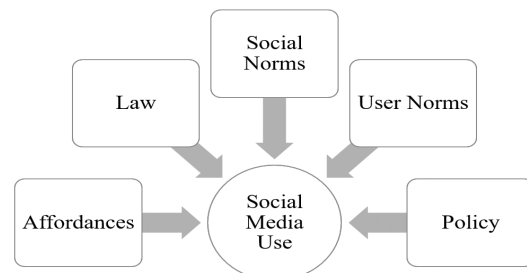

Fig. 1. Polycentric regulation: Elements regulation for social media use [4]

B. Social Media and Public Transportation

In recent years, there has been an increasing amount of literature on how public transportation agencies use social media to share information and engage with stakeholders [3], [5]-[16]. In addition, public participation has become increasingly important in traffic planning and policy-making, yet collecting and processing large-scale public opinions presents significant challenges due to project cycle limitations and costs. Hence, government departments must incorporate public feedback via social media to formulate informed policies effectively [5]-[16].

It means that social media gives transit agencies a unique opportunity to engage with their customers in personalized ways, making them appear more human than bureaucratic. Social media platforms like Facebook, Twitter, and YouTube enable transit agencies to provide real-time updates, share public information, engage with citizens, recognize employees, and entertain their audience [3],[5],[10], [11].

Several studies on social media and transit agencies in the United States and Canada found that many face challenges in adopting these tools, such as resource demands, employee usage policies, and concerns about handling online criticism and security threats [3], [6], [7]. For instance, [3] identified successful practices and challenges through surveys and case examples. Some key lessons learned include integrating social media with traditional communication methods, obtaining internal approvals, considering long-term resource costs, using an informal tone, listening to customer feedback, tailoring messages to each platform's strengths, and prioritizing user engagement. Despite gaps in knowledge, transit agencies recognize the value of social media and are developing policies to address issues like security and accessibility for all users.

In addition, [6] analyzed the Facebook and Twitter pages of 35 transit agencies in Canada and the United States. The study showed that social media is actively used for public information and engagement, with Facebook being more conducive to two-way dialogue and Twitter being used primarily for real-time service updates. However, the full potential of social media for stakeholder engagement remains underutilized due to organizational hesitancy and staff responsiveness limitations.

Social media is increasingly used by various organizations, including local government agencies like Regional Councils of Governments (RCOGs) in the state of Texas in the United States in transportation planning (Majumdar, 2017). However, there are limitations, such as a lack of guidance on best practices and the digital divide hindering effective public engagement. RCOGs without well-defined public relations departments tend to underutilize social media, while those utilizing it focus on information dissemination rather than two-way communication (refer to Fig. 2). Developing comprehensive social media policies and promoting computer literacy and internet access is essential for more robust planning processes and beneficial transport decisions for individuals and the economy [7].
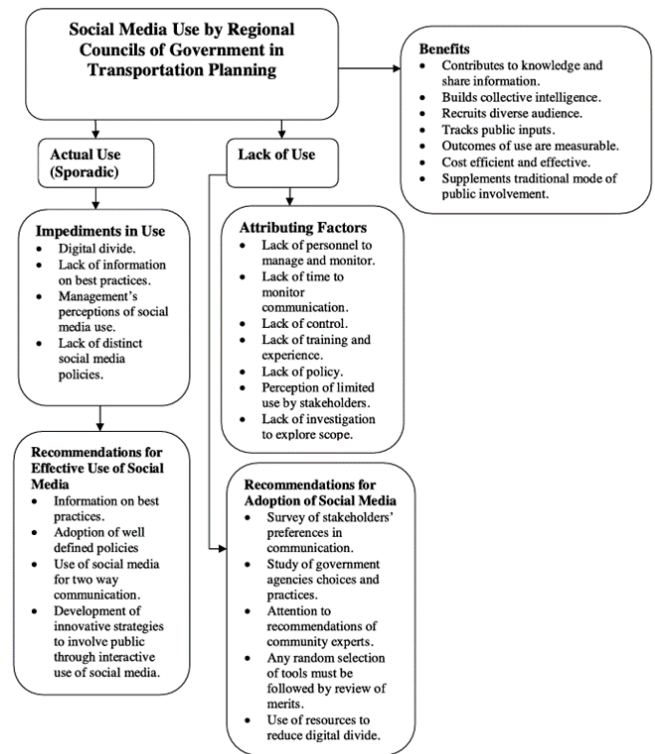

Fig. 2. A conceptual framework on using social media by RCOGs [7].

Nikolaidou and Papaioannou [8] examine different social media platforms to identify their potential applications in the transportation sector. Through a comprehensive review and analysis, the study reveals that social media data can be utilized for various transport-related functions, such as understanding user demographics, mobility patterns, trip purposes, incident detection, and public opinion on transportation issues. Each social media platform is suitable for specific transportation uses, and leveraging social media data offers benefits like large volume and low cost. However, challenges such as selective bias, fake information, and privacy concerns must be addressed.

According to [9], social media discussions related to public transit planning and services often contain offensive remarks directed disproportionately at African American women. However, when these remarks are removed, sentiment toward public transit and airlines becomes statistically similar. The study found that transit agencies benefit from engaging with patrons on social media to disseminate information, listen and respond to concerns, and ultimately improve relationships with traditional media and local businesses. The findings highlight the importance of thoughtful engagement on social media to enhance public perception of transit services and contribute to more constructive conversations about the role of transit in urban areas.

A recent study [10] conducted in Sweden examines the benefits of digital communication tools for public transport providers. While digital channels have the potential to enhance existing services, implementing them can be costly, and it can be challenging to meet the diverse needs of travelers. The study identifies three areas where digital solutions can improve customer experience: service quality, interaction quality, and peer-to-peer quality. However, seniors often struggle with digitalization and prefer traditional

methods like paper timetables. Therefore, providers should offer both digital and analog solutions and customize information to cater to different user preferences. To ensure successful digitalization, collaboration among stakeholders, integration of information channels, and supportive public policies favoring low-carbon options are crucial. Consequently, traffic planning and management require public participation, but traditional methods of collecting and analyzing public opinions at scale have limitations. A study [11] uses text analysis with large-scale data from social network platforms to extract primary public opinions and identify spatial and temporal characteristics using probabilistic topic modeling. The study proposes a process for mining public opinions on social networks, improving speed, efficiency, and accuracy. The approach can be applied throughout traffic planning, from collecting public needs for planning to providing a mechanism for public supervision after policy implementation. The research acknowledges limitations and suggests further refinement to enhance the effectiveness of future traffic public opinion monitoring systems.

A research paper [12] suggests a framework for identifying transportation hubs and estimating public transport flows by analyzing social media data. The study creates an infrastructure to handle the uncertainty of data retrieval and compares social media signals with data from OpenStreetMap. A case study conducted in London demonstrates the successful extraction of public transport hubs and flows. However, the study recognizes limitations and challenges in deducing public transport flows from social media. One potential application of this research is to detect unusual traffic patterns and incidents in nearly real-time. Another study [13] has demonstrated how social media data can complement traditional transportation surveys and improve our lives. By analyzing travel mode choices extracted from social media data, researchers can gain valuable insights into the transportation habits of users. This information can help us make informed decisions about transportation infrastructure and services. The study emphasizes the potential of social media as an additional source of transportation information, especially when validated with user demographics. With the right approach, we can use technology to create more efficient and sustainable transportation systems that cater to the needs of all users. The study's findings inspire us to think outside the box and explore innovative ways of using technology to solve real-world problems and make our communities better places to live.

C. SWOT Analysis

SWOT analysis is a strategy tool widely used worldwide to assess a business or project's strengths, weaknesses, opportunities, and threats [17]. This way, SWOT helps organizations identify internal factors (Strengths and Weaknesses) and external factors (Opportunities and Threats) that may impact their objectives. Analyzing these factors allows organizations to develop strategies to capitalize on strengths, address weaknesses, leverage opportunities, and mitigate threats, thus improving their overall strategic position [17], [18]. A SWOT matrix has been created per the literature review findings conducted in this research (refer to Table I).

TABLE I. A SWOT MATRIX OF USES OF SOCIAL MEDIA IN PUBLIC TRANSPORTATION

	Positive	Negative
Internal	**Strengths:** - Public data, information, and knowledge collection - Improved Communication - Citizen engagement - Employee recognition - Entertainment - Cost-effective marketing	**Weaknesses:** - Resource requirements - Managing employee access - Responding to online criticism - Accessibility - Security - Archiving and records retention - User privacy - Changing social media landscape
External	**Opportunities:** - Improve knowledge sharing - Improve customer satisfaction - Improved sustainability	**Threats:** - Social media policy - Social media metrics - Internet security - Access for people with disabilities - Multicultural issues - Integration with other agency activities - Revenue potential

Table I presents a SWOT analysis of using social media in public transportation that is described below.

- **Strengths:** The most significant advantage of using social media is the availability of data, information, and knowledge people share on social media platforms. Social media enables direct and real-time communication with passengers, providing timely updates, service information, and interactive dialogue. It fosters community and engagement among passengers, improving customer satisfaction and loyalty. Compared to traditional advertising methods, social media provides a cost-effective way to promote services, events, and initiatives. Social media analytics offer valuable insights into passenger preferences, behaviors, and satisfaction levels, aiding service improvements and targeted marketing efforts.

- **Weaknesses:** Maintaining an active social media presence requires dedicated staff, time, and resources for content creation, monitoring, and responding to inquiries. Handling personal data and ensuring privacy compliance can be challenging, particularly with evolving regulations and user expectations. Transit agencies are vulnerable to public criticism and negative feedback on social media, which can damage their reputation if not managed effectively. Not all passengers may have access to or be proficient in using social media platforms, limiting the reach of communication efforts.

- **Opportunities:** Leveraging passenger feedback from social media can help identify areas for service enhancements and customer-focused initiatives. Social media can facilitate partnerships with local businesses, organizations, and influencers to enhance community engagement, support, and sustainability. Tailored content and targeted advertising on social media can reach specific demographic groups and promote transit services effectively. Social media can be integrated with mobile

apps and digital platforms to create seamless and convenient passenger experiences.

- **Threats:** Transit agencies are susceptible to cybersecurity threats such as data breaches, phishing attacks, and misinformation campaigns on social media. Evolving regulations around data privacy and online advertising may require transit agencies to adapt their social media strategies and policies. Other transportation providers and ride-sharing services may use social media to compete for passengers and market share. Viral incidents or misinformation spread on social media can quickly damage the reputation of transit agencies, affecting ridership and public perception.

It is essential to consider that while social media presents valuable opportunities for public transportation agencies to improve communication, engagement, and service delivery, it also comes with challenges related to resource allocation, privacy, and managing potential risks. Transit agencies should adopt strategic approaches to leverage the strengths of social media while addressing weaknesses and mitigating threats effectively.

III. RESEARCH APPROACH

The paper is structured in three different phases. The primary phase involves a literature review to gain insights into social media usage for public transportation. This phase focuses on understanding the strengths, weaknesses, opportunities, threats, and requirements of social media usage in public transportation. In the second phase, we aim to survey how people in Sweden use social media for public transportation. Finally, in the third phase, we plan to analyze the most common Facebook pages in Sweden to understand how people follow and communicate with them based on the results of the second phase of this study.

In February 2024, we surveyed by sharing an online questionnaire on various social media platforms. The survey was open to people from different age groups and professions residing and working in Sweden, including students, teachers, researchers, engineers, doctors, and other professionals. We aimed to gather a diverse group of respondents to gain maximum insights from the survey.

Overall, the paper aims to present a detailed understanding of how social media is used in public transportation in Sweden, with a particular focus on Facebook. Hence, the information obtained from the literature review and survey will be valuable to transportation companies, social media managers, and other stakeholders involved in public transportation.

IV. DATA COLLECTION AND ANALYSIS

As previously mentioned, a survey was conducted among a diverse group of individuals residing in Sweden. The data was collected from 106 adults between the ages of 19 and 66, with an average age of 37 years. The respondents comprised approximately 49% females and 46% males, providing a balanced representation of both genders. The survey aimed to gather insights into social media and public transportation, including their preferences and attitudes.

According to the survey, among the people who rely on social media platforms to stay informed about public transportation, 48% of the respondents reported using Facebook as one of the sources of information (see Fig. 3).

This suggests that Facebook is popular for those seeking information about public transportation schedules, delays, and other related updates.
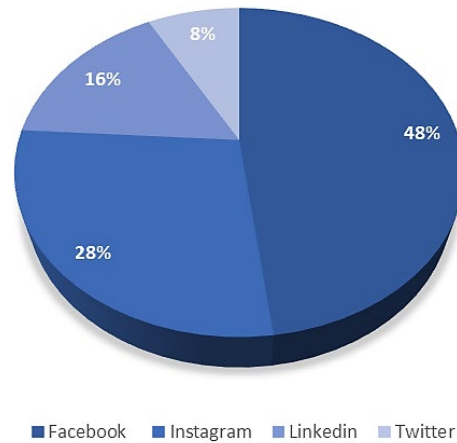

Fig. 3. Usage of Social Media Platforms for public transportation

According to the responses received from the survey participants, Skånetrafiken, Trafikverket, and SJ are the most frequently visited pages/channels for communication related to public transportation (refer to Fig. 4). These channels are considered popular by the respondents due to their reliability and ease of use. In addition, some other apps and pages were also mentioned by the participants, including 1409, SVT, Sydsvenskan local newspaper, Facebook discussion groups (such as Broen Live), and official pages on LinkedIn.

Particularly, these additional channels were not as commonly used as the top three mentioned above but were still considered helpful by some respondents. Overall, it appears that people rely heavily on the convenience and accessibility of digital platforms to stay informed and communicate about public transportation.
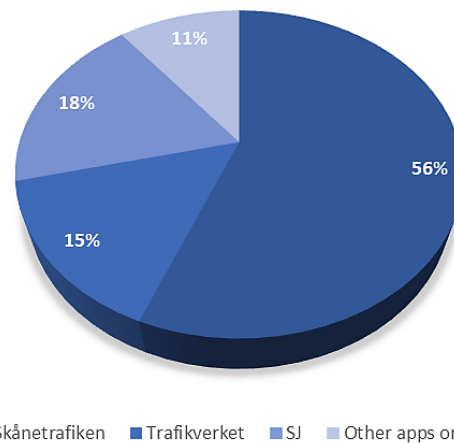

Fig. 4. Most frequently visited pages/channels for public transportation.

As indicated by the findings from the survey (refer to Fig. 5), almost half of the respondents, accounting for 49%, reported that they did not engage in posting or commenting on social media. Conversely, a smaller proportion, specifically 20% of the respondents, stated that they were actively involved on various social media platforms.
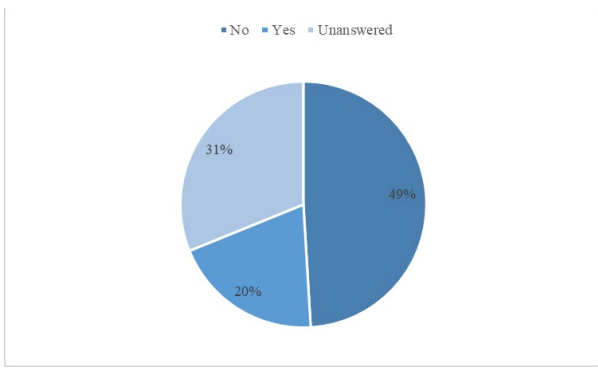
Fig. 5. Engaged in posting and/or commenting on social media platforms about public transportation

Regarding social media activity, the survey found that 54% of respondents expressed dissatisfaction with public transportation. On the other hand, 14% of posts or comments focused on expressing appreciation, another 14% were geared towards informing, 7% were recommending something, and the remaining 11% covered various other subjects (see Fig. 6).
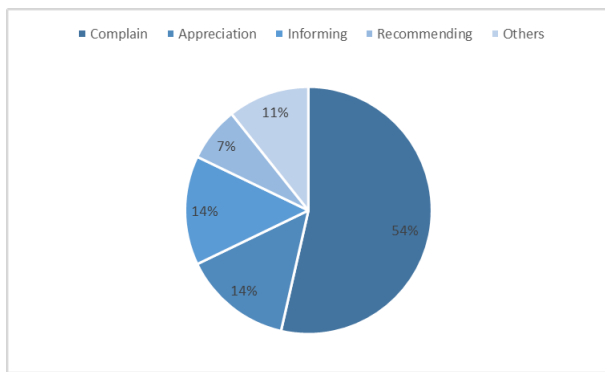

Fig. 6. Category of social media posts and comments about public transportation by people.

To better understand the use of social media by public transport providers in Sweden (both public and private organizations), the most frequently used keywords and hashtags related to public transportation in Sweden have been identified. A sample of these findings is listed in Table II, which provides valuable insights into the topics and trends surrounding public transportation in Sweden.

TABLE II. SAMPLE OF KEYWORDS OR HASHTAGS USED FOR PUBLIC TRANSPORTATION IN SWEDEN

Category	Word list (Swedish)
Regions	Blekingetrafiken, Dalatrafik, Gotlands kollektivtrafik, Gävleborgs länstrafik, Hallandstrafiken, Jämtland/Härjedalen trafik, Jönköpings länstrafik, Kalmar Länstrafik, Kronobergstrafiken, Länstrafiken Norrbotten, Skånetrafiken, SL (Storstockholms lokaltrafik), Sörmlandstrafiken, Upplands Lokaltrafik, Värmlandstrafik, Västerbottenstrafiken, Västernorrlands länstrafik, Västmanlandstrafik, Västtrafik, Örebro läns trafik, Östgötatrafiken
Vehicles	Tåg, Buss, Pendeltåg, Busslinjer, Tunnelbana, Färjor, Flygplan, Taxibilar, Motorcyklar, Cyklar

Travel	Reseplanerar, Biljettpriser, Biljett, Biljettautomat, Svensk Kollektivtrafik, ResaMedSJ, BussResa, ResaMedBuss, TågResa, ResaMedTåg, ResaGrönt, Kollbar, Resvanor

In this study, we identified 767 Facebook pages based on our chosen keywords and sorted them based on the number of active users and followers. We then filtered out pages that were not relevant to public transportation, such as the "Stockholm Design Lab" page with 14K followers and "Olyckor och andra trafikstörningar" with 426 likes and 616 followers, which have been removed from our list.

After filtering, we had around 50 public and private owner pages with more than 100 followers. We selected the 27 most active pages with the highest posts within our specified timeframe. These 27 pages are shown in the figure below. As seen in Fig. 7, we found that only 7 FB pages have more than 10000 followers and are relevant to public transportation, namely SJ AB, Trafikverket, Skånetrafiken, SL, Polisen Stockholm - Trafik, Västtrafik, and Östgötatrafiken. These pages were selected for further analysis and insights.
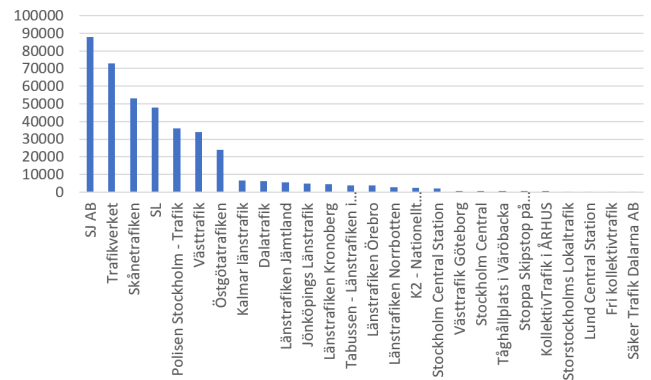

Fig. 7. Public Transport Facebook Pages and Followers

V. FUTURE RESEARCH

Social media has become an integral component of our daily lives, and public transportation is critical for urban mobility. Nevertheless, the intersection of social media and public transportation is an area that has not received much attention. A future research agenda has been proposed to expand our knowledge in this area, highlighting key areas that require further investigation. These include gaining a deeper understanding of user behavior, exploring the impact of social media on service provision, harnessing the power of data analytics, promoting sustainable mobility, ensuring equity and accessibility, and considering privacy and ethical issues. By exploring these areas, we can better understand the intersection of social media and public transportation and identify ways to optimize their integration for the benefit of society.

VI. CONCLUSION

Recent developments in social media have made it more important for businesses to connect with a broader audience and employ various tools to strengthen their relationships. This study investigates how the public transportation sector in Sweden uses social media to improve communication and

services. The paper is divided into three phases, and their results are outlined below.

The first phase of this study involved a literature review (see section II), which described the use of social media in Sweden and its regulation (refer to sub-section A and Fig.1). Several relevant studies on the use of social media for public transportation were also discussed (see sub-section B). These studies reported that public transportation agencies use social media to share information and improve services, highlighting various advantages, opportunities, and disadvantages. This phase also resulted in the creation of a SWAT matrix, which identified the strengths (e.g., data collection and citizen engagement), weaknesses (e.g., resource requirements, security, and user privacy), opportunities (e.g., improved knowledge sharing, customer satisfaction, and sustainability), and threats (e.g., social media policy and access for people with disabilities) of using social media for public organizations, considering internal and external effects (see Table I).

In the second phase, a survey of 106 Swedish citizens was conducted to understand their use of social media for public transportation. The results revealed that Facebook is the most popular social media platform for public transportation in Sweden, with 48 percent of respondents indicating its use. Additionally, according to Fig. 5 and 6, 20% of the respondents are actively posting and/or commenting on social media, with most comments focusing on complaints about public transportation.

In the third phase, the study analyzed Facebook pages relevant to public transportation in Sweden by searching for keywords or hashtags (see Table II). A total of 767 pages were identified and filtered based on their activity, number of likes, and followers (see Fig.7). The results showed that only seven Facebook pages had more than 10000 followers and were relevant to public transportation, namely SJ AB, Trafikverket, Skånetrafiken, SL, Polisen Stockholm - Trafik, Västtrafik, and Östgötatrafiken.

In conclusion, the study highlights the importance of the relationship between social media and transit agencies, as reported in previous literature. However, in Sweden, this information is lacking from both providers and users. This research found that although many pages are relevant to public transportation on social media in Sweden, they are not active or helpful for citizens. The finding agrees with the survey results, which indicate that only a small number of Facebook pages are mentioned as valuable pages for public transportation in Sweden (3 pages via the survey and 7 pages via the analyses of the Facebook pages). These results highlight the potential of social media to enhance public transportation services, promote sustainability, and support the need for further studies on transit agencies' policies for sharing information and data analysis of social media.

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