



This journal provides immediate open access to its content under the [Creative Commons BY 4.0 license](#).
Authors who publish with this journal retain all copyrights and agree to the terms of the above-mentioned CC BY 4.0 license

DOI: 10.2478/seeur-2025-0011

EXPLORING PUBLIC SENTIMENT TOWARDS AGILE AND DIGITAL TRANSFORMATION: A REFINED METHODOLOGICAL APPROACH THROUGH TWITTER SENTIMENT ANALYSIS AND TOPIC MODELING

Florenc HIDRI, PhD(c)
Faculty of Contemporary Sciences and Technologies,
South East European University
Tetovo, North Macedonia
fh31409@seeu.edu.mk
Faculty of Software Engineering, Canadian Institute of Technology
Tirana, Albania
Florenc.hidri@cit.edu.al

Blerta Abazi Çausi
Faculty of Business and Economics, South East European University
Tetovo, North Macedonia
b.abazi@seeu.edu.mk

Gladiola Tigno, PhD(c)
Faculty of Engineering, Informatics and Architecture,
European University of Tirana
Tirana, Albania
Gladiola.tigno@uet.edu.al

ABSTRACT

This paper examines public sentiment about Agile methodologies and Digital Transformation through high-end Twitter sentiment analysis techniques. Agile, initially developed for software development, is nowadays one of the most important drivers of innovation and adaptability in many sectors, whereas Digital Transformation reshapes the operations of organizations through the use of digital technologies. Understanding public

sentiment toward these concepts is crucial for organizations that want to align their strategy with new trends and adapt to an increasingly digital world.

This approach is further fine-tuned in this research through the incorporation of advanced data preprocessing techniques and the application of more sophisticated analytical tools. VADER sentiment analysis is used to catch the polarity of sentiments expressed on social media. It also includes the adoption of Latent Dirichlet Allocation, or LDA, topic modeling in order to mine further into the conversations on Agile and Digital Transformation. This constituted some methodological improvements in this study that can allow nuanced understanding of emotions, opinions, and ideas that dominate public discourse on these transformative methodologies.

This research performs an in-depth examination of the patterns of sentiment expressed through Twitter, termed a real-time barometer of public opinion, by analyzing a dataset of 1,014 tweets using the hashtags Agile and Digital Transformation tweets collected during the period from January 31, 2023, to August 18, 2023. On the other hand, integrating topic modeling will enable the identification of key areas of interest in public discussions: the role of AI and automation, organizational challenges, and finally best practices regarding the implementation of Agile. This paper gives a wider outlook on Agile and Digital Transformation from the perspective of public engagement and provides useful insights into their practice, research, and policy implications. The findings will be useful for organizational decisions, communications, and the development of better strategies in response to perceived public views and trends that arise with digital innovations.

Key words: Agile Methodologies, Digital Transformation, Sentiment Analysis, Twitter Data, VADER Sentiment Tool, Topic Modeling, Latent Dirichlet Allocation (LDA), Public Opinion

INTRODUCTION

The digital era has, without doubt, transformed business transactions, new product development, and value creation by organizations. Complementary strategies that are central to this transformation include Agile methodologies and Digital Transformation; these allow an organization to quickly react to changes in market conditions, enable innovation, and facilitate effective operations. Initially designed to be guidelines for software development, Agile has since grown in scope into various industries. Founding principles of iteration towards advancement, feedback, and cross-functional collaboration simply appeal to the requirements wrought by a fast-paced and technology-driven world. Running parallel, Digital Transformation has become the strategic priority of organizations in their quest to integrate digital technologies into operations and business models. Put together, they represent a paradigm shift both in organizational design and project management; hence, they are very important subjects of study.

It thus becomes very important to understand the sentiment of the public towards these methodologies for proper review of the way they are perceived, and how successful they really are in practice. Social media, especially in forms such as Twitter, provides a very good source of real-time data regarding opinionated feedback from a wide array of people. It is in this context important to understand the wider public discourse around Agile and Digital Transformation at a time when organizations around the globe are increasingly looking at these as strategies that would drive competitiveness and growth. This paper aims to find out perceptions, challenges, and emerging themes related to Agile and Digital Transformation through sentiment analysis and topic modeling.

Consequently, the enhancement of the methodological approach used to analyze Twitter data was performed based on previous work in this paper. This enhanced methodology embeds sophisticated data preprocessing. In-depth text cleaning is more effectively performed, whereby noise like URLs, mentions, and extra-linguistic characters is fully eliminated. For sentiment analysis, VADER is employed-a fully-fledged approach for sentiment classification in social media, considering informal language and emotional signals typical of Twitter conversations. In addition to sentiment analysis, this paper employs Latent Dirichlet Allocation-a topic modeling algorithm that uncovers the hidden structures of basic topics of public discourse about Agile and Digital Transformation.

One of the novelties in the approach of this research consists of methodologically coupling sentiment analysis with topic modeling to provide a deeper perspective on how particular themes-say, AI, DevOps, or organizational culture-affect public sentiment. Its value lies in that it drills deeper into both the emotional and thematic drivers of discourse through the classification of tweets into positive, negative, and neutral sentiments, subsequently mapping them onto distinct topics. For example, it highlights such topics as automation, enterprise architecture, and scalability, and looks at how sentiment varies across these themes.

The understanding from these advanced techniques also includes word clouds for data visualization. The application of these advanced techniques provides comprehensive and visually engaging analysis of the data. Going ahead, low-code platforms, AI, and Digital Strategy weave a thread that echoes the ever-evolving nature of Agile and Digital Transformation. The methods have moved well beyond the software development and isolated business units into the daily, high-level strategies of modern organizations.

This paper further extends the analysis by introducing predictive modeling techniques to understand how sentiment and topic distribution might evolve over time. The conclusions of the study bear important implications for practitioners, policymakers, and researchers in the assessment of the effectiveness of Agile and Digital Transformation initiatives and foreseeing future trends. With organizations still working through the complexity of digital change, public sentiment and thematic nuance for Agile and Digital Transformation will be central to successful strategy and sustainable innovation.

HYPOTHESES AND RESEARCH QUESTIONS

RQ1. What is the overall sentiment toward Agile methodologies and Digital Transformation as expressed on Twitter?

RQ2. What are the key themes or topics discussed in relation to Agile methodologies and Digital Transformation on Twitter?

RQ3. How can data visualization techniques effectively represent the sentiment and key themes around Agile methodologies and Digital Transformation?

H1: The majority of public sentiment toward Agile methodologies and Digital Transformation on Twitter is positive.

H2: Discussions about Agile methodologies and Digital Transformation on Twitter are dominated by technology-related themes such as AI, automation, and DevOps.

H3: Data visualization techniques, such as word clouds and sentiment graphs, will effectively enhance the interpretation of the sentiment and topics related to Agile methodologies and Digital Transformation, making complex data more accessible and insightful.

LITERATURE REVIEW

Agile Methodologies

Starting off with software development, Agile methodologies have, over time, grown to be applied in most industries, including finance, healthcare, and government. (Abrahamsson et al., 2017) Originally developed in reaction to the rigidities of traditional project management, Agile emphasizes iterative development, close customer collaboration, and flexibility (Beck et al., 2001). In other words, Agile is increasingly adopted outside of software development because it helps organizations respond swiftly to changes in the market, thereby promoting innovation and responsiveness. (Rigby et al., 2016) Agile has also been applied to overcome bureaucratic inefficiencies, enhance service delivery, manage digital projects, and adapt policies in public organizations. (Mergel et al., 2021) Government organizations that have begun to implement Agile practices boast of the superior performance of projects. In fact, Agile can enable such groups to respond dynamically to changing environments. (Ganapati, 2020) However, in many cases, it works successfully within the public sector because it requires leadership buy-in and is aligned with organizational culture. (Mergel et al., 2021)

In fact, research has proven that Agile methods improve team collaboration, customer satisfaction, and ultimately ensure project success across industries. For example, Serrador & Pinto, 2015; Dikert et al., 2016 present evidence that Agile project management methods result in higher success rates due to iterative development and customer involvement. Meanwhile, Ahimbisibwe et al. (2015) observe that organizational culture and leadership represent an essential determinant in Agile success, in cases when projects involve intricate conditions under which flexibility and adaptability become especially relevant.

While Agile comes with numerous benefits, challenges may lie ahead with regard to its scaling up to large organizations. For example, Hoda and Noble (2017) argue that Agile can hardly be scaled up in organizations with established hierarchies and rigid structures. Conboy (2009) identifies that Agile is not applied by default for those projects where formal governance is required. But in spite of all those challenges, organizations are increasingly embracing such frameworks as SAgE that can help address the scalability issues associated with Agile (Rigby et al., 2016).

Digital Transformation

Digital transformation may be described as the embedding of digital technology across business activities, which enables a reimagining or reshaping of how organizations operate and deliver their value. (Westerman et al., 2014) As such, DT requires not only the adoption of new technologies but also changes in organization culture, processes, and leadership. (Kane et al., 2015) Various studies have considered the role of leadership in DT to be critical. Effective transformations have been noted in cases where leaders are able to align technological initiatives toward broader business objectives, according to (Berman & Bell, 2011; Singh et al., 2022). DT already has an immense impact and influenced industries such as finance, healthcare, and manufacturing. In the banking industry, for example, DT is of great help to an organization in order for it to offer services in a personalized manner, optimizing operational aspects-whether internally or externally using real-time data analytics. (Nambisan et al., 2019) In manufacturing, smart factories running on IoT and AI are fully changing the concept of production processes. (Porter & Heppelmann, 2015. Higher education digital transformation projects also depict the critical role of integrated systems to enhance institution performance and services. For instance, Abazi Çaushi et al. (2017) describe a case study at SEEU depicting

how the development of an academic planning module for an ERP system facilitated apparent enhancement of business process efficiency and services.

Although DT faces a lot of challenges, particularly in the public sector, due to regulatory constraints and organizational inertia that place stumbling blocks in the way of development. In any case, (Ganapati, 2020). Nonetheless, AlNuaimi et al. (2022) are convinced that through effective leadership and stakeholder engagement, every challenge may be responded to and the DT initiative successfully implemented within an organization of the public sector. In what concerns digital strategy, the authors underline its alignment with the needs of citizens and priorities of government to pursue transformative outcomes. DT is not devoid of risks. According to Sebastian et al. (2017), in the absence of adequate governance, with a clear strategic vision, the efforts towards achieving DT are very likely to result in wasted resources and lost opportunities. Other critical deterrents to effective DT include cybersecurity threats and requirements for continuous development of skills. (Ross et al., 2019)

Sentiment Analysis

Sentiment analysis, frequently applied in the context of social media, is a crucial method for comprehending public opinion through the study of textual data (Pak & Paroubek, 2010). It enables companies to evaluate the emotional tone of user-generated information and has applications in a variety of fields, including political debate and customer feedback (Tumasjan et al., 2010; Liu, 2012). Because it can precisely capture colloquial language and emoticons that are ubiquitous on social media sites like Twitter, the Valence Aware Dictionary and Sentiment Reasoner (VADER) tool is widely used for sentiment analysis in social media content (Hutto & Gilbert, 2014).

Sentiment analysis has been used to understand public sentiment in a number of sectors. Studies have utilized it, for example, to track responses to technological advancements, public health initiatives, and political events (Gautam & Yadav, 2014; Kouloumpis et al., 2011). By enhancing the contextual comprehension of text, recent developments in natural language processing (NLP), such as BERT (Bidirectional Encoder Representations from Transformers), have significantly improved sentiment analysis capabilities (Devlin et al., 2019).

Topic Modeling

To find themes in big text datasets, topic modeling—in particular, Latent Dirichlet Allocation, or LDA—is frequently employed (Blei et al., 2003). LDA makes the assumption that papers have a variety of themes, and that the distribution of words reflects these topics. This method has been used to identify underlying themes in a variety of domains, including business, healthcare, and the social sciences (Boyd-Graber et al., 2017). LDA has been used to investigate the topic focus of conversations on social media platforms in the context of Agile and Digital Transformation. For instance, topic modeling has shown that public debates about Agile usually emphasize automation and artificial intelligence, but discussions about Digital Transformation typically center on strategy and leadership (Liu et al., 2016). Chang et al. (2009) warns that while topic modeling offers useful insights, LDA models can occasionally generate incoherent topics, particularly when used on extremely heterogeneous datasets.

This study utilizes a combination of sentiment analysis and topic modeling to explore public sentiment and key themes related to Agile methodologies and Digital Transformation on Twitter. The research methodology consists of several key stages: data collection, preprocessing, sentiment analysis, topic modeling, and data visualization.

METHODOLOGY

1. Data Gathering

The dataset of this research consists of a total of 1,014 tweets, which were gathered through the Twitter API by hashtag and keyword tracking on Agile methodologies and Digital Transformation. Collection was made during a very thin period of time so that the sample would be representative and timely. Later on, data was exported into CSV format, considering that the "Text" column is the one holding the main text used in this analysis.

2. Data Preprocessing

Preprocessing steps included the following to clean and prepare the tweets for analysis. First, text cleaning was done to get rid of useless information like URLs, mentions, hashtags, and punctuation. Also, the cleaning included changing all text into lowercase and removing the stop words, which came from NLTK to decrease noise. Tokenization: The cleaned tweets were tokenized, meaning each piece of text is broken down into single words or tokens to facilitate further analysis.

Lemmatization: This step involved converting the tweets into their base forms to ensure that different inflections of the same word are considered as one.

3. Sentiment Analysis

For sentiment analysis, the Valence Aware Dictionary and Sentiment Reasoner (VADER) tool was used, which is specifically designed to handle social media text. VADER assigns sentiment scores ranging from -1 (most negative) to +1 (most positive) based on the polarity of the text. The sentiment scores were categorized into positive, negative, and neutral sentiments using thresholds:

- Tweets with a score greater than 0.05 were classified as positive.
- Tweets with a score less than -0.05 were classified as negative.
- Tweets with scores between -0.05 and 0.05 were considered neutral.
- Summary of Sentiment Analysis Results:

- Total Tweets: 1,014
- Positive Tweets: 701 (69.13%)
- Negative Tweets: 86 (8.48%)
- Neutral Tweets: 227 (22.39%)
- Average Sentiment Score: 0.38

The results indicate a predominantly positive sentiment towards Agile methodologies and Digital Transformation, suggesting favorable perceptions of these topics within public discourse.

4. Topic Modeling

Topic modeling was done using Latent Dirichlet Allocation to expose the underlying themes in the tweet dataset. One such LDA model, trained on tokenized, cleaned tweet data, revealed 15 distinct topics, each represented by a set of keywords. The main intent behind this was to identify key topics from Agile and Digital Transformation and see their relative prevalence in public discussions.

Other topics which were produced from the LDA modeling included themes such as the following: agile methodologies-for example, Scrum and software development; technologies-areas such as AI, automation, and low-code platforms; organizational strategies-for example, enterprise architecture and digital strategies. The top words that characterize each topic ranked according to their frequency within the whole dataset.

5. Data Visualization

Further illustrating the results with several visualization techniques was necessary:

Distribution of Sentiment: A bar plot displaying the distribution of positive, negative, and neutral sentiments was developed for the distribution across the dataset. This allowed for a better representation of the dominant public view about Agile and Digital Transformation.

Distribution of Topics: It also generated a bar plot to display the frequency of each topic in the dataset. It allowed for an understanding of what the most discussed topics were.

Word Cloud: A word cloud was done to show the most frequently used words within the tweets. This offers a more intuitive feeling of what really constitutes the central topics and themes in the dataset.

RESULTS

Sentiment Analysis

This will present a better overview of the feelings of people about Agile methodologies and Digital Transformation by analyzing the dataset of 1,014 tweets. Sentiment analysis was made by using VADER tool, as it is designed to handle subtle nuances in the language of social media. Therefore, the tweets were rated according to positive, negative, and neutral sentiments. The results are that Twitter users are pretty optimistic; in the given years, 701 tweets were judged as positive, totaling 69.13%. With this high level of proportion, it is clear that the masses consider Agile methodologies and Digital Transformation somewhat positive-beneficial frameworks that further enhance organizational efficiencies, innovation, and adaptability in an increasingly digitalized era. This may be due to increased awareness regarding the responsibility of Agile toward collaboration, interaction in respect of change, and the associated benefits of adopting digital technologies for transformation.

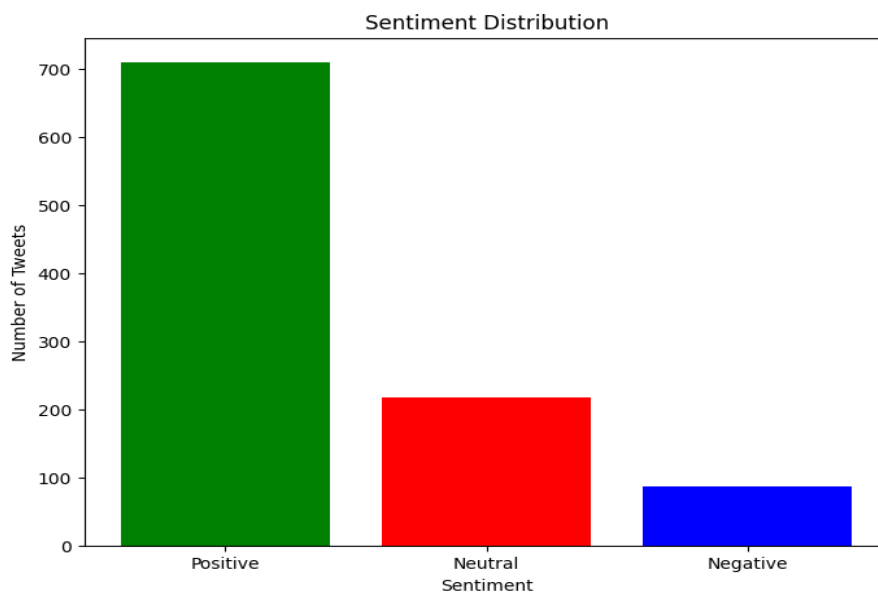


Figure 1 Sentiment Distribution

By contrast, the negative sentiment tweets found were 86, accounting for 8.48%. The much lower figure of negative results reveals that negative feelings are minor compared with the overwhelming positive sentiments. The negative tweets might reflect concerns or criticisms related to the challenges and difficulties of organizations trying to implement Agile practices or undergo Digital Transformation. Matters such as resistance to change, lack of proper training, and lack of proper leadership support are normally highlighted in discussions

regarding Agile and Digital Transformation; hence, these could be contributory factors to such negativity.

Moreover, 227 tweets were classified as neutral at 22.39%, indicating discussions that are more informative in nature. These tweets might contain facts, statistics, or general comments about Agile methodologies and Digital Transformation without giving their view. This neutrality suggests a segment of the public that is engaged in the discourse but does not hold a definitive stance.

The average score for sentiment would be 0.38, which further corroborates this overall positive outlook. In sentiment analysis, scores usually range from -1; therefore, a score of 0.38 indicates a tendency toward positivity. This is optimistic public sentiment in relation to Agile methodologies and Digital Transformation.

Overall, these results highlight the prevalent positive perception of Agile methodologies and Digital Transformation on Twitter, suggesting a strong endorsement of these strategies as vital components for organizational success in the digital age. The findings serve as a valuable resource for practitioners and researchers interested in understanding public opinion and the broader societal discourse surrounding these transformative methodologies.

Topic Modeling

The topic modeling analysis, conducted using Latent Dirichlet Allocation (LDA), identified 15 distinct topics from the analyzed tweets concerning Agile methodologies and Digital Transformation. Each topic consists of a set of keywords that encapsulate the primary themes of discussion among Twitter users. Below is a comprehensive overview of all topics:

Table 1 Topic Modeling

Topic	Value
Topic 0	(0,'0.059*"agile"+0.043*"digitaltransformation"+0.028*"scrum"+0.026*"softwaredevelopment" + 0.025*"tech")
Topic 1	(1,'0.042*"agile"+0.037*"digitaltransformation"+0.015*"ai"+0.014*"experiences" + 0.014*"deliver")
Topic 2	(2,'0.063*"agile"+0.051*"digitaltransformation"+0.023*"business"+0.022*"development"+ 0.020*"software")
Topic 3	(3, '0.057*"agile" + 0.042*"digitaltransformation" + 0.016*"customer" + 0.014*"transformation" + 0.013*"design")
Topic 4	(4, '0.043*"agile"+0.033*"digitaltransformation"+ 0.013*"softwaredevelopment" + 0.011*"buttoninc" + 0.010*"digitalstrategy")
Topic 5	(5,'0.043*"agile"+0.041*"digitaltransformation"+0.015*"teams"+0.012*"tocndix+ 0.012*"orgdesign")
Topic 6	(6,'0.087*"agile"+0.050*"digitaltransformation"+0.019*"innovation"+ 0.016*"enterprisearchitecture" + 0.015*"planning")
Topic 7	(7, '0.043*"agile"+0.041*"digitaltransformation"+ 0.025*"devops" + 0.020*"saas" + 0.018*"python")
Topic 8	(8, '0.056*"agile" + 0.049*"digitaltransformation" + 0.027*"technology" + 0.027*"automation" + 0.024*"lowcode")
Topic 9	(9, '0.066*"agile" + 0.051*"digitaltransformation" + 0.030*"digital" + 0.019*"create" + 0.018*"way")
Topic 10	(10, '0.057*"agile" + 0.045*"digitaltransformation" + 0.022*"iot" + 0.021*"traceability" + 0.013*"industry40")
Topic 11	(11, '0.039*"agile"+0.039*"digitaltransformation" + 0.032*"digital" + 0.020*"keep" + 0.016*"speed")
Topic 12	(12, '0.059*"agile" + 0.057*"digitaltransformation" + 0.029*"innovation" + 0.018*"automation" + 0.016*"digital")
Topic 13	(13, '0.077*"agile" + 0.052*"digitaltransformation" + 0.031*"transformation" + 0.019*"digital" + 0.013*"technology")
Topic 14	(14, '0.044*"agile" + 0.036*"digitaltransformation" + 0.015*"technology" + 0.014*"scalability" + 0.014*"agility")

Topic 0: Keywords include *agile, digitaltransformation, scrum, softwaredevelopment, tech*. This topic emphasizes discussions about Agile practices, particularly Scrum, and their application in software development. Users are likely to share insights on how Agile methodologies enhance technological advancements in software projects.

Topic 1: This topic features *agile, digitaltransformation, ai, experiences, deliver*. It reflects conversations around the integration of Artificial Intelligence (AI) within Agile practices. Users might be discussing their experiences with AI-enhanced Agile processes and how these innovations improve project delivery.

Topic 2: Keywords such as *agile, digitaltransformation, business, development, software* indicate a focus on the impact of Agile and Digital Transformation on business strategies. This topic suggests that users are exploring how these methodologies drive effective software development and influence overall business growth.

Topic 3: This topic includes *agile, digitaltransformation, customer, transformation, design*. It centers on customer-oriented approaches within Agile and Digital Transformation. Discussions may focus on how these methodologies improve customer experience through innovative design practices.

Topic 4: The presence of terms like *agile, digitaltransformation, softwaredevelopment, buttoninc, digitalstrategy* suggests discussions about how Agile frameworks support digital strategy formulation in software development. Users might be evaluating the effectiveness of Agile in executing comprehensive digital strategies.

Topic 5: Keywords such as *agile, digitaltransformation, teams, tocndix, orgdesign* highlight themes related to teamwork in Agile practices. This topic may indicate that users are sharing insights on team dynamics and organizational design in the context of Digital Transformation.

Topic 6: Featuring *agile, digitaltransformation, innovation, enterprisearchitecture, planning*, this topic focuses on the role of Agile in fostering innovation within enterprise architecture. Users are likely discussing how Agile methodologies contribute to effective planning and implementation of innovative solutions.

Topic 7: This topic presents keywords like *agile, digitaltransformation, devops, saas, python*. It emphasizes the relationship between Agile practices, DevOps methodologies, and technology tools. Users may be discussing how integrating DevOps with Agile enhances software development efficiency.

Topic 8: The inclusion of terms such as *agile, digitaltransformation, technology, automation, lowcode* reflects discussions on technological advancements. Users are likely exploring the benefits of low-code platforms and automation in facilitating Agile practices and Digital Transformation efforts.

Topic 9: Keywords like *agile, digitaltransformation, digital, create, way* indicate a focus on how Agile methodologies contribute to creating new digital strategies. This topic suggests that users are sharing insights on innovative approaches to leveraging Agile for digital initiatives.

Topic 10: This topic includes *agile, digitaltransformation, iot, traceability, industry40*, highlighting discussions on the Internet of Things (IoT). Users may be focusing on how IoT integration within Agile practices aligns with Industry 4.0 trends and enhances operational efficiency.

Topic 11: The presence of keywords such as *agile*, *digitaltransformation*, *digital*, *keep*, *speed* suggests conversations focused on maintaining agility and speed in digital transformation efforts. Users likely discuss strategies to sustain Agile principles in fast-paced environments.

Topic 12: This topic features *agile*, *digitaltransformation*, *innovation*, *automation*, *digital*, indicating a focus on the intersection of innovation and automation. Users are likely discussing how these elements work together to drive success in Agile and Digital Transformation contexts.

Topic 13: Keywords like *agile*, *digitaltransformation*, *transformation*, *digital*, *technology* suggest discussions on the broader implications of Agile methodologies. Users may be exploring how Agile facilitates overall organizational transformation in the digital age.

Topic 14: This topic includes *agile*, *digitaltransformation*, *technology*, *scalability*, *agility*, emphasizing the scalability of Agile practices. Discussions here are likely to address the challenges and strategies for maintaining agility in larger organizational contexts.

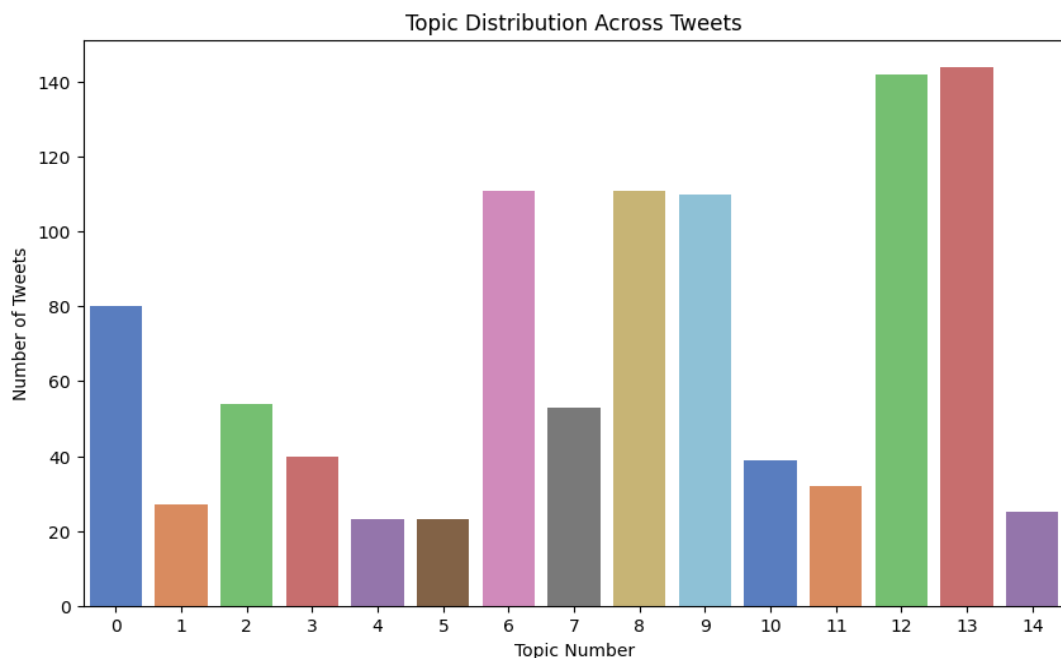


Figure 2 Topic Distributions Across Tweets

Topic Modeling Visualization

The topic modeling analysis is illustrated through three key visualizations: Topic Distributions Across Tweets, Topic Keyword Distribution, and a Word Cloud of the most frequently occurring terms.

Topic Distributions Across Tweets

The graph on Topic Distributions Across Tweets represents the number of times each topic comes up in the dataset. Agile methodologies, including Scrum and software development, are the discussions that override the set and hence represent the core areas which the public associates with Agile and Digital Transformation. Also, technological topics, especially AI and automation, are well represented to show how much interest there is in how these novelties are integrated into the Agile practice. With topics like enterprise architecture cropping up regularly, Agile's role in restructuring companies is discussed far and wide.

Topic Keyword Distribution

The Topic Keyword Distribution graph provides insight into the key terms that define each topic. Common terms such as "agile" and "digitaltransformation" are central to many topics, highlighting the foundational role of these concepts in public discourse. Keywords like "AI" and "automation" emphasize the technological focus of Digital Transformation discussions. Furthermore, the presence of terms like "teams" and "orgdesign" indicates that discussions about Agile extend beyond technical practices to include team dynamics and organizational design.

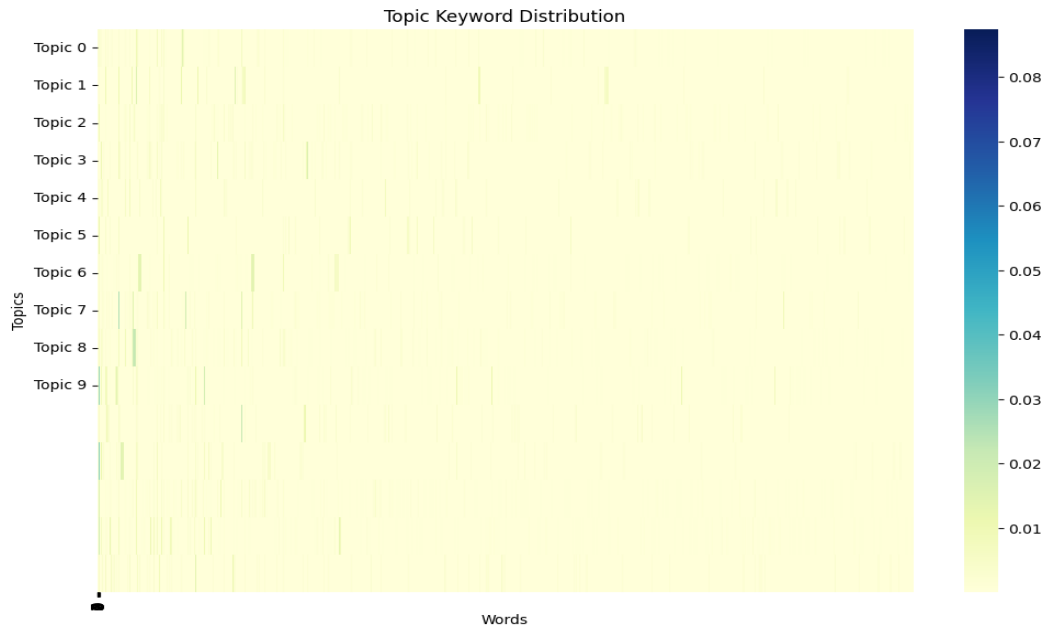


Figure 3 Topic Keyword Distribution

Word Cloud

The Word Cloud visualization offers a comprehensive view of the most frequently used terms across all tweets, visually emphasizing the key themes in public discussions. Larger terms such as "agile," "digitaltransformation," and "softwaredevelopment" stand out, indicating their central role in shaping conversations. Other terms like "innovation," "automation," and "teams" are also prominent, reflecting the broad range of topics discussed, from technological advancements to team-based Agile practices.

itself but does not reflect the whole gamut of opinions by professionals who work directly within the organizations that apply Agile and Digital Transformation practices. Moreover, sentiment analysis tools such as VADER work well on social media but are unable to interpret sarcasm or more complex emotional nuances, which might distort the sentiment scores in certain contexts.

It is worth noting, however, that there are drawbacks in using data from Twitter for sentiment and topic analysis. Participants on Twitter may not be representative of the general population, and brevity of the site, bots (automatic accounts), and context ambiguity (e.g., irony or sarcasm) may introduce bias or influence sentiment accuracy. These are to be considered when interpreting results.

CONCLUSION

This has been a deep-diving review about the trends within the public sentiments and themes, in relation to Agile Methodologies and Digital Transformation, through Sentiment Analysis and Topic Modeling. The general trend of these methodologies can be judged as positive, where public discourses describe Agile and Digital Transformation as very supportive in current business strategy. These are topics that feature strongly, underlining AI, Automation, and Software Development, a high tech tied up with Agile and Digital Transformation.

Though few, negative sentiments would mean there are still challenges to be had, such as the scaling of Agile practices and resistance to organizational changes. This is quite instrumental in businesses and practitioners who look to either adopt or optimize their Agile and Digital Transformation strategies, as this highlights both the opportunities for innovation and some potential pitfalls with which organizations will have to negotiate.

Further research might extend these findings based on an expanded dataset, including other social media platforms or industry-specific forums that would better represent opinions across a wide range. Indeed, deeper analysis across sectors could disclose more specific trends—for example, the distinction between public and private organizations—regarding the adoption of Agile and Digital Transformation practices.

This study, therefore, joins the corpus of an emerging literature on Agile methodologies and Digital Transformation. The study contributes with important insights into the perception of these practices in the public discourse and how these continuously shape the future of organizational strategy in the digital age.

Future research can be an extension of these findings to include other social media platforms to the dataset (e.g., LinkedIn, Reddit), compare the efficacy of various sentiment analysis tools (e.g., BERT-based models), or conduct industry-specific studies in an attempt to observe how online conversations vary between industries and organizational types.

REFERENCES

1. Abrahamsson, P., Salo, O., Ronkainen, J., & Warsta, J. (2017). Agile software development methods: Review and analysis. arXiv preprint arXiv:1709.08439.
2. Ahimbisibwe, A., Cavana, R. Y., & Daellenbach, U. (2015). A contingency fit model of critical success factors for software development projects: A comparison of agile and traditional plan-based methodologies. *Journal of Enterprise Information Management*, 28(1), 7-33.
3. Beck, K., Beedle, M., Bennekum, A. V., et al. (2001). The Agile manifesto. Agile Alliance.
4. Berman, S. J., & Bell, R. (2011). Digital transformation: Creating new business models where digital meets physical. IBM Institute for Business Value, 4.
5. Blei, D. M., Ng, A. Y., & Jordan, M. I. (2003). Latent Dirichlet allocation. *Journal of Machine Learning Research*, 3, 993-1022.
6. Boyd-Graber, J., Hu, Y., & Mimno, D. (2017). Applications of topic models. *Foundations and Trends in Information Retrieval*, 11(2-3), 143-296.
7. Chang, J., Boyd-Graber, J., Gerrish, S., Wang, C., & Blei, D. M. (2009). Reading tea leaves: How humans interpret topic models. *Advances in Neural Information Processing Systems*, 22, 288-296.
8. Conboy, K. (2009). Agility from first principles: Reconstructing the concept of agility in information systems development. *Information Systems Research*, 20(3), 329-354.
9. Devlin, J., Chang, M. W., Lee, K., & Toutanova, K. (2019). BERT: Pre-training of deep bidirectional transformers for language understanding. *Proceedings of the 2019 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies*, 1, 4171-4186.
10. Dikert, K., Paasivaara, M., & Lassenius, C. (2016). Challenges and success factors for large-scale agile transformations: A systematic literature review. *Journal of Systems and Software*, 119, 87-108.
11. Ganapati, S. (2020). Digital governance in the public sector: Digital transformation strategies and outcomes. *Government Information Quarterly*, 37(4), 101449.
12. Gautam, A., & Yadav, R. (2014). Sentiment analysis of Twitter data using machine learning approaches and lexical resource. *Proceedings of the 5th International Conference on Information Systems*, 61-66.
13. Hoda, R., & Noble, J. (2017). Becoming agile: A grounded theory of agile transitions in practice. *Proceedings of the International Conference on Software Engineering*, 141-151.
14. Hutto, C. J., & Gilbert, E. (2014). VADER: A parsimonious rule-based model for sentiment analysis of social media text. *Proceedings of the 8th International Conference on Weblogs and Social Media*, 216-225.
15. Kane, G. C., Palmer, D., Phillips, A. N., Kiron, D., & Buckley, N. (2015). Strategy, not technology, drives digital transformation. *MIT Sloan Management Review*, 14(1), 1-25.
16. Kouloumpis, E., Wilson, T., & Moore, J. (2011). Twitter sentiment analysis: The good, the bad, and the OMG! *Proceedings of the 5th International Conference on Weblogs and Social Media*, 538-541.
17. Liu, B. (2012). Sentiment analysis and opinion mining. *Synthesis Lectures on Human Language Technologies*, 5(1), 1-167.
18. Liu, S., Liu, X., & Li, X. (2016). Understanding users' concerns about the health data breach in healthcare organizations: A text mining approach. *MIS Quarterly*, 40(4), 993-1022.

19. Mergel, I., Ganapati, S., & Whitford, A. B. (2021). Agile: A new way of governing. *Public Administration Review*, 81(1), 161-165.
20. Nambisan, S., Wright, M., & Feldman, M. (2019). The digital transformation of innovation and entrepreneurship: Progress, challenges, and key themes. *Research Policy*, 48(8), 103773.
21. Abazi Chaushi, B., Dika, Z., & Chaushi, A. (2017). Improving institutional services through university ERP: A study of the academic planning module development at SEEU. *SEEU Review*, 12(2), 62–81. <https://doi.org/10.1515/seeur-2017-0018>