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Introducing concepts: stairs of acceptance and project specific reputation score. Exploring public acceptance in three Finnish construction projects via large dataset media-analytics

Kalle Nuortimo*

Turku School of Economics, University of Turku, Finland
Email: kalle.nuortimo@shi-g.com

Janne Härkönen

Industrial Engineering and Management,
University of Oulu, Finland
Email: janne.harkonen@oulu.fi

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ABSTRACT The opposition to a deployed technology in large construction projects can grow step by step when transferred from a global level to local project delivery. Large construction projects with specific technology implementations put pressure on local public acceptance and community involvement. This pressure is transferred to project management, how to deal with the issue of stakeholder acceptance before, during, and after project execution. Hence, understanding public acceptance and project-specific reputation can prove beneficial. Utilized mostly in the company Market Intelligence function(MI), modern large dataset media analytics enables mining technology-related sentiments on global, regional, or local project levels. This paper measures the media sentiment towards three large Finnish construction projects. The specific interest is to investigate which stakeholder groups are visible through the editorial and social media and how these can be classified according to the level of required information or participation level. The aim is to gain a numerical value for project reputation, a concept belonging to the marketing field of studies. Relevant technology deployment indications are provided, and a stairs of acceptance concept is conceptualized to reflect the project-specific public acceptance. Specific needs to increase efforts at a local project level are indicated. The means to counteract local resistance can involve the mode of project execution or social marketing. The new algorithm-based method for measuring public acceptance and the introduced stairs of acceptance concept may bring project-level benefits by providing the added focus for increasing public acceptance.

KEYWORDS: Data-analytics, public acceptance, project reputation, complex project stakeholder analysis, sentiment analysis

* Corresponding Author

1. INTRODUCTION

Market Intelligence(MI) information and tools can be utilized in various functions of a company, also in the project management function, especially in the case of complex megaprojects. It is not just the local project execution that is affected by the drastic increase in information and the variety of channels providing open communication among project stakeholders. The global technology trends, as perceived by project stakeholders based on available information and communication, can influence the local project execution via technology acceptance. Examples can be drawn, for example, from coal combustion technology; its reputation globally has been so negative that there are implications for any future local coal power plant projects and local stakeholder management (Nuortimo 2020). Nevertheless, studies are scarce in terms of direct project management focus on public acceptance via modern digital media sentiment analytics, in order to take advantage of the vast sea of available market information from social media (SoMe).

This paper combines multiple aspects, it measures the media sentiment of three complex construction projects via a combination of large-scale media-analytics and a detailed classification to understand exactly what is measured, i.e., is it the project acceptance amongst a stakeholder group, or something else. It is also important to understand how the media-analytics compares to traditional methods. The difference is the pure amount of data; where traditional methods are very limited in coverage, the opinion mining on a global dataset can consist of several hundreds of thousands of data points (Nuortimo 2020, 2021). In this study, a new methodological approach is adopted to analyze the project sentiment. Human validation is applied to ensure data validity.

The paper starts from local project execution, including a specific focus on stakeholder management. To describe traditional, complex construction projects, the main participants in a construction coalition are usually the client, the architect, and the contractor. The interrelations between these participants determine the overall performance of the construction project to reach successful completion (Takim, 2009). The main contractor selects the sub-suppliers. The project alliance model, on the other hand, aims to reduce the length of the construction time and the construction costs through contractor involvement at an early stage of the design process. The project participants are paid on a net cost basis with participants jointly sharing the financial success or failure of the project at the completion, and the creation of a contractual partnership between all the parties (Scheublin, 2001). How these two execution models treat stakeholders differ, while in management theory and practice, the rise and role of stakeholders as major players in organizational dynamics are widely recognized and recorded, and the traditional view of the client as a single entity does not reflect the reality of stakeholder configurations for most projects (Newcombe, 2003). In Finland, large construction projects with different phases are executed with both traditional and alliance models, which utilize the expertise of different sub-suppliers and partners.

Today, the public acceptance is considered as the most critical issue, especially in areas without any prior experience, for example, a specific energy product. The widely discussed "Not in My Back Yard" (NIMBY) syndrome needs to be considered already in the project planning stage (Achillas *et al.*, 2011). Further, the NIMBY syndrome has been found to have several dimensions, including sociological, economic, political, and ethical (Beben, 2015). Strong protests by local communities can be observed especially in cities with high population densities (Ren *et al.*, 2016). The NIMBY syndrome is a part of the socio-political research field, whereas its influence has been notified also in the field of marketing research and tackled by, for example, social marketing, originally introduced by Philip Kotler (Stead & Hastings, 2018). In addition to using the alliance execution model, social marketing is a process where actions are aimed at triggering desired attitudes and behaviours by using marketing techniques, and marketing mix, containing cost, product benefits, communication, distribution, and people leaders (Beben, 2015). Especially in the Chinese WtE incineration projects, the NIMBY has been dealt with by a 6P model of the social marketing mix, based on the social marketing theory (Dong *et al.*, 2016).

To manage the stakeholders, complex construction projects attract interest from various stakeholders who express needs and expectations about the project, while these are often in conflict with each other, and it is unlikely that all of them can be fulfilled, requiring stakeholder management (Olander, 2007). Traditionally, stakeholder involvement has been researched by using questionnaires (Wang & Huang, 2006; Zanjirchi & Moradi, 2012).

In stakeholder theories, public acceptance has seldom been prioritized over hard financial values, while stakeholders can be classified stakeholders to groups. Construction engineers are seen to use the relation among the key stakeholders as the most important criterion of evaluating project success (Wang & Huang, 2006). The project stakeholders' project performance is also seen to positively correlate with each other; whereas project owners play the most important role in determining the project success, and project management organizations' performance has significant correlations with project success criteria as the single point of project responsibility (Wang & Huang, 2006).

When transferring the stakeholder acceptance measurement methods from questionnaires and interviews to digital age, numerical project reputation value is a new concept introduced in this paper, derived from automated media sentiment analysis via Likert scaling. Reputation is formed in the minds of stakeholders and is out of direct company control, making it rather challenging to manage (Argenti & Druckenmiller, 2004). Companies can have versatile reputations for various stakeholder groups. The analysis is committed with the help of media analytics, in this case black-box type media monitoring software. This takes place in the global context, where the mere manual analysis of content is no longer practical due to the sheer volume of data (Dhaoui et al., 2017; Wang et al., 2012), and therefore automated analysis is necessary. The computational analysis of vast amounts of data has only recently become truly viable due to developments in information technology (Chen et al., 2012). In this case, the possibility to measure large datasets with global, regional, and local levels, contributes to the build-up of stairs of acceptance concept, combining global and regional results from previous research (Nuortimo 2020; 2021) with project level studies presented in this paper and in Lehtinen (2021). One important project specific comparison point is the dissertation by Lehtinen (2021), highlighting the Raidejokeri project details studied with traditional methods, such as questionnaires and interviews.

This paper aims to 1) highlight the larger framework of acceptance and its measurement on global, regional, and local project levels via modern media-analysis, and 2) analyse via hybrid approach whether there are visible differences in project stakeholder communication of different groups, and how the general project reputation score can be calculated. Also, the human classification results via hybrid research approach are utilised to ensure validity of the measured sentiment.

This paper is organized as follows: First, literature review highlights the theoretical aspects related to the concept of public acceptance in different levels, and related stakeholder and project managerial aspects. Also, the method application, such as sentiment measurement related aspects, are discussed. Then the large-scale data-analysis is carried out based on the project name, to highlight general project visibility, sentiment, and development trend of three large construction projects, which in general, would be facing issues related to public acceptance and stakeholder management. Based on the research scope, Raidejokeri was selected as an example project to investigate the more detailed aspects. Finally, in discussion section, these views are combined to highlight theoretical, methodological, and managerial contributions.

2. LITERATURE REVIEW

Projects involve a variety of stakeholders whose opinions and interests may influence the success of delivering the project outcomes (Bourne & Walker, 2006). It is essential to increase the understanding of stakeholders' influence, attributes, concerns, and behaviour to understand how to engage them in the project management decision-making process (Aaltonen & Kujala, 2010). Also, the public, or members of public are stakeholders if they have interests in the project, and the acceptance or opposition by them may affect the project.

In general, the concept of stakeholders and their engagement are considered a part of stakeholder theory (Parmar et al, 2010). In this research paper, the general and the more focused area-specific attitudes of the public can be considered along the axis of global-regional-local acceptance. Global acceptance can be linked to potential country-level gains (Gough et al. 2002), or greater benefits for society in general (Kokkinos et al. 2018). It is generally described as socio-political acceptance, operating at the level of technologies, policies, key stakeholders, and the general public (Sovacool and Ratan, 2012). Related market acceptance involves the adoption of technologies by consumers and businesses (Sovacool and Ratan, 2012). Acceptance of a technology can be described as a "range of potential attitudes towards the technology, which are other

than active opposition, namely apathy, passive acceptance, approval, and finally active support" (Hanger et al. 2016). In literature, it is generally described, that distinction can be made between different levels of acceptance taking place in different spheres (Wüstenhagen et al., 2007). The regional acceptance links to the perception of stakeholders and fairness (Gölz & Wedderhoff, 2018).

Local acceptance is linked to three types of factors, namely personal (age, gender, education), place attachment (bonds, awareness, behavioral, etc.), and project-related factors (perceived impacts, procedural justice, and trust). Nevertheless, project-related factors are seen as the most important ones in explaining local acceptance, or the lack of it (Devine-Wright, 2012). Local community acceptance can be considered as the most specific level (Sovacool and Ratan, 2012) and it concerns the energy by communities affected by the technology developed and is constructed nearby (Roddis et al., 2018). So, it seems evident, that community acceptance is a key player in implementing technologies on the local level. One essential factor, which can affect to resistance, is how public perceives the cost and benefit distribution (Shaw et al., 2015).

As the acceptance can be considered either as that by individuals or the overall public acceptance, transparency is particularly essential for building and maintaining the public acceptance, both in terms of the decision-making process, as well as the possibilities to influence it (Hildebrand et al. 2012). Furthermore, it can be possible to determine suitable levels of public participation that would positively influence public acceptance (Heldt et al. 2016). After all, it is the public engagement strategy that creates public acceptance through the pathway of communication and engagement (Mulyasari et al., 2021). Gaining public acceptance not only requires communication and dissemination of information, or elaborate risk assessment but also acknowledging different moral stakeholder viewpoints and accommodating a variety of values (Correljé et al. 2015).

As to tackle challenges on project level, social marketing is proposed as a technique to achieve social change as an effective approach to engage the public in terms of projects that influence them or their surroundings (Wong-Parodi et al. 2011). Social marketing can also be used to identify engagement strategies to increase understanding (McCarthy & Eagle, 2020). Social marketing can further be seen as an intervention design with support for planned behavior theory (Tapp et al. 2015). Stakeholder participation is specifically highlighted as important for social marketing efforts (McHugh et al. 2018).

As project reputation is a concept introduced in the marketing research field, the evaluation of project reputation is dependent on the nature and timing of such evaluation, and the stakeholder perspective (McLeod et al. 2012). Project reputation has also been linked to project performance (Badewi, 2016), indicating some linkage to public engagement and acceptance. Product and process perspectives have been highlighted as drivers of project reputation with linkages to stakeholders (Olawale et al. 2020). The main relation of reputation and acceptance seems to be that even things with good reputation are not necessarily accepted due various reasons in some stakeholder groups, such as political, ideological, or religious. The decision-making should be aware that stakeholder reactions may not be aligned with the overall project reputation.

Project managers attempt to predict the stakeholder reactions during the decision-making and choose suitable solutions to manage the stakeholders (Yang et al. 2009). The stakeholder management involves the stakeholder analysis that is prone to interpretations and the interpretation process is affected by how the information is obtained, filtered, and processed (Aaltonen, 2011). It is the project manager's perception of stakeholder attributes that is seen as critical to the view of stakeholder salience in the stakeholder classification (Mitchell et al. 1997). Nonetheless, effective stakeholder analysis should understand the possible trade-offs that do not compromise the project purpose, identify the extent to which the needs and concerns are possible to be fulfilled, and understand the consequences of non-fulfilment (Olander & Landin, 2008). Stakeholder relationship analysis is an alternative approach to predicting stakeholder behaviour and demands (Rowley, 1997). These normative guidelines on classifying stakeholders by assuming an objectively analysable environment form a good share of stakeholder research and have their use in classifying stakeholders and in evaluating their impact along with attributes, attitudes, and interdependencies. Nevertheless, certain interconnectedness of stakeholder concerns can produce a chain effect leading to conflicts and resistance, making the understanding of concern interdependencies also beneficial (Mok et al. 2017). The overall understanding of stakeholder dynamics and the impacts on project

management is important for evaluating project viability (Aaltonen et al. 2015). Nevertheless, different interpretations are possible from similar stakeholder analysis processes (Aaltonen, 2011).

Project stakeholder analysis can be seen to have the primary aims to identify, prioritise, and make the appropriate decisions (Yang, 2014). Data collection is necessary to identify stakeholders, followed by interpretation to give meaning to identify, and to further classify. Aaltonen (2011) divides the stakeholder analysis process phases into data collection, stakeholder identification and classification, and strategy formulation and decision-making. A variety of methods have been discussed in conjunction with stakeholder analysis and linkages to stakeholder process steps (Table 1). Nevertheless, the methods to cover the stakeholder analysis and their application can entail challenges in terms of identification and the characterisation of the stakeholders (Jepsen & Eskerod, 2009). However, these methods are mainly concentrated on local project level without the possibility to gain a global view of the applied technology and related acceptance, which can be influential for example in complex projects when the technology to be implemented has a poor reputation.

As project stakeholders play a significant role in the project execution, stakeholder analysis is not enough, but adequate stakeholder management with a systematic process is needed (Karlsen, 2002). Understanding stakeholder behaviour is necessary for stakeholder management (Berman et al. 1999). Also, following the plan is not enough as a project can be successful only if the stakeholders contribute as they evaluate the success (Eskerod & Jepsen, 2013). Stakeholder management can be seen as organisation-focused or issue-focused, depending on whether the focus is on the organisation's welfare or an issue that affects relationships with other societal groups (Roloff, 2008).

Factors affecting the stakeholder management process from the project implementation perspective, either positively or negatively are listed as 1) analysing stakeholder concerns and needs, 2) communication of benefits and negative impacts, 3) evaluation of alternative solutions, 4) project organisation, and 5) media relations (Olander & Landin, 2008). One perspective is that even unpopular decisions can be pushed through by using alliances between inner stakeholders coined with powerful outside stakeholders to gain power (Newcombe, 2003) to work towards project objectives.

Meeting the project objectives often necessitate the appropriate inclusion of the public (Sterry & Sutrisna, 2007). However, the general public is often seen as a secondary stakeholder (Newcombe, 2003), and is traditionally seen to result in low-level risk impact on projects, even if the public may have high interests in the project and are impacted by the project (Manowong & Ogunlana, 2010). Nevertheless, in some instances, the successful project outcome necessitates that the public is regarded as a key stakeholder (Yuan, 2017), whereas it is the media that plays a vital role in informing and educating the public during the stakeholder participation process (Li et al. 2013). The public as a participating stakeholder can provide beneficial public awareness (Xie et al. 2014). Addressing the problem of the public being in the margins and moving them to the centre has been discussed for some projects (Henjewele et al. 2013).

Not in my Backyard (NIMBY) effect, produced by factors such as known risks, values,

Table 1. Examples of stakeholder analysis methods, stakeholder management, and linkages to process steps.

Method	Source	Process step
Interviews	(Brugha & Varvasovszky, 2000; Raum, 2018)	Data collection/ Stakeholder identification
Brainstorming	(Colvin et al. 2016)	Stakeholder identification
Stakeholder lists	(Yang et al. 2011)	Stakeholder prioritisation
Stakeholder led categorisation	(Reed et al. 2009)	Stakeholder prioritisation
Stakeholder salience	(Mitchell et al. 1997)	Stakeholder prioritisation
Power/ Interest matrix	(Olander & Landin, 2008)	Stakeholder prioritisation
Social network analysis	(Rowley, 1997)	Stakeholder identification/ prioritisation
Strategic/ Intrinsic	(Berman et al. 1999)	Stakeholder management
Factors affecting the stakeholder management process	(Olander & Landin, 2008)	Stakeholder management

and feelings of unfairness, is one form of the potential negative outcome of the public opinions being overseen (Tcvetkov et al. 2019). Nevertheless, it has been noted that the NIMBY label is masking issues that the project has not addressed (Devine-Wright, 2012). The public opposition to the projects is further labelled as NIMBYism (Cass & Walker, 2009). The general attitude of the public towards the project can be positive, but they just do not want it in proximity and is a form of local opposition (Carley et al. 2020).

Today, the social media acts as a catalyst for the rapid spread of public opinions, reflecting the acceptance or opposition by the public. Social media, in general, is seen to consist of Web 2.0 -labelled applications, such as Twitter, Facebook Instagram, and YouTube, which enable creating and sharing different kinds of information (Kumar & Singh, 2020). Social media enables two way communication between stakeholder groups, thus a project organisation can benefit from different SoMe sources in attempts of understanding the external stakeholder network and stakeholders' online behaviour. Or alternatively enhancing the sense of community that helps planning the following communication with specific stakeholders (Williams et al., 2015; Turkulainen et al., 2015). However, stakeholder communication research on social media channels is only in the very early stages and studying the details and effectiveness of social media communication in complex projects is essential for developing a more contextualised understanding of stakeholder engagement (Lehtinen, 2021). This is one of the research gaps addressed in the paper.

As a way to implement new ways of tackling very diverse flow of social media based information, and advance research methods typical for questionnaires and interviews in a wider scale, opinions can be determined by the means of sentiment analysis, which is increasing in the social media (Chaudhary et al., 2018). This includes multiple IT-related aspects, such as 1) what the sentiment is measuring, 2) what is the accuracy, and 3) How to get to the detailed subject level, thus bringing multidisciplinarity into this type of research approach. Previous studies have applied sentiment analysis to for example online reputation management (Olaleye et al., 2018). Zervas et al. (2021) studied the online reputation via customer ratings, and Rust et al. (2021) created the automated reputation tracker. As an example of similar project acceptance measurement via an automated approach, public acceptance of an energy technology has been modelled previously for example via a Deep Neural Network algorithm, which is a hybridisation of fuzzy logic and a deep neural network algorithm (Buah *et al.*, 2020). This work utilizes a hybrid approach (Nuortimo 2021), with an aim to 1) discover trends and directions from a larger dataset, 2) reach basis for project comparison, both large scale and detailed level, 3) define project reputation score and details for smaller dataset classification, described in the next section, and 4) compare classification results to a larger scale automatic measurements to form a bigger picture.

3. RESEARCH METHOD: HYBRID APPROACH

This research paper utilises two stepped hybrid approach: 1) Projects' yearly data is obtained from black-box media monitoring software, commonly used in the company's MI-function and summarised. 2) More detailed project-level analysis is carried out via manual classification of hits to discover the project stakeholder related details and distil implications to managerial actions.

Opinion mining on a large media dataset is utilised in the first step with the help of a commercial black box media monitoring software M-Adaptive (Nuortimo, 2020, 2021). This is done in compilation with a more detailed human-based analysis to clarify the content details related to the project stakeholders. Figure 1 illustrates the applied hybrid approach. The used software (M-Brain, 2015) has the capability to utilise a large dataset covering 236 regions, 71 languages in 3 million social media platforms and 100,000 news outlets, both social media (SoMe) and editorial media sources. The software includes different lexicons for several languages, from which the algorithm defines the first local sentiments for a document and then compares those to the search terms. The results are presented for the entire document, indicating the sentiment (neutral, negative, positive, mixed, or unknown). The algorithm applies the same consistent logic for the text in all the documents. The accuracy of sentiment classification is approximately 80 %. The analysis by machine is objective, and should any mistake take place, they are made in a predictable manner. The benefits include avoiding dependency on individuals, and the ability to deal with

a vast quantity of data. After the opinion mining, the project sentiments are grouped and compared to each other, and the human made classification is the final step.

The two-step approach helps in focusing on the aspects of project stakeholder related issues, firstly, it reveals the projects media visibility, and the sentiment, enabling comparison to other projects and discover development trends during time and project progress. In the second stage, a detailed human made classification analysis of the projects can complement the big picture with insights. These insights can include issues such as: explanation on why the project sentiment was negative or positive; support for converting negative issues to positive project stakeholder communication; understanding whether the positive/negative media hit measure project reputation, local project resistance, stakeholder views in format of electronic word to mouth communication (eVOM), or something external to project environment, related fairly random items, such as the existence of endangered species in the project site, as was the case in the Raidejokeri project.

Table 2. Selected Finnish construction projects.

Project	Alliance model (yes/no)	Sector	Schedule	Location	Description
Fennovoima/ Hanhikivi1	No	Large nuclear	2014–2022/5 terminated	Pyhäjoki, Finland	Nuclear Power Plant
Naistenlahti 3	No	Medium sized CHP plant	2020–2023	Tampere, Finland	Bio-plant (combined heat and power) that burns renewable biomass
Raidejokeri	Yes	Light rail system construction (Tram)	2019–2024	Helsinki & Espoo, Finland	Cross-Regional Public Transport: Tramline to connect the cities of Helsinki and Espoo.

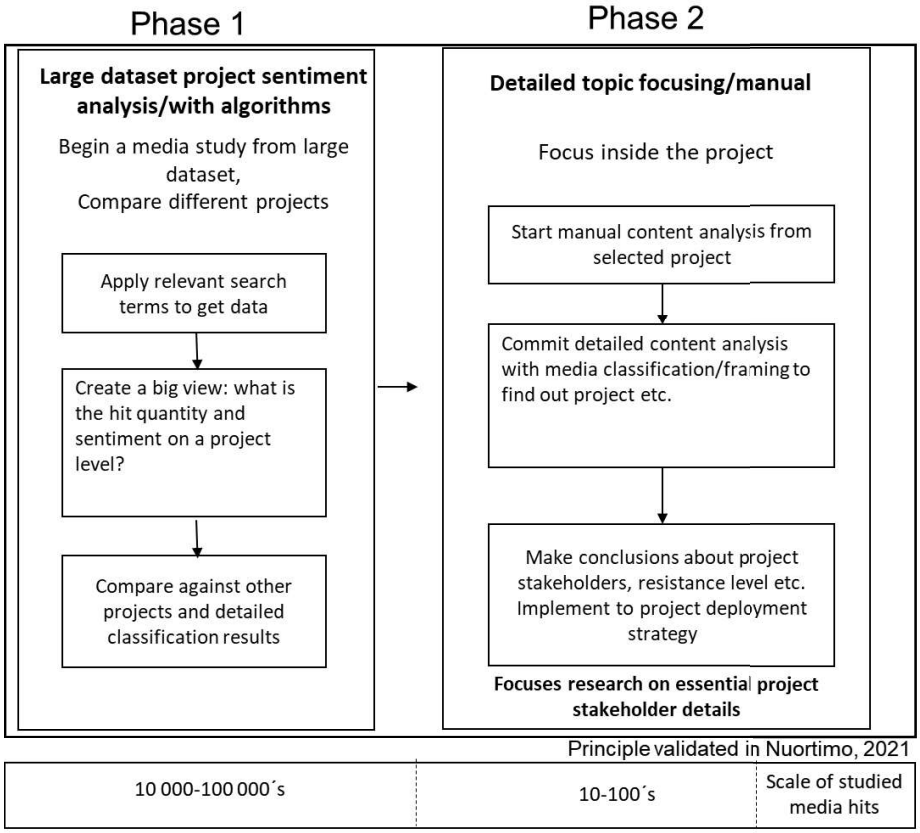

Figure 1. Hybrid approach (Nuortimo, 2021) as a research method – algorithm-based mining of media, and focused manual analysis.

When the sentiment of communication is likert scaled with scale of 1–5 (positive 4–5, negative 1–2, neutral + mixed 3, it is possible to get a numerical value for different stakeholder groups such as construction companies, electronic word to mouth based on local residents, tram users, politicians, governmental communication, local editorial press, and trade press. By calculating the numerical value, it is possible to gain total project reputation score, which can be used to compare projects, and to understand support or opposition in terms of more specific issues. The selected projects are described in table 2.

Figure 1 depicts the two-stepped hybrid approach used in this paper.

4. DATA-ANALYSIS FROM A LARGE DATASET TO DETAILED LEVEL

This section presents the results media-based data-analysis covering two years, 2020 and 2021, with the aim to gain a) quantity/sentiment comparison between projects, b) understand development trend, and c) indication of the most interesting project for further detailed study. The total amount of analysed hits was 11 780, mainly in Finnish language due to the projects' origin.

4.1 First stage: Two year media analysis data covering three Finnish construction projects

Table 3 summarises the identified relevant media analysis data for the three construction projects over the two year period based on the media-based data mining of a vast amount of data.

From the overall large dataset based media-analytics on three projects, some general comparisons can be made concerning the project sentiment and the communication volume. Trend analysis can also be made over the course of the projects. If, for example, the communication in social media (SoMe) should turn negative at some point, the reasons could be investigated. Also, the popularity of the project, project reputation, can be compared amongst the projects. Whereas the two-year media sentiments and the amount of communication indicate that the Raidejokeri tram project with an alliance execution model has received the majority of the communication (total hits 7131–4559 editorial/ 2572 SoMe), with a mostly neutral and positive sentiment (Figures 2 and 3). Fennovoima project received the second most communication (total of 4185 hits – 2788 editorial, 1397 SoMe), editorial sentiment being mostly positive and SoMe mostly neutral. The regional Kyvo 3 CHP-power plant, Naistenlahti project received the least attention (464 total hits – 375 editorial, 89 SoMe).

From the figure 2 it is visible, that Raidejokeri sentiment is neutral and positive, while Fennovoima had slightly better positive score in the editorial media, but not in the social media. Naistenlahti being the smallest and a regional project to build a CHP powerplant, it received mostly neutral communication especially in the social media. None of the project data gained from the large dataset implicate significantly large negative communication. Based on general comparison, indicative conclusions could include, that the projects are

Table 3. Analysed media hits summarised.

Project/ sector/ schedule	Analysis time frame/ months	Total editorial hits/av.hits/ month	Total SoMe hits/ av.hits/month	Editorial Sentiment % positive/ negative/ neutral	Social media Sentiment % positive/ negative/ neutral
Fennovoima/ Large nuclear/ 2014-terminated 24.5.2022	2.1.2020–20.12.2021/ 24months	4569/190	1397/ 58	36%/ 10%/ 48%	23%/13%/60%
Naistenlahti 3/ Medium size CHP plant/ 2020–2023	2.1.2020–20.12.2021/ 24 months	375/15	47/2	29%/ 2%/ 65%	11%/4%/79%
Raidejokeri/ Public transport/ 2019–2024	31.12.2019–20.12.2021/ 24 months	4559/ 379	2572/190	31%/4% /62%	26%/4%/67%

generally accepted, and that Raidejokeri could be a target for further studies, specifically taking into account the focus of this paper.

The more specific Fennovoima project hits are presented as Figures 4 and 5. From Figure 4, it can be seen that the SoMe sentiment is slightly less positive, and more neutral and negative.

The trend of media-attention for Fennovoima has been increasingly more positive both in editorial media and SoMe (Figure 5).

Figures 6 and 7 present the two-year project media sentiment distribution for Naistenlahti 3 project, for which the sentiment has been more positive in the editorial media, and slightly decreasing from 2020 to 2021.

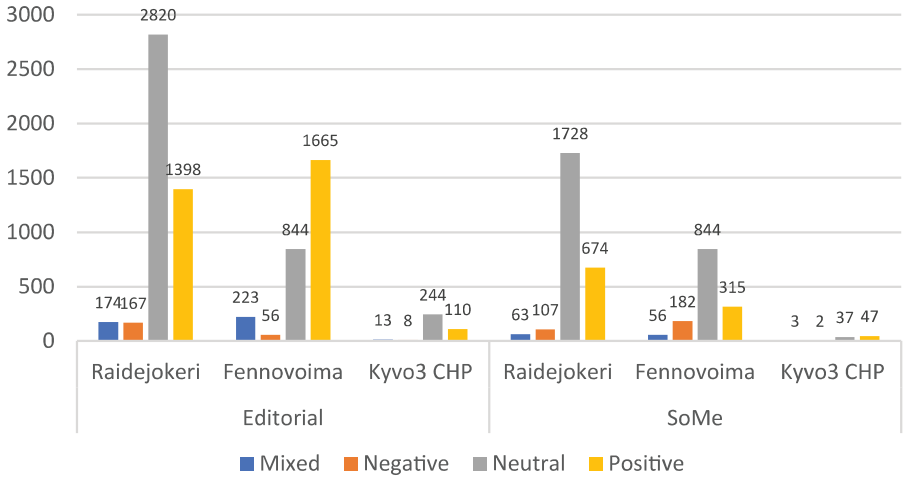

Figure 2. Media visibility and sentiment distribution of the projects over two year period.

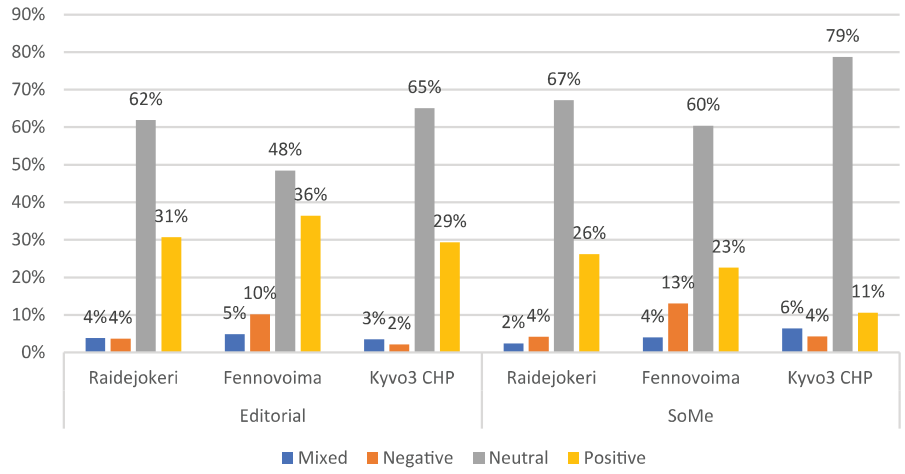

Figure 3. Media sentiment distribution of the projects over two year period.

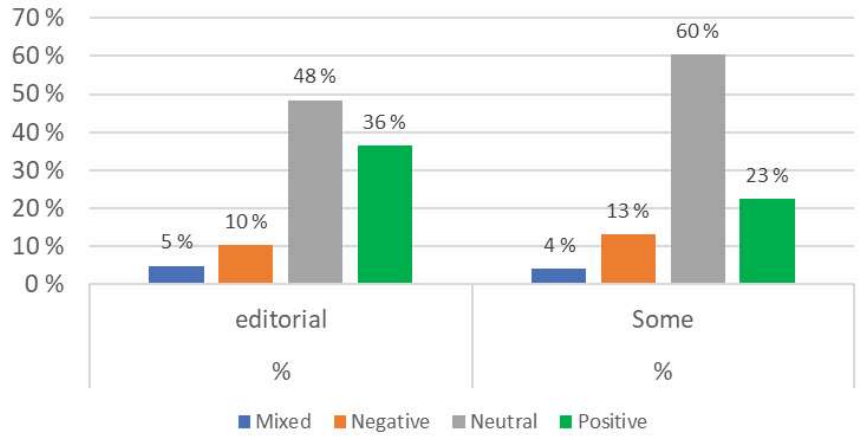

Figure 4. Sentiment of 2020 & 2021 opinion mined media hits – Fennovoima.

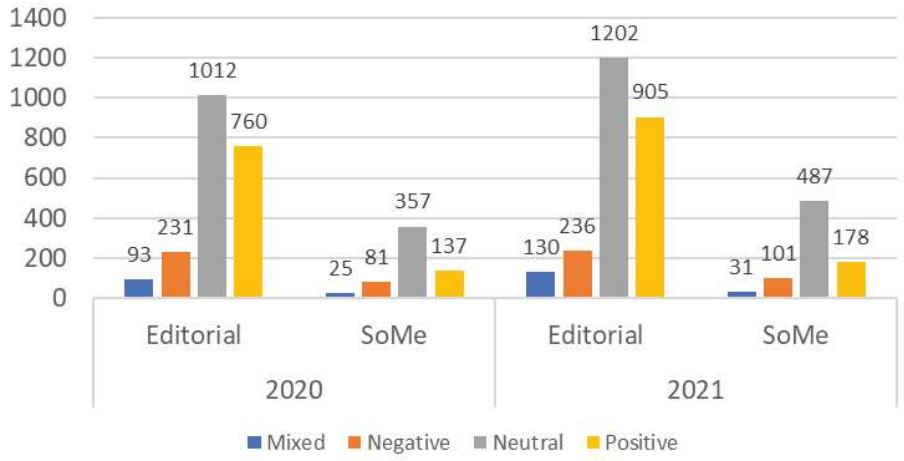

Figure 5. 2020 & 2021 opinion mined media hits – Fennovoima, yearly trend.

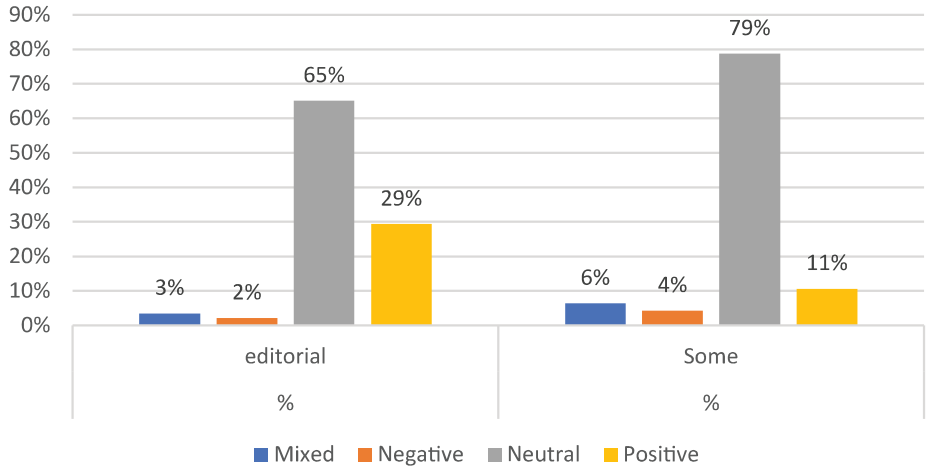

Figure 6. 2020 & 2021 opinion mined media hits – Naistenlahti 3.

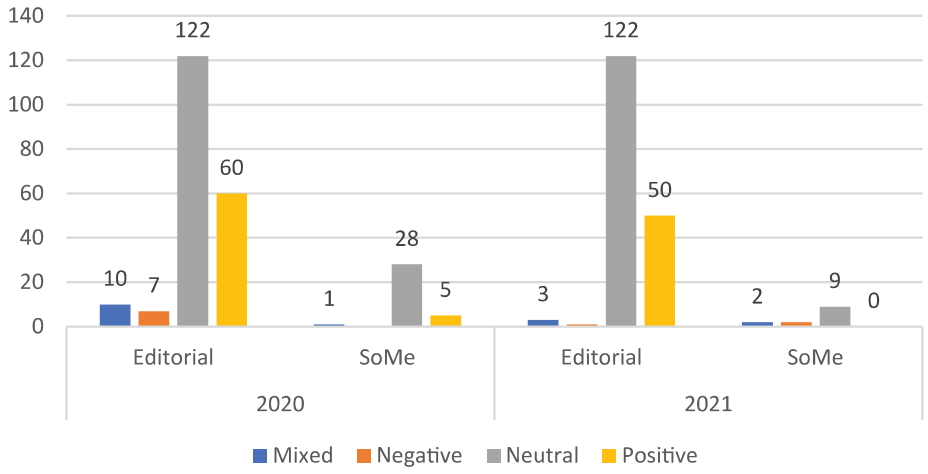

Figure 7. 2020 & 2021 opinion mined media hits – Naistenlahti 3.

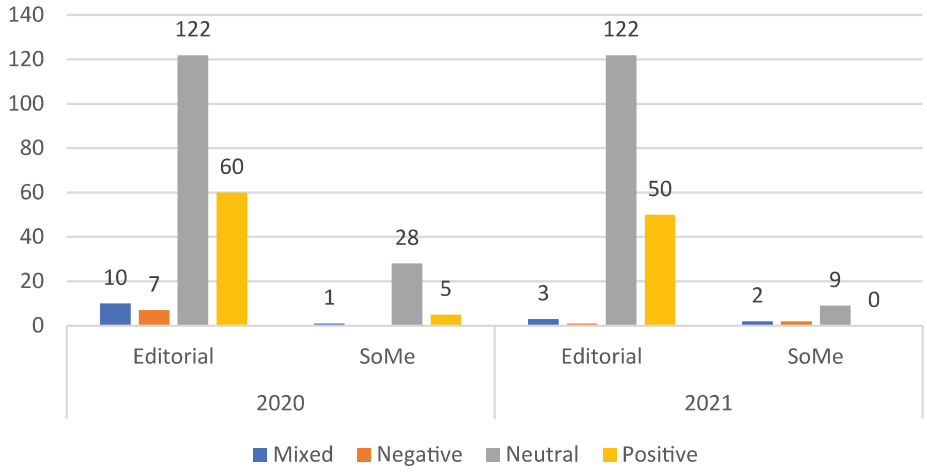

Figure 8. 2020 & 2021 opinion mined media hits – Raidejokeri.

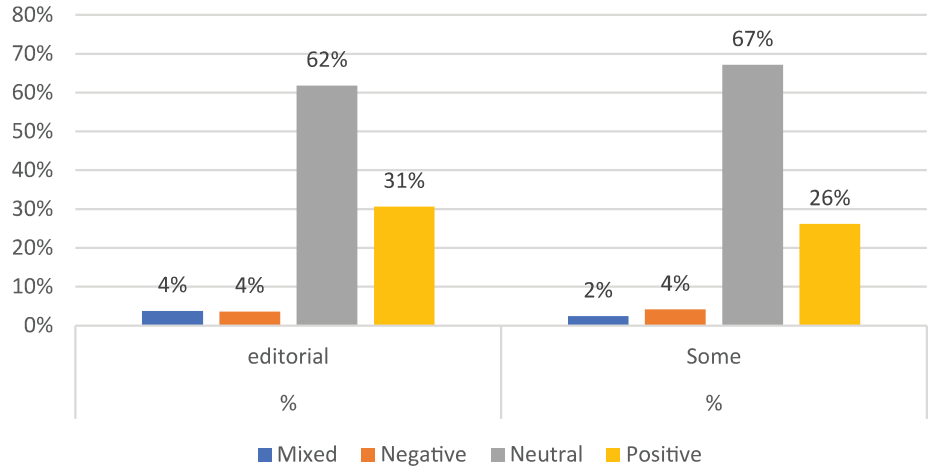

Figure 9. 2020 & 2021 opinion mined media hits – Raidejokeri.

The Figures 8 and 9 present the two-year media sentiment distribution for the Raidejokeri project, and give an indication that the editorial media has been slightly more positive, and trend has been somewhat increasing from 2020 to 2021.

From the first stage, general conclusions can be made to aid in highlighting the general project sentiment, and to guide the further research stages, namely the classification of Raidejokeri project related hits. One important target is to obtain information on what the project sentiment is actually measuring, whether it is project acceptance, reputation, or something else, and to finally reach the goal to defining project specific reputation value.

4.2 Second stage: Classification analysis of the media hits

The project of interest was selected based on large-dataset media-analysis stage, where Raidejokeri gathered most of the positive and neutral media attention both in the editorial and social media. The project was the only one executed with an alliance model, hence the interest was also focused on how the alliance model execution is visible in the media-feed.

The classification structures for the project related media hits are described as tables 4–6. Total of 45 hits were classified manually for the period of 22.1.2020–3.4.2021 to understand what the media hit sentiment actually measures, whether it is as accurate as implicated (app. 80 %), and to clarify the project specific communication details. It was noted that all selected hits were relevant, and somehow related to Raidejokeri project. In general, "Raidejokeri" was the specialised search word giving mostly results related to the project, due to the uniqueness of the word. Table 4 presents general results, the general sentiment.

It is visible from table 4 that media hit sentiment seldom measures direct project acceptance or resistance. Nevertheless, it is possible to identify major stakeholder classes.

Table 4. Classification analysis of Raidejokeri project hits.

Topic correct	Sentiment correct	Major stakeholder class visible	Company generated editorial/ SoMe	Activist generated editorial/ SoMe	Positive measures acceptance	Negative measures resistance
45	37/ 82%	43	9	3	4	1

Table 5. Classification of Raidejokeri project hits.

Sentiment reflects project reputation	Positive	Negative	Neutral
28	15	1	11

It is visible from table 5 that the sentiment is mostly an indication of project reputation amongst different stakeholders, not necessarily direct acceptance. This is mainly related to automated sentiment calculation, where only positive and negative expression are identified from text without direct relation to content. Table 6 illustrates classified hits with likert scaling from sentiment value and calculating the average, combining both topic and sentiment classification with deeper insight.

Table 6. Likert scaled values for different measured stakeholder groups based on the 27 hits measuring project reputation (Scale 1–5: 1–2 negative – 3 neutral + mixed – 4–5 positive).

Project stakeholder	Value
Construction companies	4
eVom: residents, tram users, politicians	3,6
Government/local authority communication	3,5
Local/national editorial press	3,3
Trade press	4,2
Total project reputation score	3,6

It is visible from the Table 6 that the project participants, such as construction companies, have highly positive active communication, which can then be compared against other stakeholder groups. This also includes eVOM (Electronic word to mouth communication), such as editorial press, authorities, and individuals. In general, the project reputation score for Raidejokeri is a bit above medium(3), which is in-line with the large amount of neutral hits in the first step's larger data series. This indicates that the project reputation is already indicatively visible from the larger data series but does not imply direct acceptance. The reputation is generally on the level that is not directly hindering or stopping the project execution, and the details listed in appendix 1 can be used by project management to counteract issues rising during the project execution and find out positive outcomes of alliance execution model.

General Raidejokeri project related issues included reaching targeted goals, project being executed according to environmental regulations, increased project schedule but higher cost, project hold-ups, experiences utilised from similar projects, and random issues, such as the endangered species on the project site. These can be utilised to gain managerial implication for project managers in the construction alliance. This also implicates possibilities to utilise company's MI function in co-operation with project management, to generate measurable data from changes in stakeholder reactions and random items influencing to project execution.

5. DISCUSSION

Understanding the influence of public acceptance on technology development and deployment for different technologies in general, and in terms the acceptance of individual projects, and the acceptance of technologies with linkages to projects can be beneficial for addressing the relevant project related acceptance of opposition. The literature focuses on acceptance from a variety of perspectives, whereas the complex project stakeholder management related acceptance has not been measured widely by the means of algorithm-based opinion mining, nor has the results been compared to wider acceptance contexts. The literature concerning co-operation between company's MI-function and project management is scarce. Nevertheless, opinion mining results not being fully conceptualized and the relevant technologies developing, certain caution is necessary to understand what the opinion mined sentiments are actually measuring. Also, the acceptance or opposition may not be completely visible directly from the gained opinion mining results. Hence, project stakeholder reputation

score is applied in this study. The reputation score is a concept applied in the marketing domain.

Due to the previous absence of a method for measuring global, or large regional acceptance, there has been a gap in explaining the influence distilled from the global level to the local project execution. The stairs of acceptance concept conceptualised in Figure 9 and is intended to reflect the project-specific public acceptance. The approach implies the reverse top to bottom order in which the technology deployment acceptance issues would be feasible to be targeted. This approach is compiled by the unification of acceptance studies to global opinion mining results. In general, the global level includes global agreements, general public sentiment, and the global technology reputation. The regional issues include country level politics, regulations, local subsidies, and the local level implies the local project implementation and site location related issues. As an energy technology related example, in the global level, agreement such as Glasgow COP-agreements guide the technology selection and would be required to be tackled before specific project implementation, and policies & regulation on regional level, with finally tackling local project deployment related issues.

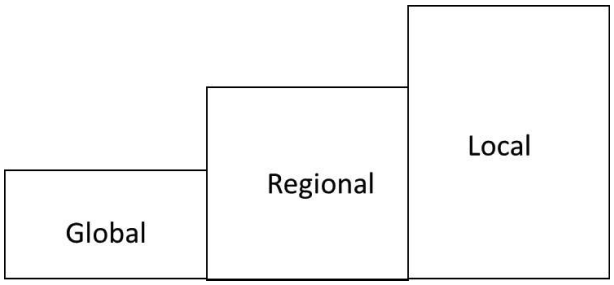

Figure 9. Stairs of acceptance

The stairs of acceptance concept can be used to emphasise the order and scale of required actions in technology development and deployment concerning the public acceptance or opposition. For example, the focus can be on power production technologies (Table 7). The approach can be used to highlight a) the general top-down approach in reaching technology acceptance to facilitate deployment, and b) increase the needed stakeholder management actions and local communication, including social marketing at the local level. The tasks of stakeholder management and local communication can be specifically challenging if the technology is not accepted at the global level, as is the case with coal and nuclear energy technologies (Nuortimo 2021). This approach also combines the benefits of co-operation between company's MI function in order to analyse global media(incl SoMe) coverage in order to make generalizations for project management concerning global-, regional- and local acceptance, as well as monitor weak signals influencing project execution in a local level, such as endangered species in the project site.

The results from the studied energy technology projects in this paper, namely Fennovoima and Naistenlahti are in-line with global and regional results. This is despite the facts that it is evident that a) the opinion mining results do not directly measure the acceptance, and merely provide an indication of it, and b) the errors in a large datasets need to be considered, such as the sentiment measurement accuracy and the influence of applied search words. In case of Fennovoima nuclear project, the chain of reasoning was visible as follows: Nuclear power sentiment globally was negative, while in Finland the overall sentiment was positive, and also for Fennovoima in general (Editorial sentiment: 36 % positive/ 9 % negative/ 49 % neutral: SoMe sentiment: 23 % positive/ 13 % negative/ 61 % neutral). The project was eventually cancelled mostly due to issues related to the Russian sub-supply linked to geopolitical issues, also one relevant topic to monitor in company's MI function.

In case of small-scale projects with well-known technology, the easy application and positive product reputation, such as solar PV panels, this type of acceptance chain is clearly positive in global, regional, and local project levels. However, in the detailed classification phase the indication was that the media analysis does not necessarily directly measure the acceptance, so the global and regional results are mostly indicative, and do not in any case present causality. On the contrary to nuclear, a WTE or coal project, if a neighbour installs solar panels on their roof, no one is likely to pay attention, which is an indication of high product reputation.

In the case of the focus project Raidejokeri, Tram-technology is well-established, and the acceptance issues are more related to project implementation level, to issues such as large demolition works and other project specific issues, such as endangered species at the construction site. The Raidejokeri is a bit separate path from energy technology acceptance but is suitable for methodological testing,

due to having communication of multiple stakeholders in a large volume, and the applied alliance project execution model.

Table 7. Three stepped classification of energy technologies.

Technology	Globally accepted/	Regionally accepted	Project accepted
Solar PV	Yes	Yes	Yes
Wind	Yes	Yes	Differs, mostly accepted
Bio	Yes	Moderate	Differs, mostly accepted
WTE	Yes	Yes	No, differs regionally
Coal	No	No	No, not accepted almost everywhere
Nuclear	No	No, differs	No, differs regionally

5.1 Methodological implications

In terms of project level sentiment measurement technologies, while new data-mining technologies such as opinion mining based on a large dataset can provide insight in all levels (global – regional – local) with generally moderate accuracy, the main question is what the project sentiment is measuring. Does the project sentiment measure acceptance or something else? In this paper, the indication is, that it is not necessary always acceptance, granted in the form of a social license, instead, the result on detailed project level could be labelled as "project reputation amongst the stakeholder group". This paper also introduced a project specific reputation score for different stakeholder groups, which can be calculated based on media hit sentiment classification, providing a numerical comparable value by following the Likert scaling by the sentiment classification. This is an approach which is comparable to current reputation scores formulated via questionnaires and interviews, utilised for different research purposes.

5.2 Managerial implications

This paper provides a new way of thinking for stakeholder management in complex projects, highlighting the co-operation between MI-function and project execution. Large construction projects may benefit from starting the stakeholder planning from the global perspective, by first thinking about general technology acceptance. This can provide new insights to the project implementation phase. Also, there is a possibility to monitor and measure the project stakeholder reputation as a numerical value with easy comparison to different project participants. It is possible to highlight how the project participants reputation has a score 4,2, but public only has 3,2, with implications to aid further guiding the positive stakeholder communication to most relevant

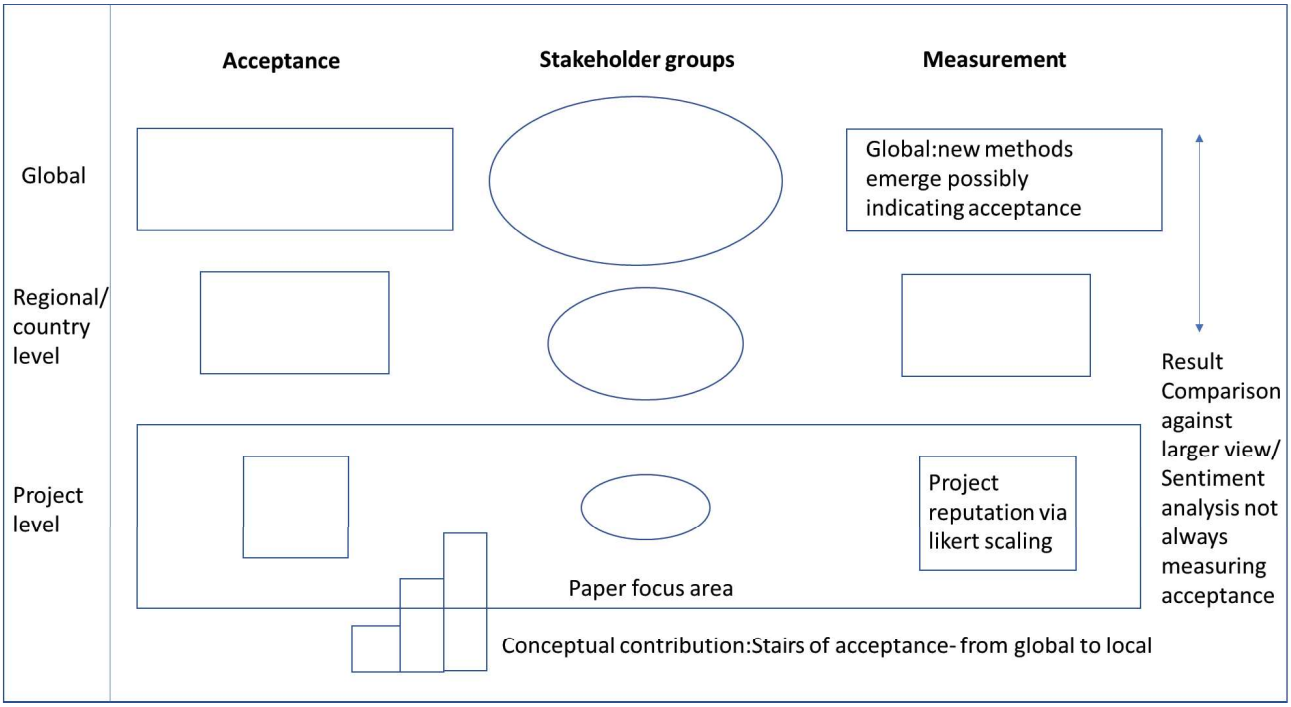

Figure 10. Summary of main paper contribution.

groups, and addressing issues as they emerge. In case of Raidejokeri project, the product reputation score of 4,2 in trade press clearly indicates the efforts to convey positive reputation for the project and alliance model, visible also in the content classification, while the reputation amongst the tram users 3,6 could indicate, that they do not read trade press. Local press score was 3,3. In case of other projects, general project reputation score could be compared against other projects to highlight the differences and find out ways to improve.

5.3 Summary of contribution

Figure 10 summarizes the main findings of this research paper.The main contribution of this research include highlighting the co-operation between MI-function and project management in order to discover how the acceptance can vary at different levels, while the largest efforts are required on the local project level, depending on the project type/scale/technology in question. To gain acceptance for a technology the approach should be from top to bottom, from global to local, by addressing different stakeholder groups.

When new measurement technologies are concerned, in project level, while new data-mining technologies such as opinion mining from large dataset, applied in the MI-function, can provide insight in all the levels with generally moderate accuracy, the question is:what is project sentiment measuring, is it acceptance or something else? In this paper, the indication is, that it is not necessary always acceptance, granted in the form of a social license, instead, the result on detailed project level could be labeled as "project reputation amongst the stakeholder group". This paper also introduced project specific reputation score for different stakeholder groups, which can be calculated based on media hit sentiment classification as a final step, providing a numerical comparable value after likert scaling from sentiment classification. This is an approach which is comparable to current reputation scores formulated via questionnaires and interviews, utilized for different marketing research purposes.

6. CONCLUSIONS

This research paper highlights how company's MI function can co-operate with complex project execution project management. This comes from issues, such as a technology can face different acceptance levels, whether it relates to global, regional, or local project delivery. Algorithm-based data mining, utilised from company's MI function, is applied in this study to reveal the project and technology related media sentiment. It is realised how the development of data-analysis is what influences the measurement of global, regional, and local stakeholder sentiment. The project specific reputation can be calculated based on the media sentiment and the conceptualised stairs of acceptance model can be used to emphasise and address the order and scale of required actions. The stairs of acceptance visualises the possible opposition faced by a project starting from the global level and ending to a local project delivery, where the resistance level can be the highest, and also the effort required to support technology deployment, especially in case of unpopular large scale project deliveries. The application of a hybrid approach is presented as a way to measure stakeholder influence from the media feed. The main project specific result is that automatic sentiment detection is about 80 % accurate, and does not necessarily indicate direct acceptance or resistance as a form of a social license, but contribute to the presented project reputation score. It was calculated, that Raidejokeri project's project reputation was 3,6 in a scale 1-5, and the most positive stakeholder group involved trade press.

REFERENCES

Aaltonen, K. (2011). Project stakeholder analysis as an environmental interpretation process. *International Journal of Project Management*, 29(2), pp. 165–183.

Aaltonen, K., Kujala, J., Havela, L. & Savage, G. (2015). Stakeholder Dynamics During the Project Front-End: The Case of Nuclear Waste Repository Projects. *Project Management Journal*, 46(6), pp. 15–41.

Aaltonen, K. & Kujala, J. (2010). A project lifecycle perspective on stakeholder influence strategies in global projects. *Scandinavian Journal of Management*, 26(4), 381–397.

Argenti, P. A., & Druckenmiller, B. (2004). Reputation and the corporate brand. Corporate reputation review, 6(4), 368–374.

Badewi, A. (2016). The impact of project management (PM) and benefits management (BM) practices on project success: towards developing a project benefits governance framework. *International Journal of Project Management*, 34(4), 761–778.

Bęben, R. (2015). The role of social marketing in overcoming the NIMBY syndrome. *Journal of positive management*, *6*(1), 3–16.

Berman, S. L., Wicks, A. C., Kotha, S., Jones, T. M. (1999). Does Stakeholder Orientation Matter? The Relationship Between Stakeholder Management Models and Firm Financial Performance. *Academy of Management Journal*. 42(5), 488–506.

Bourne, L., & Walker, D. H. T. (2006). Visualizing Stakeholder Influence – Two Australian Examples. *Project Management Journal*, 37(1), 5–21.

Buah, E., Linnanen, L., & Wu, H. (2020). Emotional responses to energy projects: A new method for m and prediction beyond self-reported emotion measure. *Energy*, *190*, 116210.

Brugha R. and Varvasovsky, Z. (2000). Stakeholder analysis: a review. *Health Policy and Planning*, 15(3), 338–345.

Carley, S. Konisky, D., Atiq, Z. Land, N. (2020) Energy infrastructure, NIMBYism, and public opinion: a systematic literature review of three decades of empirical survey literature. *Environmental Research Letters*, 15(9), 093007.

Cass, N., Walker, G. (2009). Emotion and rationality: The characterisation and evaluation of opposition to renewable energy projects, *Emotion, Space and Society*, 2(1), 62–69.

Chaudhary, M., H. Kumar, S. Kaushal, and A. K. Sangaiah. 2018. The case analysis on sentiment based ranking of nodes in social media space. *Multimedia Tools and Applications*, 7 (4): 4217–4236.

Colvin, R. M., Witt, G. B., Lacey, J. (2016). Approaches to identifying stakeholders in environmental management: Insights from practitioners to go beyond the 'usual suspects'. *Land Use Policy*. 52, 266–276.

Correljé, A., Cuppen, E., Dignum, M., Pesch, U., & Taebi, B. (2015). *Responsible Innovation in Energy Projects: Values in the Design of Technologies, Institutions and Stakeholder Interactions*. Responsible Innovation 2, 183–200.

Devine-Wright P. (2012) Explaining "NIMBY" objections to a power line: the role of personal, place attachment and project-related factors. *Environment and Behavior*, 45(6), 761–781.

Dhaoui, C., C. M. Webster, and L. P. Tan. 2017. Social media sentiment analysis: lexicon versus machine learning. *Journal of Consumer Marketing*, 34 (6): 480–488.

Dong, Q., Chen, Y., Liang, L., & Chen, F. (2016). Social marketing in NIMBY facilities planning policy: lessons learned from Hangzhou, China's unsuccessful municipal solid waste incinerator project. *FEB-FRESENIUS ENVIRONMENTAL BULLETIN*, 4823.

Eskerod, P., Jepsen, A. L. (2013). *Project Stakeholder Management*. Routledge, London, UK.

Gough, C., Taylor, I., Shackley, S. (2002). Burying Carbon under the Sea: An Initial Exploration of Public Opinions. *Energy & Environment*, 13(6), 883–900.

Gölz, S., Wedderhoff, O. (2018). "Explaining regional acceptance of the German energy transition by including trust in stakeholders and perception of fairness as socio-institutional factors. *Energy Research & Social Science*, 43, 96–108.

Hanger, S., Komendantova, N., Schinke, B., Zejli, D., Ihlal, A., & Patt, A. (2016). Community acceptance of large-scale solar energy installations in developing countries: Evidence from Morocco. *Energy Research & Social Science*, *14*, 80–89.

Heldt, S., Budryte, P., Ingensiep, H. W., Teichgräber, B., Schneider, U., Denecke, M. (2016). Social pitfalls for river restoration: How public participation uncovers problems with public acceptance. *Environmental Earth Sciences*, 75, 1053.

Henjewele, C., Fewings, P. and D. Rwelamila, P. (2013). De-marginalising the public in PPP projects through multi-stakeholders management. *Journal of Financial Management of Property and Construction*, 18(3), 210–231.

Hildebrand, J., Rau, I., Schweizer-Ries, P. (2012). Die Bedeutung dezentraler Beteiligungsprozesse für die Akzeptanz des Ausbaus erneuerbarer Energien—Eine Umweltpsychologische Betrachtung. *Informationen zur Raumentwicklung*, 9, 491–501

Jepsen, A. L. Eskerod, P. (2009). Stakeholder analysis in projects: Challenges in using current guidelines in the real world. *International Journal of Project Management*, 27(4), 335–343

Karlsen, J. T. (2002). Project Stakeholder Management. *Engineering Management Journal*, 14(4), 19–24.

Kokkinos K., Lakioti E., Papageorgiou E., Moustakas K., Karayannis V. (2018). Fuzzy Cognitive Map-Based Modeling of Social Acceptance to Overcome Uncertainties in Establishing Waste Biorefinery Facilities, *Frontiers in Energy Research*, 6, 112.

Kumar, P., & Singh, G. (2020). *Using social media and digital marketing tools and techniques for developing brand equity with connected consumers*. In Handbook of research on innovations in technology and marketing for the connected consumer (pp. 336–355). IGI Global.

Lehtinen, J., 2021. External engagement in complex projects. Doctoral Dissertation, Aalto University.

Li, T. H. Y., Ng, S. T., Skitmore, M. (2013). Evaluating stakeholder satisfaction during public participation in major infrastructure and construction projects: A fuzzy approach, *Automation in Construction*, 29, 123–135.

Manowong, E. & Ogunlana, S. (2010). *Strategies and Tactics for Managing Construction Stakeholders*. Chinyoio, E. (Ed.), Construction Stakeholder Management, John Wiley and Sons, United Kingdom, 121–137

McCarthy, B. & Eagle, L. (2020). *Winds of Change: Engaging with Conflicting Perspectives in Renewable Energy*. In: Hay, R., Eagle, L., Bhati, A. (eds) Broadening Cultural Horizons in Social Marketing. Springer, Singapore.

McHugh, P., Domegan, C., Duane, S. (2018). Protocols for Stakeholder Participation in Social Marketing Systems. *Social Marketing Quarterly*, 24(3), 164–193.

McLeod, L., Doolin, B., MacDonell, S.G. (2012). A perspective-based understanding of project success. *Project Management Journal*, 43(5), 68–86.

Mitchell, R. K., Agle, B. R., & Wood, D. J. (1997). Toward a theory of stakeholder identification and salience. Defining the principle of who and what really counts. *Academy of Management Review*, 22(4), pp. 853–886.

Mok, K. Y., Shen, G. Q., Yang, R. J. & Li, C. Z. (2017). Investigating key challenges in major public engineering projects by a network-theory based analysis of stakeholder concerns: A case study, *International Journal of Project Management*, 35(1), pp. 78–94.

Mulyasari, F., Harahap, A. K., Rio, A. O., Sule, R., Kadir, W. G. A. (2021). Potentials of the public engagement strategy for public acceptance and social license to operate: Case study of Carbon Capture, Utilisation, and Storage Gundih Pilot Project in Indonesia. *International Journal of Greenhouse Gas Control*, 108, 103312.

Newcombe, R. (2003). From client to project stakeholders: a stakeholder mapping approach. *Construction management and economics*, *21*(8), 841–848.

Nuortimo, K. *Public acceptance in energy technology development and deployment*. Opinion mining case study (Doctoral dissertation, University of Oulu).

Nuortimo, K. (2021). *Hybrid approach in digital humanities research: a global comparative opinion mining media study* (Doctoral dissertation, University of Oulu).

Olander, S. (2007). Stakeholder impact analysis in construction project management. *Construction management and economics*, *25*(3), 277–287.

Olander, S. & Landin (2008). A comparative study of factors affecting the external stakeholder management process. *Construction Management and Economics*, 26(6), 553–561.

Olaleye, S. A., I. T. Sanusi, and J. Salo. 2018. Sentiment analysis of social commerce: a harbinger of online reputation management. *International Journal of Electronic Business*, 14 (2): 85–102.

Olawale, O. A., Oyedele, L. O. & Owolabi, H. A. (2020). Construction practitioners' perception of key drivers of reputation in mega-construction projects. *Journal of Engineering, Design and Technology*, 18(6), 1571–1592.

Parmar, B. L., Freeman, R. E., Harrison, J. S., Wicks, A. C., Purnell, L., & De Colle, S. (2010). Stakeholder theory: The state of the art. *Academy of Management Annals*, 4(1), 403–445.

Raum, S., (2018). A framework for integrating systematic stakeholder analysis in ecosystem services research: Stakeholder mapping for forest ecosystem services in the UK. *Ecosystem Services*. 29(A), 170–184.

Reed, M. S., Graves, A., Dandy, N., Posthumus, H., Hubacek, K., Morris, J., Prell, C., Quinn, C. H., Stringer, L. C. (2009), Who's in and why? A typology of stakeholder analysis methods for natural resource management. *Journal of Environmental Management*. 90(5), 1933–1949.

Ren, X., Che, Y., Yang, K., & Tao, Y. (2016). Risk perception and public acceptance toward a highly protested Waste-to-Energy facility. *Waste management*, *48*, 528–539.

Roddis, P., Carver, S., Dallimer, M., Norman, P., & Ziv, G. (2018). The role of community acceptance in planning outcomes for onshore wind and solar farms: An energy justice analysis. *Applied energy*, *226*, 353–364.

Roloff, J. (2008). Learning from Multi-Stakeholder Networks: Issue-Focussed Stakeholder Management. *Journal of Business Ethics*, 82, 233–250.

Rowley, T. J. (1997). Moving beyond dyadic ties: a network theory of stakeholder influences. *Academy of Management Review*, 22(4), pp. 887–910.

Rust, R. T., Rand, W., Huang, M. H., Stephen, A. T., Brooks, G., & Chabuk, T. (2021). Real-time brand reputation tracking using social media. *Journal of Marketing*, *85*(4), 21–43.Scheublin, F. J. M. (2001). Project alliance contract in The Netherlands. *Building Research & Information*, *29*(6), 451–455.

Shaw, K., Hill, S. D., Boyd, A. D., Monk, L., Reid, J., & Einsiedel, E. F. (2015). Conflicted or constructive? Exploring community responses to new energy developments in Canada. *Energy Research & Social Science*, 8, 41–51.

Sovacool, B. K., & Ratan, P. L. (2012). Conceptualizing the acceptance of wind and solar electricity. *Renewable and Sustainable Energy Reviews*, *16*(7), 5268–5279.

Stead, M., & Hastings, G. (2018). Advertising in the social marketing mix: getting the balance right. In *Social Marketing* (pp. 29–43). Psychology Press.

Sterry, P. & Sutrisna, M. (2007). Briefing and Designing Performing Arts Buildings: Assessing the Role of Secondary Project Stakeholders. *Architectural Engineering and Design Management*, 3(4), 209–221.

Takim, R. (2009). The management of stakeholders' needs and expectations in the development of construction project in Malaysia. *Modern Applied Science*, *3*(5), 167–175.

Tapp, A. Nancarrow, C. & Davis, A. (2015). Support and compliance with 20 mph speed limits in Great Britain. *Transportation Research Part F: Traffic Psychology and Behaviour*, 31, 36–53.

Tcvetkov, P., Cherepovitsyn, A., Fedoseev, S. (2019). Public perception of carbon capture and storage: A state-of-the-art overview, *Heliyon*, 5(12), e02845.

Turkulainen, V., Aaltonen, K., & Lohikoski, P. (2015). Managing project stakeholder communication: the Qstock festival case. *Project Management Journal*, 46(6), 74–91.

Wang, X., & Huang, J. (2006). The relationships between key stakeholders' project performance and project success: Perceptions of Chinese construction supervising engineers. *International journal of project management*, *24*(3), 253–260.

Wang, W., L. Chen, K. Thirunarayan, and A. P. Sheth. 2012. Harnessing twitter 'Big Data' for automatic emotion identification. in Privacy, Security, Risk and Trust (PASSAT), 2012 International Conference on Social Computing (SocialCom), IEEE, Washington, DC. 587–592.

Williams, N. L., Ferdinand, N., & Pasian, B. (2015). Online stakeholder interactions in the early stage of a megaproject. *Project Management Journal*, 46(6), 92–110.

Wong-Parodi, G., Dowlatabadi, H., McDaniels, T., Ray, I. (2011). Influencing Attitudes toward Carbon Capture and Sequestration: A Social Marketing Approach. *Environmental Science and Technology*, 45(16), 6743–6751.

Xie, L.-l., Yang, Y., Hu, Y. and P. C. Chan, A. (2014), "Understanding project stakeholders' perceptions of public participation in China's infrastructure and construction projects: Social effects, benefits, forms, and barriers", *Engineering, Construction and Architectural Management*, 21(2), 224–240.

Yuan, H. (2017). Achieving Sustainability in Railway Projects: Major Stakeholder Concerns. *Project Management Journal*, 48(5), 115–132.

Yang, J., Shen, G. Q., Bourne, L., Ho, C. M. F. & Xue, X. (2011). A typology of operational approaches for stakeholder analysis and engagement, Construction Management and Economics, 29(2), 145–162.

Yang, J., Shen, G. Q., Ho, M., Drew, D. S., & Chan, A. P. C. (2009). Exploring critical success factors for stakeholder management in construction projects, *Journal of Civil Engineering and Management*, 15(4), 337–348.

Yang, R. J. (2014). An investigation of stakeholder analysis in urban development projects: Empirical or rationalistic perspectives. *International Journal of Project Management*, 32(5), pp. 838–849.

Zanjirchi, S. M., & Moradi, M. (2012). Construction project success analysis from stakeholders theory perspective. *African Journal of Business Management*, *6*(15), 5218–5225.

Zervas, G., Proserpio, D., & Byers, J. W. (2021). A first look at online reputation on Airbnb, where every stay is above average. *Marketing Letters*, *32*(1), 1–16.

Appendix 1. Classification of media hits.

1	2		3	4	5	6	7	8	9	10	11	12	13	14	15
Channel	**Sub.cat.**	**Date (UTC)**	**Content**	**Sentiment reviewed**	**Autom. sentiment correct**	**Local resistance/ nimby**	**Major stakeholder class visible**	**Company generated editorial/ Some**	**Activist generated**	**Positive measures acceptance**	**Negative measures resistance**	**Sentiment measures project reputation**	**Relates to project model/ alliance**	**Implications to project execution/ deployment**	**Scale**
Editorial	Online only	03/04/2021	Mentioning of project in job advertisement, to help in transportation to work	positive	yes	no	no	no	no	no	no	yes	no	no	4
Editorial	Trade magazine	01/04/2021	Alliance model provides possibilities to transfer silent information	positive	yes	no	yes	no	no	no	no	yes	yes	no	4
Editorial	Trade magazine	01/04/2021	Editorial article concerning project, Sweco manager interview	neutral	yes	no	yes	no	no	no	no	yes	yes	no	3
Editorial	Trade magazine	01/04/2021	Alliance pioneer project provides skills development possibilities	neutral	yes	no	yes	no	no	no	no	yes	yes	no	3
Editorial	Trade magazine	01/04/2021	Experiences utilized from Tampere alliance model	neutral	yes	no	yes	no	no	no	no	yes	yes	no	3
Editorial	Govern-mental	31/03/2021	Set goal was reached	neutral	yes	no	yes	no	no	no	no	yes	yes	Set goal was reached	3
Editorial	Research	27/03/2021	dissertation IEM	mixed	yes	no	yes	no	no	no	no	yes	yes	no	3
Editorial	Govern-mental	19/03/2021	Raidejokeri is built according to environmental principles	positive	yes	no	yes	yes	no	no	no	yes	yes	Project is execut-ed according to environmental regulations	4
Editorial	Govern-mental	18/03/2021	increased project execution schedule	neutral	yes	no	yes	no	no	no	no	yes	yes	Increased project schedule	3
Editorial	Govern-mental	18/03/2021	new services and residents to Oulunkylä due to project	neutral	yes	no	yes	no	no	no	no	yes	no	no	3
Editorial	Govern-mental	16/03/2021	Raidejokeri as significant regional project	positive	yes	no	yes	no	no	no	no	yes	yes	no	4
Blog		14/03/2021	Raidejokeri improves transportation	positive	yes	no	yes	no	yes	yes	no	yes	yes	no	4
Blog		01/03/2021	Discussion of car use, raidejoker as example of public transportation	positive	yes	no	yes	no	yes	yes	no	yes	no	no	4
Editorial	Organiza-tion	18/02/2021	YIT partner communication	neutral	yes	no	yes	yes	no	no	no	yes	yes	no	3

1	2		3	4	5	6	7	8	9	10	11	12	13	14	15
Twitter		09/02/2021	Project as an example of increased investments to public tram transportation	neutral	yes	no	yes	no	yes	yes	no	yes	no	no	3
Twitter		08/02/2021	Project as an example of increased investments to public tram transportation	neutral	yes	no	yes	yes	no	no	no	yes	yes	no	3
Facebook		02/02/2021	2–4 graders in elementary school went to see the project	positive	yes	no	yes	yes	no	yes	no	yes	yes	no	5
Editorial	Business/ Economics	22/01/2021	Finland as a forerunner in Alliance model projects, not the cheapest project execution model, but acts as a solution for typical problem in large construction project	positive	yes	no	yes	no	no	no	no	yes	yes	no	4
Facebook		22/01/2021	Tekniikka & talous visited project site, alliance model works, project partly half year ahead of schedule	neutral	no	no	yes	no	no	no	no	yes	yes	no	3
Editorial	Online only	20/01/2021	Job advertisement	positive	yes	no	yes	yes	no	no	no	yes	no	no	4
Editorial	News agency	19/01/2021	project execution phase begins	positive	yes	no	yes	no	no	no	no	yes	yes	project phase begins	4
Instagram		18/12/2020	Instagram posting about work experiences from project organisation company	positive	yes	no	yes	yes	no	no	no	yes	no	no	5
Facebook		16/12/2020	Complaints against project were rejected. Resulted schedule delay will overcome	positive	no	yes	yes	no	no	no	no	yes	no	yes	5
Twitter		26/11/2020	Project participant communication(videos), environmental friendly, commences in advanced schedule	Positive	no	no	yes	yes	no	no	no	yes	yes	no	5
Editorial	Trade magazine	08/11/2020	Project price estimate	neutral	yes	no	yes	no	no	no	no	yes	yes	Cost level established	3
Editorial	Governmental	22/10/2020	Good experiences from Tampere are predecessor for Raidejokeri alliance model	positive	yes	no	yes	no	no	no	no	yes	yes	positive experiences from other similar projects	4
Editorial	Regional/ Local	01/07/2020	Project on hold	negative	no	yes	yes	no	no	no	yes	yes	no	Project on hold	2
Editorial	National/ Major	29/05/2020	Flying squirrel sighting as a setback for new tramway project, appeals from non-governmental organizations suspend construction works – If an exceptional permit is not granted, ”it must be contemplated whether Raidejokeri can be completed or not”	negative	no	no	yes	no	no	no	no	no	no	Yes. Negative impact on project schedule	2