ISSN 2652-1016 (Online)

Volume 4, Edition 1. Published 23rd September 2021

Research Report

Social Media Use in Project Management – An Exploratory Study of Multiple Transport Projects

Yongjian Ke, School of Built Environment, University of Technology Sydney, Australia.

Abstract

The research aims to explore the opportunities that social media could offer to project managers of transport projects. We focus on how social media could be used to evaluate benefits realisation and create public value. Multiple case studies are the research method. We chose to study the Sydney Metro Northwest project in Sydney, Australia and Chennai Metro Phase-1 in Chennai, India. Python and Twitter Search API were used to retrieve social media data on Twitter. Although the analysis of tweets from these two projects indicated that citizens who use these transport facilities report benefits, they do not seem to use the same terms as the project's promoters to describe these benefits. The article proposes some ideas on how social media can supplement current methods used in evaluating benefits from transport projects. It is also validated that transport agencies can use social media as a helpful tool to monitor operational issues, collect recommendations to improve, and capture live sentiments.

1. Introduction

Due to global trends such as urbanisation, there is an increasing need for the delivery and maintenance of transport infrastructures, such as roads, railways and metro rails. These kinds of endeavours are typically organised and managed as transport infrastructure projects (Volden and Samset, 2017). Transport infrastructure projects have at least two characteristics that make them especially interesting. First, the scale of these types of projects tends to be very large and the delivered infrastructure is designed to be in use for several decades. The value created in these kinds of projects is realised over an extended period of time. Consequently, the overall project success is challenging to evaluate thoroughly when the projects are completed but not yet fully used. Second, transport infrastructure projects are of interest not only to internal stakeholders such as the project supplier

(e.g., contractors) and client (e.g., government agencies responsible for infrastructure delivery), but also to the people who use the delivered infrastructure. One important stakeholder group to be considered is citizens who are the future users of the transport infrastructure.

Although citizens can, especially in collaboration, have a strong influence on projects (Aaltonen and Kujala, 2016), their capacity for making their voices heard is limited by their peripheral location in stakeholder maps. However, a critical avenue for individual citizens to be heard is social media, which has become widely used in recent times to express opinions publicly. There is a wide range of research evidence of people, especially customers, having significant effects on organisations through social media (Alalwan et al., 2017; Salo, 2017). Recently, the interest in the role of social media in project management has grown as well. Hence, this project aims to explore the opportunities that social media could offer to project managers at different stages of transport projects.

This article is structured as follows. First, we analyse recent literature on the role of social media in project management and identify the potential roles to be validated. Then, we present the methods used for an empirical study of metro rail projects in India and Australia. This is followed by the empirical findings and discussion of the contributions. Finally, we provide our conclusions and recommendations for using social media in projects.

2. Literature Review

2.1 Social Media in Project Management

One of the most significant developments enabled by the internet is the advent of social media. In April 2021, it was estimated that roughly seven-in-ten Americans said they used any kind of social media (Pew Research Center, 2021). According to Pew Research Center (2021), 84% of adults ages 18 to 29 said they ever used any social media sites, similar to the share of those ages 30 to 49 who say this (81%). By comparison, a somewhat smaller share of those ages 50 to 64 (73%) said they used social media sites, while fewer than half of those 65 and older (45%) reported doing this.

Social media is increasingly adopted by companies and studied by scholars as well. However, there is a dearth of research on social media in project management. The published studies combining social media and project management have focused on topics such as improved project learning through social media (Rosa et al., 2016; Winter and Chaves, 2017), better intra-project communication or collaboration through social media (Kanagarajoo et al., 2019; Zhang et al., 2018), and social media as a platform for branding (Ninan et al., 2019) or managing external stakeholders (Ninan et al., 2020) in megaprojects. Although the number of studies is still low, the combined message of this early research seems to indicate several possibilities for utilising social media in project management (see also Hysa and Spalek, 2019).

In contrast to project management, social media has received more scholarly attention in the fields of general management, especially in marketing and sales. This is illustrated by a few review articles published on the topic (Alalwan et al., 2017; Andzulis et al., 2012; Salo, 2017). Electronic word of mouth (e-WOM) has more reach and influence than traditional word of mouth (Alalwan et al., 2017; Salo, 2017). In other words, social media enables the general public to share opinions about products, firms and services quickly and easily. In a similar vein, customers use social media as a source of information when making purchasing decisions (Erkan and Evans, 2016; Powers et al., 2012) and, consequently, companies invest more and more on strategic marketing in social media (Alalwan et al., 2017; Salo, 2017).

The rationale behind this study is the broader application of social media in marketing and sales. In particular, whether customers using transport infrastructure such as metro rail actively shared opinions about these projects using social media. The study will focus on how social media could provide an opportunity to evaluate benefits realisation and create public value, as explained in the following literature review sections.

2.2 Assessment of Benefits Realisation

The benefits from a transport infrastructure project are typically evaluated before, during and after project implementation. These pre-project, mid-term and post-project evaluations focus on topics such as value for money and funding decisions, assessment of project progress and assessment of project success, respectively. Although the viewpoint of the citizens is implicitly present in, for example, value-for-money assessments (e.g., Volden, 2019), their voice is seldom heard directly. However, if the main goal of a project is to deliver flows of value to stakeholders (Zwikael and Smyrk, 2012), is it not important that we listen to the stakeholders themselves?

2.2.1 Pre- and Mid-Project Reviews

The most established pre-project reviews acknowledging project value creation are cost-benefit analyses (CBAs) and benefits management. CBA is a method for measuring the project's "value for money" by assessing the relationship between resources invested in a project (i.e., "the money"), and the benefits that can be achieved from the project (i.e., "the value") (Volden, 2019). More precisely, the aim of a CBA is to compute the net present value (NPV) of a project or several competing project alternatives (Volden, 2019). Regarding value creation, the critical aspect of CBA is the inclusion of both financial and non-financial benefits in the analysis; in other words, the aim of CBA is to be comprehensive in terms of coverage of a project's impacts. There are various challenges in CBA, or value-for-money assessment in general, such as measurement problems (Volden, 2019) and appraisal optimism (Flyvbjerg, 2009). Despite the possible shortcomings, different versions of value-for-money assessments are in use for project appraisal around the world (Volden and Samset, 2017), especially for public sector projects (Volden, 2019).

Benefits management is a stream of literature with solid roots in the information system projects literature (e.g., Breese et al., 2015; Coombs, 2015). Regarding pre-project reviews and value creation, a critical element of benefits management is the definition of target benefits (Zwikael et al., 2018). Target benefits can be defined as "those benefits set prior to project commencement which the project funder seeks thorough an investment in a project" (Zwikael et al., 2018); in other words, target benefits are the desirable flows of value resulting from the project (see Zwikael and Smyrk, 2012). Although defining target benefits is not a guarantee of realised benefits (e.g., Coombs, 2015), setting effective target benefits has been argued to support project investment decisions (Zwikael et al., 2018).

Especially in large projects, such as transport infrastructure projects, there is typically a project governance model or a project management methodology (e.g., PMI, 2017) in place. While conducting pre-project reviews, a typical consideration in these kinds of models is the assessment of a business case. Regarding mid-project reviews – that is, reviews during project implementation – project management methodologies or governance models often include some types of performance review (PMI, 2017), stage-gate model (e.g., Narayanan and DeFillippi, 2012), or similar. However, typically these kinds of mid-project reviews are mostly concerned with project performance; for example, this is the case with performance review in the PMBOK model (PMI, 2017) or in earned value analysis (e.g., Kwak and Anbari, 2012).

2.2.2 Post-Project Reviews

In the benefits management literature, the post-project phase is labelled as benefits realisation or benefits realisation management (BRM) (e.g., Coombs, 2015; Zwikael, 2016). The BRM literature discusses the linkages between BRM and project success (Serra and Kunc, 2015) and the inhibitors and facilitators of benefits realisation (Coombs, 2015). The core message of this stream of literature is that benefits are not realised automatically; instead, benefits realisation must be managed and promoted actively. For example, project sponsors may have an important role in promoting benefits realisation (Breese et al., 2015). However, this stream of literature has paid less attention to assessing the delivery of project benefits.

After a project's completion, most project management guidelines or methodologies include some sort of a post-project review (e.g., PMI, 2017). The assessment of value creation is included in some of these assessments as well. An illustrative example is the UK-based OGC Gateway Process (Klakegg et al., 2008). Tailored versions of the Gateway Process have been introduced in various other countries, for example, in Australia (Xu et al., 2013). The core idea of the Gateway Process is the independent review of major projects and programs at critical points of their lifecycles (Klakegg et al., 2008). Regarding post-project benefits assessment, main reviews include "Review 4: Readiness for service" (OGC, 2007a), and "Review 5: Operational review and benefits realisation" (OGC, 2007b). Regarding benefits management, the key question of these reviews is the delivery of the expected benefits, with respect to the original business case (OGC, 2007a, 2007b).

However, the traditional method of evaluating projects using methods used in project management reviews has come under criticism in an article evaluating megaproject success (Fahri et al., 2015). These authors suggested that post-project evaluation should benefit from using ideas from the evaluation literature (Vedung 2010).

2.3 Value Creation in Infrastructure Projects

We view projects as vehicles for defining, creating and delivering value (Laursen and Svejvig, 2016; Martinsuo et al., 2019a), and consider the desirable outcomes of a project (i.e., the goals of a project) as flows of value from the project to the stakeholders (Zwikael and Smyrk, 2012). To set the scene for this review, Table 1 summarises recent empirical studies on value creation in infrastructure projects. This list is limited to empirical studies that have focused on infrastructure projects and considered value as the worth of a project (Martinsuo et al., 2019b), or as benefits for the stakeholders (Zwikael and Smyrk, 2012), instead of other perspectives as value related to ethical and moral considerations (Martinsuo et al., 2019a) or beliefs (Martinsuo, 2020).

Table 1. Recent Empirical Studies on Value Creation in Infrastructure Projects

Article	Context and method	Key findings for this study
Kivilä et al., 2017	Context: Transport infrastructure projects Method: A qualitative single-case study	- Focus on the project implementation phase and sustainability as a dimension of value. - A holistic control package with control mechanisms for different dimensions of sustainability.
Liu et al., 2019	Context: Infrastructure development programs Method: Action research, single case	- Focus on value co-creation at the program front end. - Client's intended value (value-for-firm) was competing with market partner's values.

		- Three sets of values (value-in-use) as results of value co-creation: commercial, intellectual and collaborative values.
Martinsuo et al., 2019b	Context: Transport infrastructure projects Method: A qualitative multiple-case study	- Focus on the stakeholders' framing of value at the project front end. Framing of value relates to project funding decisions. - Three dimensions of value: financial, social and comparative values. - Positive and negative dimensions of value, and four themes of lifecycle-oriented framing of value: uncertainties, timing of cost and benefits realization, project relations and external sponsorship.
van den Ende and van Marrewijk, 2019	Context: Transport infrastructure projects Method: A qualitative, longitudinal two-case study	- Focus on community resistance to large subway projects. - An institutional theory perspective to understanding project actors' responses to community resistance. - Community resistance prompted institutional work by project actors to socially (re)construct the projects in pursuit of legitimacy.
Vuorinen and Martinsuo, 2019	Context: Transport infrastructure projects Method: A qualitative multiple-case study	- Focus on the stakeholders' influence efforts during project implementation. - Stakeholders' value perceptions explain the stakeholder influence strategies utilized. - Three dimensions of value: environmental and social value, financial value and systemic value. - Four stakeholder influence strategies in transport infrastructure projects differentiated according to their different value priorities.

Three observations can be made based on Table 1 and the broader literature on value creation in projects (e.g., Laursen and Svejvig, 2016). First, value in projects is not a unidimensional concept but extends to multiple interrelated dimensions. The multidimensionality of value is demonstrated in studies referred to in Table 1 (Kivilä et al., 2017; Liu et al., 2019; Martinsuo et al., 2019b; Vuorinen and Martinsuo, 2019) as well as in studies published on value creation in other types of projects (e.g., Ahola et al., 2008; Ang et al., 2016; Green and Sergeeva, 2019; Martinsuo, 2019).

Second, recent empirical studies illustrated the importance of stakeholder considerations in value creation. Martinsuo et al. (2019b) demonstrated how stakeholders shape value at the project's front end, and the case studies of van den Ende and van Marrewijk (2019) and Vuorinen and Martinsuo (2019) illustrated how the perceived (especially negative) value of a project could drive stakeholders to seek influence on projects. Liu et al. (2018) discussed similar findings in the context of major construction projects.

In summary, the recent empirical studies have focused mostly on the front end of a project (Liu et al., 2019; Martinsuo et al., 2019b) or its implementation phase (Kivilä et al., 2017; van den Ende and van Marrewijk, 2019; Vuorinen and Martinsuo, 2019). Less attention has been placed on the value created in the project operations phase. Thus, this stream of literature reviewed provides few answers to the question of assessing value creation at the operations phase.

3. Research Method

The philosophical underpinning for this study is interpretivism. In particular, we looked for meanings from the perception of social reality constructed by citizens as expressed in social media. We designed this study as a multiple case study. Case studies are useful to study a phenomenon in-depth within a context to retain the holistic and meaningful characteristics of real-life events (Yin, 2014). Case studies are particularly useful to study a phenomenon that focuses on contemporary events and where the researchers have no control over the behaviour of the informants (Yin 2014, p. 9). We studied two purposefully sampled cases, which were completed over the past two years in two different countries, to allow us to have cross-case analysis and also because multiple cases are analogous to multiple experiments (Eisenhardt, 1989). Eisenhardt and Graebner (2007) noted that the findings from multiple case studies are better grounded, more accurate and more generalizable than single-case research. Multiple case studies also help us not to misjudge the representativeness of events that occur within a single case (Tversky and Kahneman, 1989).

We chose to study metro rail projects in Chennai (India) and Sydney (Australia) for two theoretical reasons. First, both projects were in the operational phase and hence would help us evaluate the benefits. Second, both projects had social media presence and activities, thereby enabling us to use social media for evaluating the benefits realisation. We now present a brief overview of these projects.

3.1 Case Description

Chennai Metro Phase-1 is a rapid transport system serving the city of Chennai in Tamil Nadu, India. The network is managed by the Chennai Metro Rail Limited (CMRL), a joint venture with equal equity holding between the Government of India and the Government of Tamil Nadu. The Chennai metro rail project's phase one started in June 2009 with an estimated cost of USD 2.2 billion and was fully commissioned on 10 February 2019. The project covers 45.1 kilometres, has 32 stations and operates on two lines – the green and the red. The green line connects Chennai Central railway station to St. Thomas Mount station via the central bus terminal called Chennai Mofussil Bus Terminus (CMBT). The red line connects Chennai International Airport to Washermanpet. The two lines intersect at Alandur station and Chennai Central railway station, where passengers can switch between the lines.

The Sydney Metro Northwest is a rapid transit link to the north-western suburbs of Sydney in New South Wales, Australia. The link is managed by Transport for NSW through its Sydney Metro agency, and it connects the suburbs of Rouse Hill and Chatswood via Castle Hill and Epping. The link, which includes the Epping to Chatswood Rail Link, opened to service on 26 May 2019, with Metro Northwest Line services running on the link between Tallawong and Chatswood. The project involved 15 kilometres of new tunnels. The metro provides a fast transport link for suburbs experiencing significant growth in the northwest region of Sydney to CBD.

3.2 Data Collection

Data were collected through tweets from the Sydney and Chennai metros. We used Python and the Twitter Search Application Programming Interface (API) to retrieve tweets from Twitter. Twitter provides a search API for the public to search their database with user-defined keywords and time range. The API returns 500 records for each call, and a program written in Python was executed to recursively retrieve tweets containing the keywords. The keywords are the titles of two projects, i.e. "Chennai Metro" and "Sydney Metro". It is acknowledged that some tweets would not be retrieved if they discussed the two projects without using the keywords. No duplicates were observed on checking the unique ID of each tweet, and the collected data were stored as a comma-separated values file. We collected the tweets for a 90-day period from 1 July 2019 to 30 September 2019, during which both the metro rail projects were operational. The selected study period enables us to retrieve tweets

relevant to the research objective, i.e., whether the conceptualised benefits during the planning phase were realised during the operation phase. There were 1064 tweets relating to the Chennai metro rail project and 5960 tweets relating to the Sydney metro rail project. All the tweets were in English. Even though the local language of Chennai is Tamil, we found the tweets in English representative of the total discourses around the project as Chennai is one of the largest English-speaking cities in India.

3.3 Data Analysis

We used content analysis and open coding of the tweets collected to understand what each tweet conveyed. We went through each tweet and looked at the meaning/message of the tweet. We focused on the contextual meaning of the text (McTavish and Pirro, 1990) rather than merely ranking message variables based on the frequency with which they occurred. For example, a tweet that read "Thank god for @cmrlofficial I reached from Teynampet to Central in less than 15 mins #ChennaiMetro" was coded as 'time saving', even though the tweet did not have the words 'time' or 'saving'. The focus was on the content and meaning of the tweet rather than on word choice or frequency of occurrence. The process was very iterative, and we took multiple readings of the tweets as some categories are often not apparent until the second or third reading due to the focus on content and meaning. We employed manual coding as automatic methods could create a barrier to understanding (Kozinets et al., 2014).

To enhance the rigour of our approach to data analysis, first, we conducted an exploratory coding to understand the different categories of tweets extracted. Along with tweets of benefits of the metro rail project, there were also negative tweets, interest group tweets, and operational issues tweets. The coding structure along with sample tweets for our initial analysis is given in Table 2. We then organised the tweets of benefits realisation into first-order observations and then assembled them into a more structured aggregate dimensions of benefits. This was done by collapsing or clustering the first order observations that seemed to share some unifying benefits. The results of the benefits of the Chennai metro rail project and the Sydney metro rail project are presented in Tables 3 and 4, respectively.

Table 2. Example Exploratory Coding of Tweets

First Order Exploratory Codes	Aggregate Category	Tweet Example
Travel time saved	Benefits	"Chennai metro line from the airport to the high court is awesome if a lawyer is flying in for a case. Comfy, economical and speedy. Seen nothing comparable in any other metro." (1 August 2019)
Customer satisfaction		
Well-connected network		
Inconvenience due to Construction	Negative Tweets	"Wow!! Finally after ten years! #Chennai's iconic #MtRoad aka #AnnaSalai near LIC buildings is now open for two-way traffic. Stretches of road were closed for (@cmrlofficial) #chennai metro work back in 2008? Now one straight road 4 m Munro statue to RajBhawan. Skip #ExpressAvenue" (29 September 2019)
High ticket prices		
No mobile connectivity in underground stretches		
Demolition of buildings	Interest group tweets	"We, poor people are cursing u how dare u could demolish>1000 Buildings? - Message to unnecessary Chennai metro rail phase 2 crew! Ask sorry to poor & Ban the construction" (29 September 2019)
Green roads than dusty metro station buildings and viaducts		
Complaints about doors	Operational issues tweets	"the USB points in car 0501 don't work FYI" (15 September 2019)
Non-functional facilities		
Lack of parking		

Lack of connecting buses		

Table 3. Data Structure of Benefits of Chennai Metro Rail

First Order Observations	Aggregate Dimensions	Tweet Example
Fast transport	Travel time saved	"Uncluttering myself inside the Chennai Metro Rail. It took just an hour to go all around my beloved Chennai! #metroride" (23 September 2019)
Time saving		
Getting through traffic		
Connectivity	Well-connected network	"@ChennaiMetRail Amazing work connecting the city! No Chennai citizen could have asked for more! Super convenient access to the airport! Looking forward to using it more regularly!" (30 September2019)
Convenient		
Accessible		
Efficient		
Safe	Enhanced customer satisfaction	"Used Chennai metro for first time today. Well built and clean. Stations modelled on Singapore (layout etc.). Makes me fall in love with the city more. Indeed makes life better. Well done!" (10 July 2019)
Air-conditioned		
Comfort		
Cleanliness of the metro		
Best metro rail		
Aesthetics of the metro stations	City landscape	"First time travelling in Chennai Metro … Service Platforms looks like Abroad." (5 August 2019)
Minimizing pollution	Social benefits	"@chennaimetro has been running in full capacity for the past week. No place to sit. Not complaining. Happy that the service is being opted by many of us & thereby helping in minimizing pollution". (20 August 2019)
Conserving water through innovations		

Table 4. Data Structure of Benefits of Sydney Metro Rail

First Order Observations	Aggregate Dimensions	Tweet Example
Fast	Travel time saved	"On the other side of the fence I'm actually having no problems and it's faster than the bus for me" (1/08/2019)
Time saving		
Impressive first experience	enhanced customer satisfaction	"New, Sydney Metro driverless trains.... New experience. Pretty impressed, gotta say." (11/07/2019)
Fun pretending they were the driver		
Cleanliness		
Quiet		
Aesthetics of the metro stations	City landscape	"There is so much new infrastructure and development happening within the CBD. Sydney's Pitt Street Station will become the city's newest landmark with a $463 million contract awarded to build the new metro railway station and the buildings above it. #sydneyproperty #cityliving" (24/09/2019)
More housing choices	Social benefits	"Grand Cherrybrook home is just a quick walk to Sydney metro northwest https://ift.tt/2Gb31t8" (12/07/2019)
Better access to services		
Complaints about doors		"the USB points in car 0501 don t work FYI" (15/09/2019)
Non-functional facilities		

Lack of parking Lack of connecting buses	Identified operational issues	

We also used the Python library TextBlob for sentiment analysis. First, we cleaned up the dataset by removing all links, special characters, split token, and removing all words in stop-words. The stop-words consist of all propositions, keywords used for data search and other non-meaning words, such as “an”, “a”, etc. Second, we defined three sentiments as the output, which are positive, neutral and negative. Classifying tweets into different categories is determined by the polarity generated from the packages. The positive category contains tweets with a polarity greater than zero, whereas a polarity equal to zero is categorised as neutral, and a polarity less than zero is classified as a negative view.

4. Results and Discussions

4.1 The Potential of Using Social Media for Assessing Benefits Realisation

The content analysis of social media posts helped us understand the types of benefits perceived by the public during the operational phase of the metro. We found some evidence of the benefits delivered by Chennai and Sydney metro rail projects reported by citizens in their tweets. The personal descriptions in the tweets provide authenticity to the benefits claimed. The true-to-life and meaningful stories enabled through the qualitative data (Sandelowski, 1993) provide credibility that the benefits of the project were realised.

We also noted that the benefits could not be quantified and evaluated. This is because of some of the issues in social media data. We noticed several tweets that represented some negative perceptions of the project. This echoed the literature that people are often more vocal about criticism than praise (Park, 2015; Golbeck, 2016). In addition, interest groups are stakeholders such as lobby groups or activists who have a vested interest in the project and pressurise decision-makers to get their preferred outcome in the project (Henisz & Zelner, 2006). The presence of interest groups resulted in most of the tweets about the metro rail project being negative. These interest groups are very vocal on the social media platform, often echoing their interests through similarly worded tweets. These repeated tweets make a quantitative analysis of benefits quite challenging as a few words are repeated many times by the interest groups. The predominance of negative tweets and the presence of interest groups result in the benefits being overshadowed in automated data analysis. The benefits were more personal and often had different personal stories, which would be missed in automated coding of data from social media.

4.1.1 Findings from Chennai Metro

In the case of the Chennai metro rail, there were opinions that the metro rail was fast as it beats traffic and saves time. These instances were personal stories in which the users gave descriptive accounts of how the metro rail project helped them save time. Examples are highlighted below:

“My husband and I took the Chennai metro rail from Meenambakam to Anna Nagar last weekend, and I must say I am impressed. It is so much better than finding a Uber/Ola, waiting for it, and getting through the traffic. @cmrlofficial” (a tweet dated 27 September 2019).

“Uncluttering myself inside the Chennai Metro Rail. It took just an hour to go all around my beloved Chennai! #metroride” (23 September 2019).

"Encourage public transport! 340 KM will surely make a lot of difference – more time at home and less time on the roads. Hi to chennai metro" (1 September 2019).

The users of the Chennai Metro rail project also highlighted the cleanliness of the metro, as shown in the tweets below:

"Annanagar to Airport, Chennai Metro costs only Rs 50, whereas ola/uber costs anywhere between 450 to 750. Metro is clean and punctual. You need not explain the driver in tamil [local language in the city] ....and knowing your destination a Metro driver will not cancel the trip" (18 September 2019).

"Chennai best metro, best people unlike BMRCL [acronym for the metro rail project of Bengaluru, a nearby city] most inefficient. Chennai metro station speaks for itself unlike ugly Bengaluru metro stations" (11 September 2019).

Other tweets also showed that the transport system is convenient, accessible and safe. The users stated that the trains are air-conditioned, without rush and offer quick rides. Some indicative tweets are below:

"Cab ride Chennai airport to T-nagar showed 55 minutes travel. So took the #chennaimetro for the first time. Easy access from arrival to metro station. Self-ticketing kiosk. Trains at multiple intervals. Air-conditioned, no rush, clean quick ride. Reached in 19 minutes. Underrated" (20 August 2019).

"@ChennaiMetRail Amazing work connecting the city! No Chennai citizen could have asked for more! Super convenient access to the airport! Looking forward to using it more regularly! #chennai #chennaimetro" (30 Sept 2019).

"Yes, of course. It's getting there. It's visible in office as there are many of us who leave our cars at the station and take the Metro. So many people exercising this option that safe and convenient and clean" (20 August 2019).

However, there was some dissent among the commuters regarding the cost of the metro rail services. People criticised the high cost of the fares and complained that ordinary people could not afford the services. Some indicative tweets are below:

"Volumes shud b the mantra & increased patronage vl automatically bring in more revenue & help in bridging gap btw cost & income. urban public transport shud not be subsidized but under bogey of market dynamics shud not made costly like chennai metro, Bengaluru Volvo buses" (30 September 2019).

"I do not understand what you mean by improving mass transit. Chennai metro is an improved mass transit system but no point having it if people can't afford it. The section of society that Chennai suburban system [another mass rapid train system operational in the city] serves are happy with the services" (25 September 2019).

The benefits of using the Chennai Metro rail as seen from the social media comments by the users were speed, accessibility, and convenience. When compared with the mission statement of the project, i.e. "We shall provide a safe, fast, reliable, accessible, convenient, comfortable, efficient and affordable public transport service preferred by all in a sustainable manner," the tweets indicated that several planned benefits were perceived to be met during the operations phase. It was seen that most of the planned benefits were realised during the operational phase. However, the tweets also pointed to the lack of affordability of the metro rail as they included complaints about the cost of the fares.

Thus, the project failed to deliver on the benefit of affordable public transport as the users complained about the cost of the fares. It is to be noted that the community did not use the same terms in their tweets to describe the benefits as the project promoters used in their mission statement.

4.1.2 Findings from Sydney Metro

There were some tweets describing commuters' impressive first experience of riding the Metro, such as:

"Having my first Sydney #metro experience. So far very impressed." (3 July 2019)

"First ride in @SydneyMetro, wow, very clean and on time" (10 July 2019)

"Loving the @SydneyMetro first time on it." (11 July 2019)

Some users explained specifically why they were satisfied with the Metro as shown in the tweets below:

"Insanely fast mobile speed on the @SydneyMetro [a speed test result by Ookla]" (23 August 2019) and a reply on the same day "That's crazily fast. Is that underground?";

"First day, first ride on board Sydney metro from Kellyville to Chatswood. What's so great about it.? Oh boy these Sydney metro coaches were 'MADE IN INDIA'. I conceited telling this to co passengers. Superb finish, excellent acceleration, extremely quiet" (a retweet on 4 July 2019).

Another benefit of the Sydney Metro Project confirmed by the tweets is the aesthetics of the metro stations. Many users would start their days by sharing photos of the stations on Twitter, such as "Our beautiful Sydney Metro. @SydneyMetro @TransportforNSW" (a tweet with three photos on 29 September 2019)

"A #beautiful morning and a beautiful #metro station. @SydneyMetro #thebestmetro" (a tweet with a photo on 9 July 2019).

Some users had fun on the driverless Sydney Metro, pretending they were the driver or a proton beam while the train travelled through a tunnel.

"Almost six months in, people still love pretending to be the driver on @SydneyMetro #SydneyMetro" (a tweet on 19 September 2019)

"Pretending I'm a proton beam on the #sydneymetro" (a tweet on 6 August 2019)

Besides transport benefits such as travel time saved, enhanced customer satisfaction, and enabling network growth, there was also evidence for other benefits like increased economic activity, jobs, more housing choices, and better access to services. For instance, a tweet stated that

"With the opening of the Sydney Metro North West line, the hills are well and truly alive!" (See "My story from last night's #sydneyweekender featuring the new North West Metro and a gem of a restaurant tucked away in Baulkham Hills [a link to an article on sydneyweekender.com.au on riding the Sydney Metro to Quoi Dining]", a tweet dated 9 September 2019)

The opening of the Metro also brought an opportunity to provide more choice of housing and more affordable housing along with the metro line, as evident from the announcement tweet issued by Landcom:

"Landcom and Sydney Metro will deliver up to 55 dwellings reserved for Affordable Rental Housing to accommodate workers on low to moderate incomes at the Sydney Metro Tallawong station precinct" (26 August 2019)

In addition, more development opportunities for business service providers were seen through some tweets such as:

"Construction of a new international fresh food marketplace and underground Sydney Metro link at Castle Towers is underway – with dozens of new specialty stores and food outlets expected to open by Christmas" (7 September 2019)

On the other hand, the operation of the Metro was found to be not always perfect. A series of service disruptions marred the first few months of operation caused by some teething problems like train doors sometimes closed too quickly to allow passengers to get on and off. There were, in fact, many complaint tweets about the train doors, such as:

"@SydneyMetro Your 15-second door opening is stupid and dangerous. People cannot get off the train in the fifteen seconds. Fix it before people get hurt" (16 September 2019)

A typical example is an incident where a distraught mother was separated from her two-year-old boy when the new driverless train took off from a station before she could get on board:

"Latest fiasco with Sydney Metro driverless trains. Mother trying to get on with baby in pram, doors shut 2yr old on train by itself. Mother frantic as she is left behind on the platform" (24 August 2019).

Other users have complained about non-functioning facilities such as train display, USB point, air conditioning, thermometer, escalator, as well as a lack of parking and connecting buses.

4.2 The Potential of Using Social Media for Creating Value

For the analysis of the social media tweets collected from the Sydney metro rail and Chennai metro rail, we find the potential to use social media for generating value in infrastructure projects. Value can be created by using big data in social media to address real-time operational issues, collate suggestions to improve, and capture the live sentiments associated with the project.

4.2.1 Addressing Real-Time Operational Issues

Issues relating to the operation of the infrastructure service have to be addressed as soon as possible for smooth service. The users widely shared operational issues relating to the project on Twitter across both projects. In Chennai metro rail, one user complained on Twitter that the doors were not opening in one of the stations as below:

"Crazy. @chennaimetro rail's doors didn't open when it stopped @Pachaiyappas metro station, at around 11am today, putting the passengers to hardships. What's happening?" (2 September 2019)

Similarly, in the case of Sydney metro rail, a user complained about lifts being out of service in one of the stations.

"The lift between the concourse and the platforms at North Ryde is out of service" (29 September 2019)

An interesting observation regarding those complaints is that social media can play a role in service requests. People may complain on social media because they feel they are not being seen or heard through the official channel provided by the service provider or because they would like to get attention from others. It then becomes useful for service providers to handle requests or complaints on social media. A tweet dated 31 July 2019 stating "@SydneyMetro Please clean N5432 carriage upper deck #trains #sydney" with a photo of the situation was responded to on the same day with "Thanks for bringing this to our attention. It has been passed onto our cleaning team."

Social media provides an excellent platform where users of the infrastructure service post day to day operational issues surrounding the projects. We can create more value in infrastructure projects if we systematically collect this big data, analyse it through algorithms, and efficiently communicate it to the service team to mitigate the current issue through timely action.

4.2.2 Collating Suggestions to Improve

Many users are active stakeholders offering multiple suggestions to improve the services. In contrast to operational issues, suggestions to improve are more than addressing an operational defect on a particular day. For example, in the case of the Sydney metro, a user suggested fixing the 15-second door opening duration before people get hurt, as below.

"@SydneyMetro Your 15 second door opening is stupid and dangerous. People cannot get off the train in the fifteen seconds. Fix it before people get hurt" (16 September 2019).

Similarly, in the case of Chennai metro, a user suggested bringing down the ticket costs, which will lead to more traffic and hence revenue, as below.

"Volumes shud b the mantra & increased patronage vl automatically bring in more revenue & help in bridging gap btw cost & income." (30 September 2019).

Collating such suggestions to improve can help the project create more value for the society as decision-makers would know the main issues raised by the community.

4.2.3 Capturing Live Sentiments

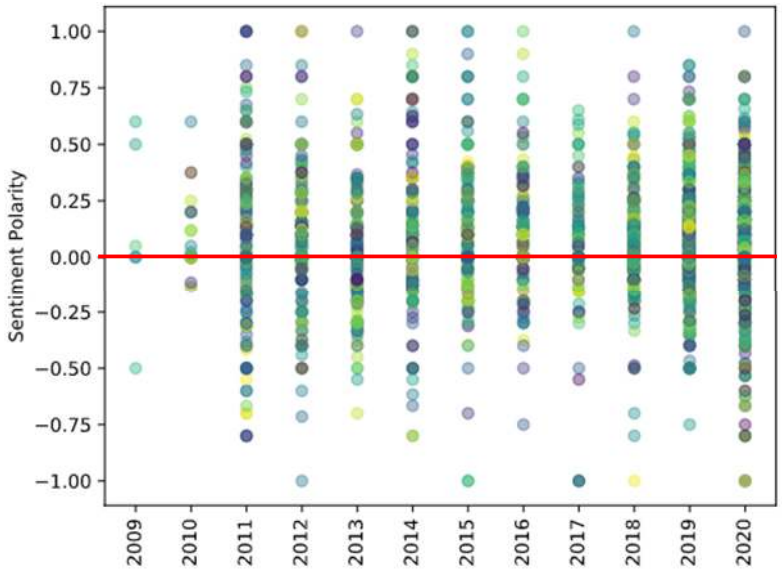
By using big data from social media to analyse sentiments, decision-makers can take proper strategic decisions to create more value to the public. Capturing live sentiments can guide investors to make long term strategic decisions, such as which route has to be expanded. It can also help the project take practical steps to improve the sentiment associated with the project, such as offering complimentary rides for school children or celebrating a regional festival (Ninan et al., 2019).

Taking the Sydney Metro project for example, among the total tweets, 41.4% of them are positive, 18.5% are negative, and 40.1% are natural. Given that people are often more vocal about criticism than praise (Park, 2015; Golbeck, 2016), it can be reasonably concluded that the Sydney Metro project is highly supported by the general public. In addition, it seems promising that we can use the sentiment results to measure public acceptance towards the project, which may serve as supplementary evidence for social license to operate.

Since tweets automatically record the time and location information, we can then conduct timeline sentiment analysis, which places the sentiment results on the timeline. Figure 1 illustrates an example

scatter chart that includes sentiment results of each year. We could not see an apparent pattern from the scatter plot. But in 2020, we can observe more negative comments emerged comparing to other years, which may be due to the impacts of the COVID-19 pandemic on the operation of transport services.

Figure 1. Yearly Sentiments



If a more extensive set of tweets data is available, we could place monthly or even weekly sentiments on the timeline, which would allow the project manager to identify some critical timings when there are significant changes in sentiments. Project managers can then review the content of tweets in the identified period of time and understand factors influencing public sentiment changes. Decision-makers can take proper strategic decisions accordingly to improve the sentiments, thereby creating more value to the public.

We also identified the most frequently used words amongst positive and negative tweets, as shown in Figures 2 and 3. They offer a big picture of what people like and do not like.

Figure 2. Common Words for Positive Tweets

Figure 3. Common Words for Negative Tweets

5. Conclusions and Future Research

This study focused on the potential of social media for assessing benefits realisation and creating value in transport infrastructure projects.

Some evidence of the benefits delivered by Chennai and Sydney metro rail projects were reported by citizens in their tweets. However, the predominance of negative tweets and the presence of interest groups make the quantitative evaluation of benefits quite challenging as the tweets related to benefits are overshadowed. We suggest that transport agencies can use social media as an additional way of studying public perception about benefits derived besides their existing benefit realization assessments. We also noticed that the terminology used by the public to describe perceived benefits was different from the terminology used by the project sponsors to describe benefits expected from the project in their business case or mission statement. This confirms the criticism of strategic misrepresentation of large public projects to get them funded (Flyvbjerg, 2006) as sponsors do not use the language used by stakeholders such as citizens to justify spending on a project but terms that appeal to the political system.

The citizens discussed different kinds of benefits on social media. This is in line with several studies that have emphasised the multidimensional nature of value in infrastructure projects (Kivilä et al., 2017; Liu et al., 2019; Martinsuo et al., 2019b; Vuorinen and Martinsuo, 2019). The nature of the social media discussion, for example, the presence of interest groups, also illustrates the subjectivity of value (e.g., Ang et al., 2016; Green and Sergeeva, 2019). In other words, different stakeholders, in this case, citizens, can perceive and value and express these perceptions quite differently. Taken together, the multidimensionality and subjectivity of values set additional challenges for assessing benefits realisation in infrastructure projects.

Most of the studies on value creation in infrastructure projects have focused on the front end or implementation phases of infrastructure projects. This study contributes to the existing literature by studying value creation in the operation phase of infrastructure projects. We have analysed social media data to see if we can indicate how the value created is perceived by the public from two metro projects. The evidence shows that social media could be a helpful tool for transport agencies to monitor operational issues, collect recommendations to improve, and capture live sentiments. All these can then generate more value in operation.

The findings from this study could also contribute to our evolving understanding of what project success means (Judgev and Müller, 2005). They also support the recent calls for the use of mass media in stakeholder engagement of megaprojects in the planning and operation stages (Ninan et al., 2020; Cuppen et al., 2016; Flyvbjerg, 2012).

This study focused on projects from Chennai and Sydney and used a manual scan of the tweets. We suggest similar research in different transport infrastructure projects across countries. We only studied tweets in a 90-day period in both projects. While this duration was adequate for the purpose of this article, continuous monitoring of these messages could provide an idea of a change of public perception over time. Also, the research team used Twitter as a single source for sentiment analysis. The limitation also includes the use of only Twitter data as no single source can cover entire demographics. We suggest expanding the social media sites to include Facebook, WeChat, YouTube, etc., to cover broader demographics. This analysis worked as the number of tweets were just sufficient for a manual scan. If the number of tweets is large, a manual analysis is time-consuming and prone to error. We suggest expanding the scope to include artificial intelligence and machine learning models to conduct sentiment analysis. Future research could explore this avenue. Shortly, we also plan to engage with the Transport for NSW to develop prototypes of social media use to translate the research into practical use.

Acknowledgement

This research was funded by the PGCS Research Grant Award 2020.

References

Aaltonen, K., & Kujala, J. (2016). Towards an improved understanding of project stakeholder landscapes. *International Journal of Project Management*, 34(8), 1537-1552. https://doi.org/10.1016/J.IJPROMAN.2016.08.009

Ahola, T., Laitinen, E., Kujala, J., & Wikström, K. (2008). Purchasing strategies and value creation in industrial turnkey projects. *International Journal of Project Management*, 26(1), 87-94. https://doi.org/10.1016/j.ijproman.2007.08.008

Alalwan, A. A., Rana, N. P., Dwivedi, Y. K., & Algharabat, R. (2017). Social media in marketing: A review and analysis of the existing literature. *Telematics and Informatics*, 34(7), 1177-1190. https://doi.org/10.1016/j.tele.2017.05.008

Andzulis, J., Panagopoulos, N. G., & Rapp, A. (2012). A review of social media and implications for the sales process. *Journal of Personal Selling & Sales Management*, 32(3), 305-316. https://doi.org/10.2753/PSS0885-3134320302

Ang, K., Sankaran, S., & Killen, C. (2016). Value for Whom, by Whom: investigating value constructs in non-profit project portfolios. *Project Management Research and Practice*, 3, 1-21. https://doi.org/10.5130/pmrp.v3i0.5038

Breese, R., Jenner, S., Serra, C. E. M., & Thorp, J. (2015). Benefits management: Lost or found in translation. *International Journal of Project Management*, 33(7), 1438-1451. https://doi.org/10.1016/j.ijproman.2015.06.004

Coombs, C. R. (2015). When planned IS/IT project benefits are not realised: a study of inhibitors and facilitators to benefits realisation. *International Journal of Project Management*, 33(2), 363-379. https://doi.org/10.1016/j.ijproman.2014.06.012

Cuppen, E., Bosch-Rekveldt, M. G., Pikaar, E., & Mehos, D. C. (2016). Stakeholder engagement in large-scale energy infrastructure projects: Revealing perspectives

using Q methodology. *International Journal of Project Management*, 34(7), 1347-1359. https://doi.org/10.1016/j.ijproman.2016.01.003

Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review*, 14(4), 532-550. https://doi.org/10.2307/258557

Eisenhardt, K. M., & Graebner, M. E. (2007). Theory building from cases: Opportunities and challenges. *Academy of Management Journal*, 50(1), 25-32. https://doi.org/10.5465/amj.2007.24160888

Erkan, I., & Evans, C. (2018). Social media or shopping websites? The influence of eWOM on consumers' online purchase intentions. *Journal of Marketing Communications*, 24(6), 617-632. https://doi.org/10.1080/13527266.2016.1184706

Fahri, J., Biesenthal, C., Pollack, J., & Sankaran, S. (2015). Understanding megaproject success beyond the project close-out stage. *Construction Economics and Building*, 15(3), 48-58. https://doi.org/10.5130/AJCEB.v15i3.4611

Flyvbjerg, B. (2006). From Nobel prize to project management: getting risks right. *Project Management Journal*, 37(3), 5-15. https://doi.org/10.1177/875697280603700302

Flyvbjerg, B. (2009). Survival of the unfittest: why the worst infrastructure gets built—and what we can do about it. *Oxford Review of Economic Policy*, 25(3), 344-367. https://doi.org/10.1093/oxrep/grp024

Flyvbjerg, B. (2012). Why mass media matter to planning research: The case of megaprojects. *Journal of Planning Education and Research*, 32(2), 169-181. https://doi.org/10.1177/0739456X12441950

Golbeck, J. (2016). Negativity and anti-social attention seeking among narcissists on Twitter: A linguistic analysis. *First Monday*, 21(3). https://doi.org/10.5210/fm.v0i0.6017

Green, S. D., & Sergeeva, N. (2019). Value creation in projects: Towards a narrative perspective. *International Journal of Project Management*, 37(5), 636-651. https://doi.org/10.1016/j.ijproman.2018.12.004

Henisz, W. J., & Zelner, B. A. (2006). Interest groups, veto points, and electricity infrastructure deployment. *International Organization*, 60(1), 263-286. https://doi.org/10.1017/S0020818306060085

Hysa, B., & Spalek, S. (2019). Opportunities and threats presented by social media in project management. *Heliyon*, 5(4), e01488. https://doi.org/10.1016/j.heliyon.2019.e01488

Kanagarajoo, M. V., Fulford, R., & Standing, C. (2019). The contribution of social media to project management. *International Journal of Productivity and Performance Management*, https://doi.org/10.1108/IJPPM-09-2018-0316

Jugdev, K., & Müller, R. (2005). A retrospective look at our evolving understanding of project success. *Project Management Journal*, 36(4), 19-31. https://doi.org/10.1177/875697280503600403

Kivilä, J., Martinsuo, M., & Vuorinen, L. (2017). Sustainable project management through project control in infrastructure projects. *International Journal of Project Management*, 35(6), 1167-1183. https://doi.org/10.1016/j.ijproman.2017.02.009

Klakegg, O. J., Williams, T., Magnussen, O. M., & Glasspool, H. (2008). Governance frameworks for public project development and estimation. *Project Management Journal*, 39(1_suppl), S27-S42. https://doi.org/10.1002/pmj.20058

Kozinets, R. V., Dolbec, P., & Earley, A. (2014). Netnographic analysis: Understanding culture through social media data. *The SAGE Handbook of Qualitative Data Analysis*, 262-276. London: Sage.

Kwak, Y. H., & Anbari, F. T. (2012). History, Practices, and Future of Earned Value Management in Government: Perspectives from NASA. *Project Management Journal*, 43, 77-90. https://doi.org/10.1002/pmj.20272

Laursen, M., & Svejvig, P. (2016). Taking stock of project value creation: A structured literature review with future directions for research and practice. *International Journal of Project Management*, 34(4), 736-747. https://doi.org/10.1016/j.ijproman.2015.06.007

Liu, B., Li, Y., Xue, B., Li, Q., Zou, P. X., & Li, L. (2018). Why do individuals engage in collective actions against major construction projects?—An empirical analysis based on Chinese data. *International Journal of Project Management*, 36(4), 612-626. https://doi.org/10.1016/j.ijproman.2015.06.007

Liu, Y., van Marrewijk, A., Houwing, E., & Hertogh, M. (2019). The co-creation of values-in-use at the front end of infrastructure development programs. *International Journal of Project Management*, 37(5), 684-695. https://doi.org/10.1016/j.ijproman.2019.01.013

Martinsuo, M. (2020). The Management of Values in Project Business: Adjusting Beliefs to Transform Project Practices and Outcomes. *Project Management Journal*, 51(4), 389-399. https://doi.org/10.1177/F8756972820927890

Martinsuo, M. (2019). Strategic value at the front end of a radical innovation program. *Project Management Journal*, 50(4), 431-446. https://doi.org/10.1177/8756972819853438

Martinsuo, M., Klakegg, O., & van Marrewijk, A. H. (2019a). Introduction: delivering value in projects and project-based business. *International Journal of Project Management*, 37(5), 631-635. https://doi.org/10.1016/j.ijproman.2019.01.011

Martinsuo, M., Vuorinen, L., Killen, C. (2019b). Lifecycle-oriented framing of value at the front end of infrastructure projects. *International Journal of Managing Projects in Business*, 12(3), 617–643. https://doi.org/10.1108/IJMPB-09-2018-0172

McTavish, D. G., & Pirro, E. B. (1990). Contextual content analysis. *Quality and Quantity*, 24(3), 245-265. https://doi.org/10.1007/BF00139259

Narayanan, V. K., & DeFillippi, R. (2012). The influence of strategic context on project management systems: A senior management perspective. In *Project Governance* (pp. 3–45). Springer.

Ninan, J., Clegg, S., & Mahalingam, A. (2019). Branding and governmentality for infrastructure megaprojects: The role of social media. *International Journal of Project Management*, 37(1), 59-72. https://doi.org/10.1016/j.ijproman.2018.10.005

Ninan, J., Mahalingam, A., Clegg, S., & Sankaran, S. (2020). ICT for external stakeholder management: sociomateriality from a power perspective. *Construction Management and Economics*, 38(9), 840-855. https://doi.org/10.1080/01446193.2020.1755047

OGC (2007a). OGC Gateway Review 4: readiness for service guidance and templates. Available at: https://www.gov.uk/government/publications/ogc-gateway-review-4-readiness-for-service-guidance-and-templates

OGC (2007b). OGC Gateway Review 5: operations review guidance and templates. Available at: https://www.gov.uk/government/publications/ogc-gateway-review-5-operations-review-guidance-and-templates

Park, C. S. (2015). Applying "negativity bias" to Twitter: Negative news on Twitter, emotions, and political learning. *Journal of Information Technology & Politics*, 12(4), 342-359. https://doi.org/10.1080/19331681.2015.1100225

Pew Research Center. (2021). Social Media Use in 2021. https://www.pewresearch.org/internet/2021/04/07/social-media-use-in-2021/

PMI (2017). *A guide to the project management body of knowledge*. Sixth Edit. Project Management Institute, Inc, Newtown Square, PA: PMI.

Powers, T., Advincula, D., Austin, M. S., Graiko, S., & Snyder, J. (2012). Digital and social media in the purchase decision process: A special report from the Advertising Research Foundation. *Journal of Advertising Research*, 52(4), 479-489. https://10.2501/JAR-52-4-479-489

Rosa, D. V., Chaves, M. S., Oliveira, M., & Pedron, C. (2016). Target: A collaborative model based on social media to support the management of lessons learned in projects. *International Journal of Managing Projects in Business*, 9(3), 654-681. https://doi.org/10.1108/IJMPB-12-2015-0120

Salo, J. (2017). Social media research in the industrial marketing field: Review of literature and future research directions. *Industrial Marketing Management*, 66, 115-129. https://doi.org/10.1016/j.indmarman.2017.07.013

Sandelowski, M. (1993). The problem of rigor in qualitative research. *Advances in Nursing Science*, 16(2), 1-8. https://doi.org/10.1097/00012272-199312000-00002

Serra, C. E. M., & Kunc, M. (2015). Benefits realization management and its influence on project success and on the execution of business strategies. *International Journal of Project Management*, 33(1), 53-66. https://doi.org/10.1016/j.ijproman.2014.03.011

Tversky, A., & Kahneman, D. (1989). Rational choice and the framing of decisions. in *Multiple criteria decision making and risk analysis using microcomputers* (pp. 81-126). Springer.

van den Ende, L., & van Marrewijk, A. (2019). Teargas, taboo and transformation: A neo-institutional study of community resistance and the struggle to legitimize subway projects in Amsterdam 1960–2018. *International Journal of Project Management*, 37(2), 331-346. https://doi.org/10.1016/j.ijproman.2018.07.003

Vedung, E. (2010). Four waves of evaluation diffusion. *Evaluation*, 16(3), 263-277. http://dx.doi.org/10.1177/1356389010372452

Volden, G. H. (2019). Assessing public projects' value for money: An empirical study of the usefulness of cost-benefit analyses in decision-making. *International Journal of Project Management*, 37(4), 549-564. https://doi.org/10.1016/j.ijproman.2019.02.007

Volden, G. H., & Samset, K. (2017). Governance of major public investment projects: principles and practices in six countries. *Project Management Journal*, 48(3), 90-108. https://doi.org/10.1177/875697281704800306

Vuorinen, L., & Martinsuo, M. (2019). Value-oriented stakeholder influence on infrastructure projects. *International Journal of Project Management*, 37(5), 750-766. https://doi.org/10.1016/j.ijproman.2018.10.003

Winter, R., & Chaves, M. S. (2017). Innovation in the management of lessons learned in an IT project with the adoption of social media. *International Journal of Innovation*, 5(2), 156-170. https://doi.org/10.5585/iji.v5i2.155

Yin, R. K. (2014). *Case study research and applications: Design and methods (5th ed.)*. Thousand Oaks, CA: Sage publications.

Zhang, Y., Sun, J., Yang, Z., & Wang, Y. (2018). Mobile social media in inter-organisational projects: Aligning tool, task and team for virtual collaboration effectiveness. *International Journal of Project Management*, 36(8), 1096-1108. https://doi.org/10.1016/j.ijproman.2018.09.003

Zwikael, O. (2016). Editorial: International journal of project management special issue on "project benefit management." *International Journal of Project Management*, 34(4), 734–735. https://doi.org/10.1016/j.ijproman.2015.12.007

Zwikael, O., Chih, Y.Y., Meredith, J.R. (2018). Project benefit management: Setting effective target benefits. *International Journal of Project Management*, 36(4), 650–658. https://doi.org/10.1016/j.ijproman.2018.01.002

Zwikael, O., & Smyrk, J. (2012). A general framework for gauging the performance of initiatives to enhance organisational value. *British Journal of Management*, 23, S6-S22.