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## On-Going Social Commentary And The New Project Manager: Sentiment In Large Infrastructure Projects

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# **ON-GOING SOCIAL COMMENTARY AND THE NEW PROJECT MANAGER: SENTIMENT IN LARGE INFRASTRUCTURE PROJECTS**

## **ABSTRACT**

Large infrastructure projects often affect large numbers of people, communities and businesses. Large infrastructure construction projects are most often complicated and paradoxical in that whilst one group can be satisfied, others are negative in their perceptions about what is happening. Managing these large projects requires not only a clear understanding of the process of project management but must also incorporate a good understanding and balancing of government, private and public organizations and the public interest, both as the project is progressing and in terms of who the end users of the project are. In the present context of social media commentary on almost every aspect of social life, people who are anxious about the on-going and immediate impacts of project delivery can now and do comment. This raises a significant question for project managers: How can project managers listen to, respond and learn from public sentiment about that project? In the context of the ongoing Sydney Light Rail Project there has been considerable social media and other media outcry, especially from the many small businesses affected. The project is long delayed; there is significant cost overrun; traffic and logistics to all types of business are negatively affected; and all of the businesses in the construction area are suffering serious business disruption, and to Dec 2018 more than 50 businesses have already closed down!

## **KEYWORDS**

Infrastructure project, Sentiment Analysis, Social Commentary, on-going social impact, Boundary Spanning

## **INTRODUCTION**

The New South Wales government introduced the CBD and South East Light Rail (CSELR) project as part of a NSW long-term transport master plan for Sydney's future strategy in December 2012. The project has been designed to extend the current light rail to cover the broader Sydney CBD area. The project's purposes are to create critical economic growth through improving and maintaining the functionality of Sydney's CBD and provide solutions to Sydney's CBD traffic congestion (NSW Parliament 2018). The estimated cost of the project when the plan was released was \$1.6 billion and was expected to produce over \$4 billion of total economic benefits in return (NSW Parliament 2018). The project planning approval was granted on the 4th of June 2014. The Sydney Light Rail Public Private Partnership (SLR PPP) was contracted to the CSELR Project Deed as a main contractor (NSW Government 2018a) in December 2014. By the time the contract was signed, the estimated project cost had risen \$549 million from \$1.6 to \$2.1 billion and the estimated benefits had

dropped to \$3 billion. This made the benefit-to-cost ratio change from 2.4 to 1.4 (Audit Office NSW 2018). The construction of the CSELR project began in October 2015. The project was staged into 31 construction zones. The system testing commencement was expected to be carried out by June 2018 (NSW Government 2018b) and civil construction substantially completed by the end of 2018 (NSW Parliament 2018). To date, neither date has been achieved. The new date set for delivery is March (or perhaps June) 2020.

Throughout this process there has been considerable commentary, mostly negative, about the CSELR and there has been conjecture in the mainstream press, that this social media activity and the sentiments expressed, and the consequences of it have made the project managers involved make important decisions to placate the 'noise' and deal with the problems that have emerged in the project and the political effects of those problems in social media commentary. This paper asks: What effect have the ongoing social media commentaries had on the CSELR large infrastructure project management decisions?

## LITERATURE REVIEW

Sentiment Analysis (SA) is the study of individual and social opinions, emotions, and attitudes about a process or project, usually expressed as text (Johansson et al, 2012) in various social media such as Facebook, Twitter, and Microblogs (Medhat et al, 2014; Balahur Dobrescu, 2011; Montoyo et al, 2012). Sentiment analysis shows that the analysis of data captured in social media can identify an understanding of how members of society, individuals, groups, and businesses perceive, and then make sense of, an on-going project (Gaspar et al. 2016). This, it can be argued, changes the relationship between projects and those that are impacted not only directly, but also indirectly. The context of that interaction will then change (He et al., 2015). Studies that use sentiment expressed in social media use text data analytics to create a real-time understanding of how people interact with perceived impacts of projects on their personal and business lives through commentary they report and upload to social media sites (Ravi & Ravi, 2015). In terms of project management scenarios, the analysis of people's reactions and their expressions of sentiment provides project managers a platform to assess public perceptions and enables the potential to better understand the on-going social and economic impact of projects (Di Gangi & Wasko, 2009; Bekmamedova & Shanks, 2014; Maynard et al., 2017).

However, detecting sentiment on micro-blog social media such as Twitter is not a trivial task. It is different to detecting conventional texts from blog or forum (Giachanou and Crestani 2016). This is due to the limitation of the number of words on each tweet, which makes sentiment analysis difficult compared to other social media such as forums, blogs or websites. Tweets are also full of the stylistic use of the alphabet and symbols to compose emoticons, intensifiers, abbreviations, slang terms, and punctuation marks in which the user can express their sentiment. To be able to correctly detect and interpret user sentiment requires a high level of computing analysis through approaches such as the Machine-based approach, the Lexicon-based approach, a Hybrid (Machine Learning & Lexicon-Based) approach and a Graph-Based approach (Giachanou and Crestani 2016). However, a discussion of these approaches is outside the scope of this paper.

There has been a limited amount of sentiment analysis used in construction industry research. Tang et al (2017) analysed large amounts of Twitter data and found that businesses in the construction industry in the USA used tweets for advertising and construction news purposes, while the construction union used Twitter to express their sentiments in terms of workload and employment policy. Jiang et al (2016) use sentiment analysis to ascertain Chinese public opinion towards the Three Gorges Project, the world's largest hydropower project in China. They collected data from the Chinese microblogging website, Weibo. The majority of the topics mentioned on Weibo were negative sentiments about the environmental effects to natural waterways, about budgets, about immigrants and about workforce casualties during the project. However, neither paper theories the use and impact of social media on project management decisions throughout the project.

In this study, the “boundary spanning” concept (March and Simon 1958) has been adopted as a lens to explore the way that the infrastructure project team stakeholders, which include government departments and the main contractor, can harvest information that is hidden in the data (public sentiment) and react to opinion with an impact that the project team did not anticipate during project planning. As an education provider, we should be seeking new ways of learning from information that is readily available to strengthen new project manager competencies. It is argued here that one of the key competencies of the new project manager has to be the management of social media response and public sentiment commentary. This is a challenge for the “New Project Manager” (Sakhrani, et al. (2017).

Boundary spanning is an organizational concept aimed at establishing relationships with the external environment to achieve organizational objectives (Aldrich and Herker 1977; Korschun 2015). Contextually, there are two dynamics to boundary spanning: the organisation environment and the interorganizational environment (Aldrich and Herker 1977; Levina and Vaast 2005). In the delivery of infrastructure projects, each member of the project team is considered *spanners* from their respective organisation (interorganisational) as well as the spanning between the project team and the environment (organisation - environment). This paper focuses on the boundary spanning on the latter (organization - environment) because establishing a relationship with the public (stakeholders) through social media can enable the project team to achieve its objectives. Information processing and external representation are the main functions of boundary spanning (Korschun 2015; Levina and Vaast 2005; Aldrich and Herker 1977). Information from external sources can be an important resource for an organization, depending on selecting and processing the right information crucial to the survival of the organization. External representation seeks to achieve any of the three outcomes to an organization, these are making changes within the organization to suit the pattern of external environment; manipulating the external environment to suit organizational needs; and reaching a compromise with the external environment. The application of the Boundary Spanning concept to the Sydney Light Rail can enable the project team to re-strategize and reach a compromised agreement with the public.

The criteria of establishing boundary spanning conditions are organizational size, technology and organizational environment (Aldrich and Herker 1977). The size of the organization determines the number of boundary spanning roles available and internal restructuring to respond to the pattern of the environment. Levina and Vaast

(2005) conducted a case study on boundary spanning between a small and large size organizations concluding that the small size firm was able to restructure because the firm has less bureaucratic or less formalized as compared to the large firm.

The level of interaction with technology as a response to technology also contributes to boundary spanning in an organizations. Mediating technology organizations like Banks have a greater proportion of their employees acting as boundary spanners with the external environment (customers). Unlike mediating technology organizations, long-linked technology organisations have a lower proportion of their workforce as permanent as employees. These organizations have more intra-organizational boundary spanning places due the interdependence of the various organizational units. Finally, intensive technology organizations like hospitals, construction projects and the police force draw clients/stakeholders as temporal members in the organization (Aldrich and Herker 1977). Construction project client are temporally integrated into the administrative structure of the organization.

We argue that in order for boundary spanning to emerge, a new joint field of practice must be produced. While negotiating the new joint field, these agents become what we call boundary spanners-in-practice who produce and use objects, which become locally useful and which acquire a common identity-hence, boundary objects-in-use. Moreover, we are interested to see how boundary spanners-in-practice use various organizational and professional resources including the influence that comes with being nominated to boundary spanners' roles to create the new joint field. The establishment of trust and creation of a field of mutual agreement spanning the vested interests of community versus project are key to project success. This trust emerges more in informal networks, rather than imposed or formal structures. This trust is driven by individuals usually, boundary spanners, who create and stimulate informal spaces of interaction, and enable trust to evolve (Lee and Sawang 2016; Edelenbos and van Meerkerk 2015). Where that trust does not emerge, stakeholder boundaries remain independent of each other and are often contested.

The nature of infrastructure projects and how they can and have been managed keeps evolving. This raises the question, how can project managers be prepared for the challenge of issues raised and then react as a form of public relations? Today's social landscape and the availability of social media tools has enabled the public, as individuals, groups or businesses, to voice their opinions about the impact that an infrastructure project has on them, or about the project itself and how it has been managed. These reactions happen in an easier, quicker and wider manner, reaching a greater audience than before. The project manager now has to be cognisant of a greater range of indirect stakeholders who now have a public voice and express opinions and sentiment in real time. This spans the boundaries of who can, who should, and who must influence an on-going infrastructure project. The project manager in their response to social media sentiment and commentary is operating across (spanning) the internal systems of the planned project, and the external social and economic systems of social comments. Understanding this will enable some theorisation of the relationship of social media and project management, and support our understanding of what effects the ongoing social media commentaries have on CSELR large infrastructure project management decisions.

## METHODOLOGY

The intent of this exploratory research was to try and identify issues reported in social media along the time span of the (CSELR) project, and analyse the project documents and reports over that time to determine the actions of the project managers in response to periods of high intensity social media. The documents and the social media postings adopted a qualitative analysis of their contents. Content analysis is “any technique for making inferences by objectively and systematically identifying specified characteristics of messages” (Holsti, 1969, p. 14). Content analysis still relies on the scientific method (including attention to objectivity, intersubjectivity, *a priori* design, reliability, validity, generalisability, replicability, and hypothesis testing) and is not limited to the types of variables that may be measured or the context in which the messages are created or presented (Neuendorf, 2016). Content analysis has several advantages (Cavanagh 1997; Keefer et al 2015; Graneheim et al 2017). First, it provides a deep understanding of a specific issue or event. This can enable the emergence of themes and knowledge. Content analysis can allow the opinions of social media contributors to be considered as they wrote it. Numerous software packages and algorithms have been developed in content analysis (Krippendorff 2018), to identify and produce word counts, analyse occurrence of specified expressions of sentiment, collate like terms of sentiment, and produce graphical representations of the analyses (Lai and To 2015)

The research process started with a content analysis. This analysis derived from project documentation released from the CSELR project, Transport for NSW, the NSW Government and public websites. The result from the content analysis highlighted the key issues that occurred prior to and during the CSELR project construction. Key social media (Twitter, Facebook) were then searched based on key words to understand the nature of the issues and what social media posts focused on. To try and better understand what was happening in the SLP project, we decided to focus in detail on the 12 month period from February 2018 to February 2019. This period was chosen because key issues became apparent during this period, because of legal action taken by the contractor against the NSW Government, and legal action taken by a collective of small business owners also against the NSW Government, following issues which had been reported in social media posts since 2016, when the project began.

To begin this analysis, we adopted a software package (software 1) which uses a specific sentiment algorithm to extract key issues, the degree of negative and positive sentiment expressed, and determination of points of intensity in social media reporting. However, the data derived from software 1 showed significant differences with data available in social media about the issues arising about the CSELR project. This resulted in us rejecting software 1. To continue the sentiment analysis, another software package, which uses a different algorithm but also focuses on sentiment analysis in social media (software 2) was deployed. Data derived from software 2 showed a significant alignment with data available in social media. In this study, (software 2) is used to collect sentiment data from various platforms, Twitter, Facebook posts, blogs and news articles online. Software 2 enabled analysis of unstructured text-based information and report demographic information such as dominant topics and location of the sentiment collected. Software 2 can also

categorise sentiment into positive, negative or neutral. The research process is shown in Fig 1.

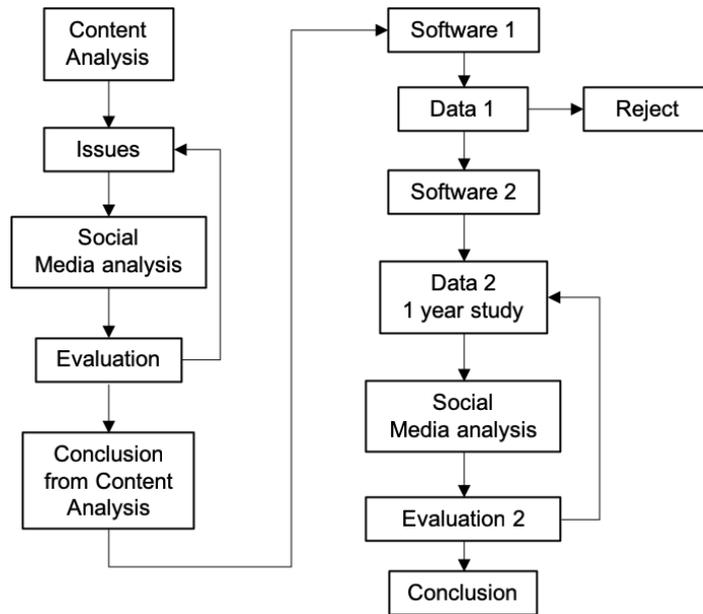


Figure 1: Research process

The sentiment data analysis in this research included terms such as ‘Sydney Light Rail’, ‘Sydney CBD tram’, ‘Sydney tram line’, ‘#sydneylightrail’ and ‘George Street light rail’; and sentiment terms ‘delay’, ‘budget blowout’, ‘poor communication’, ‘Anzac trees’, ‘shock’, ‘electrocute’, ‘human remains’, ‘small business impact’, ‘foot traffic’, ‘noise’, ‘hoarding and fences’ and ‘PPP’. The data collection period was from February 2018 to February 2019. After analysing the categorised sentiments in a chronological timeline, the outcomes were compared to the periodic official CSELR project progress reports from New South Wales Transport. These were analysed to identify what actions or responses have been executed to address project issues that impacted the public in relation to the sentiments publicly expressed.

## DOCUMENT ANALYSIS

This first part of the research reports on what has been happening in the Sydney CBD and the South East Light Rail (CSELR) project since the project planning approval was granted in June 2014. Some of the issues are on-going, some of them occurred once but left long-lasting effects. These are some of the key impacts from the CSELR project and how the project team responded to the issues.

**1) Noise:** There were significant amounts of complaints from residents, small business owners and the broader community about excessive levels of noise and vibration caused by construction work along the project sites. Residents who live along the rail line mentioned that the work finished at 5 a.m. in the morning and started again at 7 a.m. This resulted in sleep deprivation. (Nile 2019).

**Response:** NSW Project Deed issued the revised Environmental Management Measures, and all applicable legislative and licensing requirements through the Minister’s approval. One measure, such as the *Construction Noise and Vibration*

*Management Plan*, was developed to manage noise-related issues. This plan includes measures such as adjusting working hours to 6 a.m. to 6 p.m. on weekdays, 8 a.m. to 5 p.m. on Saturdays and no noise on Sundays and public holidays. However, the developed plan also had some exceptions, which allowed the main contractor to work outside the approved working hours if a) temporary road closures and other measures are required by the Police and other regulatory authorities for the safe delivery of material/equipment; b) if works have the potential to disrupt commuter services and road networks; and c) if works are required to be completed to maintain health and safety, avoid loss of life or injury and to prevent environmental damage (Nile, 2019).

**Public reaction:** Moore (2018) mentioned that over 1500 complaints were reported. The following are examples of sentiments expressed in social media as shown in Figure 2.



Figure 2: Example of sentiment about noise

**2) Lack of Communication:** There was a lack of clear communication mechanisms across all aspects of the CSELR project during the construction phase. This paucity of communication was raised through complaints from local residents and small business owners that “focused on the delays of the project, but also included poor communication from Transport for NSW and contractors with residents and businesses, lack of transparency about compensation offered to businesses, complaints about excessive construction noise and out of hours work and their impact” (Nile 2019 p. 172). Large numbers of small business owners had been suffering due to NSW Government miscommunication (Casben and Cockburn 2018). This lack of communication is also believed to be one of the reasons for long waiting times on damage claims that small businesses had to encounter.

**Response:** Based on the outcomes of the Nile report, released in January 2019, and well after the damage had been done, the Transport for NSW, the Project

Manager, was ordered by the Minister to re-assess their communication strategy and report back.

**Public reaction:** Even though this communication strategy review was in place, the effectiveness of the strategy was still questioned by public (Probert 2019). The following are examples of sentiments expressed in social media as shown in Figure 3.



Figure 3: Example of sentiment about lack of communication

**3) Severe loss of trade and business goodwill<sup>1</sup>:** After construction work on the Sydney Light Rail project had commenced, businesses started losing customers along the light rail line construction route. The losses were due to loss of foot traffic and difficulty in accessing these businesses and shops. There were a lot of complaints launched with regarding to significant business loss of trade and goodwill.

Many cases were recorded through the Public Accountability Committee inquiry in the Nile report. Some of the quotes include; “Severe loss of trade ... down across the board by over 30 per cent plus and not improving”, “As construction still continues in Kingsford today, it's hard for me to make an estimate of total damages as we would need to look at where profit would have been without construction and I am unsure how fast profit will return once construction does cease. I am sure the total figure will be over \$500,000.”, “Low foot traffic has resulted in a huge loss of sales leading to low gross margins and loss of profit.” (Nile 2019 p. 90).

**Response:** CSELR believed that one of the reasons that caused loss of foot traffic to business was due to the misplacement of hoardings (fencing) and signage along the light rail construction sites throughout the city, where in some case the hoarding was placed right next to the perimeter of the business. However, this had to be balanced with work health and safety standards that the construction project had to comply to. In response to the serious level of complaints and outcry in social media, Transport

<sup>1</sup> Goodwill is an intangible asset associated with the purchase of one company by another. Specifically, goodwill is recorded in a situation in which the purchase price is higher than the sum of the fair value of all identifiable tangible and intangible assets purchased in the acquisition and the liabilities assumed in the process. The value of a company's brand name, solid customer base, good customer relations, good employee relations, and any patents or proprietary technology represent some examples of goodwill.

for NSW established the Small Business Assistance Program in August 2017. The program was designed to assist small business owners for short term adverse impacts, and was provided on an ex-gratia basis. Apart from financial business compensation, there needed to be an increased extension and intensification of remediation to small businesses and additional measures were needed to assist with the mental health of residents and small business owners (Nile 2019).

**Public reaction:** "It has been especially hard for small businesses that have been impacted by barricades, disruption in foot traffic and the severe loss of trade and goodwill ... [including] their physical and mental health" (Baird 2019). The following are examples of sentiments expressed in social media as shown in Figure 4.

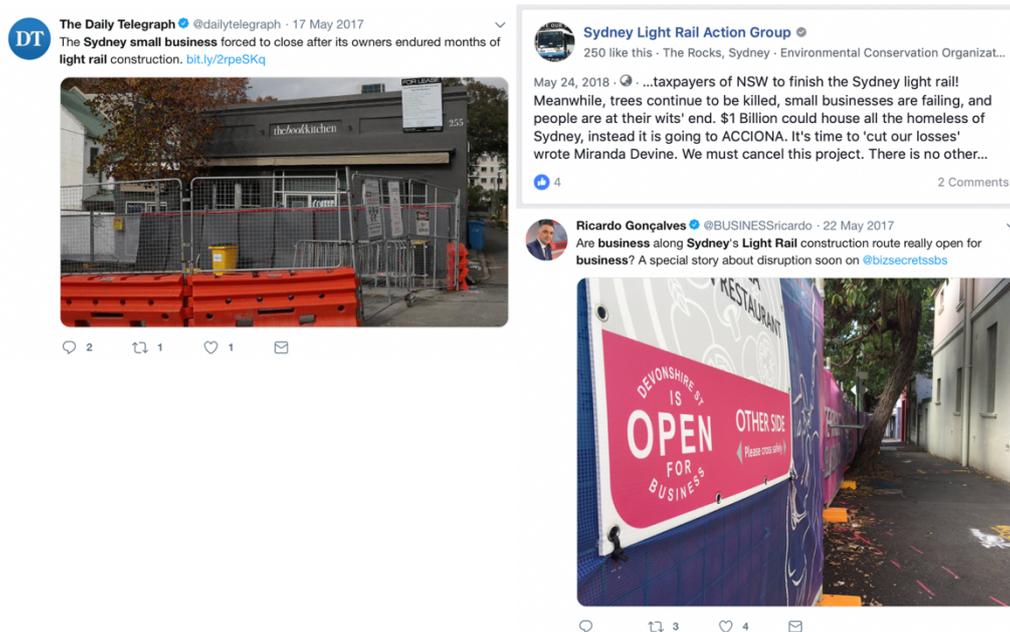


Figure 4: Example of sentiment about loss of trade and business goodwill

**4) Ineffective PPP contract:** In October 2014 the NSW Government awarded a Public Private Partnership contract to ALTRAC Light Rail (ALTRAC) - who were previously known as Connecting Sydney - to design, construct, operate and maintain the light rail network. Key stakeholders in ALTRAC who has the overall responsibility for the project included, Acciona Infrastructure Australia (regarded as a Design & Construct Contractor), Alstom Transport Australia (regarded as a Design & Construct Contractor) and Transdev Sydney (regarded as an Operations & Maintenance Contractor). There were also two other parties who had key roles in the project, 1) Ausgrid who were responsible for operating, maintaining and building the network assets that are situated along the rail route, and 2) the NSW Environment Protection Authority (EPA) (Nile 2019). The original estimated cost of the project in 2014 was \$1.6 billion. By the time the contract was signed the estimated cost had risen by \$549 million from \$1.6 to \$2.1 billion. This cost increase was caused by mispricing and omissions in the business case (Audit Office NSW 2018). In November 2018 the Auditor-General reported that the CSELR project was delayed by an inability to meet the original completion date of March 2019 and was over budget. As of June 2018 the project also had exhausted its \$207 million contingency fund in a

facilitation process to resolve claims made by the contractor. This will eventually increase with additional costs to the project (Audit Office NSW 2018a).

**Response:** The NSW Government has noted financial performance problems from the CSELR project and formally requested the Auditor-General to undertake a review into the effectiveness of Public Private Partnership contracts for significant state infrastructure projects. NSW government highlighted this concern to other government infrastructure projects during the pre-planning phase, such as the WestConnex project (Nile 2019).

**Public reaction:** Interestingly or ironically Sydney light rail project had won 2015 FinanceAsia and PFI awards (Indian Newspaper Sydney 2016). The following are examples of sentiments expressed in social media as shown in Figure 5.

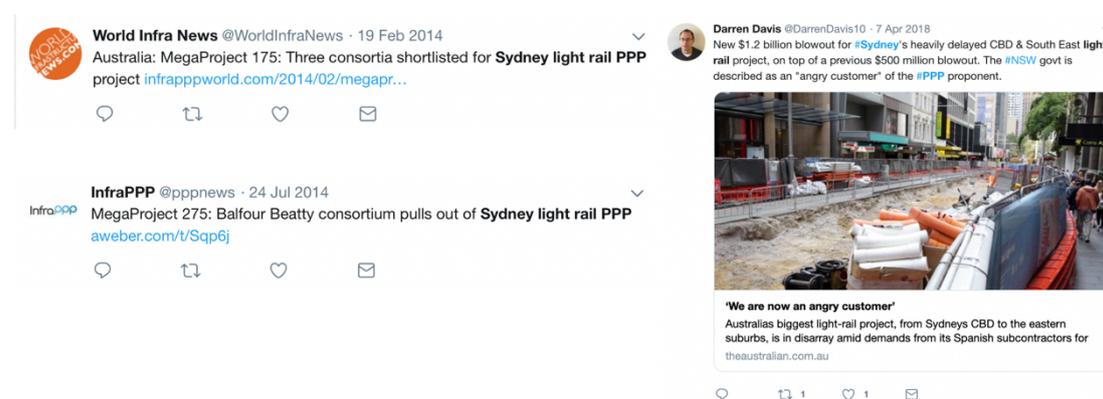


Figure 5: Example of sentiment about ineffective PPP contract

**5) Constant delays:** The original completion date of the CSELR project civil construction was by the end of 2018 and system testing commencement expected to be carried out by June 2018 (NSW Government 2018b). Neither date has been achieved. However, due to a series of questions about timeframe and cost, the completion date has been shifted. Transport for NSW would like it to be finalised by December 2019. The new official completion date is currently March 2020. There may also be a further two month delay, according to the evidence provided by ALTRAC and Acciona (Nile 2019).

**Response:** “The committee recommends that public planning inquiries for major projects, costing \$1 billion or more, be subject to thorough public scrutiny. This would include releasing the business case publicly, allowing analysis from independent experts and genuine consultation with the community. This will provide increased transparency of the expenditure of public funds, and also allow projects to be improved by a range of stakeholders and the public.” (Nile 2019 p.186)

**Public reaction:** “Every time the contractor digs a hole there is something underneath the ground that they weren’t told about” (Railway Technology 2018). The following are examples of sentiments expressed in social media as shown in Figure 6.

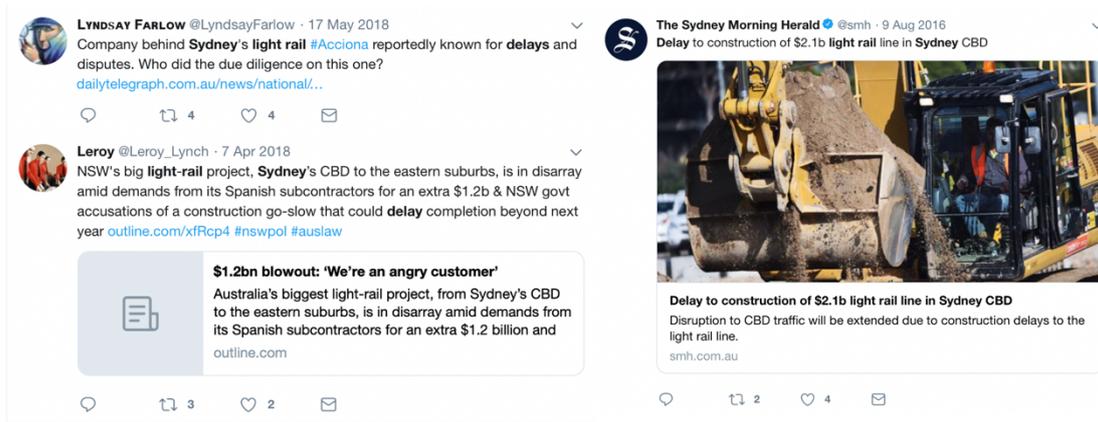


Figure 6: Example of sentiment about constant delay

**6) Over budget:** The CSELR project 2018 Financial Auditors Report, released in October 2018, stated that the project is significantly delayed and substantially over budget (Nile 2019). The Auditor-General also noted that Transport for NSW had not yet officially revised the budget, indicating that the original budget for the project was \$1.6 billion, which was revised upwards by \$500 million in December 2014 to \$2.1 billion. According to the Auditor-General the project also included a contingency fund of \$207 million, which as at 30 June 2018, had been exhausted. Given this, and that Transport for NSW are in a facilitation process to resolve claims made by the contractor as the overarching Project Manager, the Auditor-General concluded that 'additional costs to the project are to be expected' (Audit Office NSW 2018b).

**Response:** Not only were concerns highlighted by the Auditor-General early on, there continues to be concerns with the CSELR project (Audit Office NSW 2018b), and nothing has changed. No further updates on the financial situation have been publicly released.

**Public reaction:** These are some examples of social media reports and commentary on this issue: “Spanish construction company Acciona has warned that Sydney's troubled \$2.1 billion light rail risks taking an extra two months to finish and revealed that it now estimates the final cost to itself of constructing the line will double to \$1.8 billion.” (O’Sullivan 2018). The following are examples of sentiments expressed in social media as shown in Figure 7.

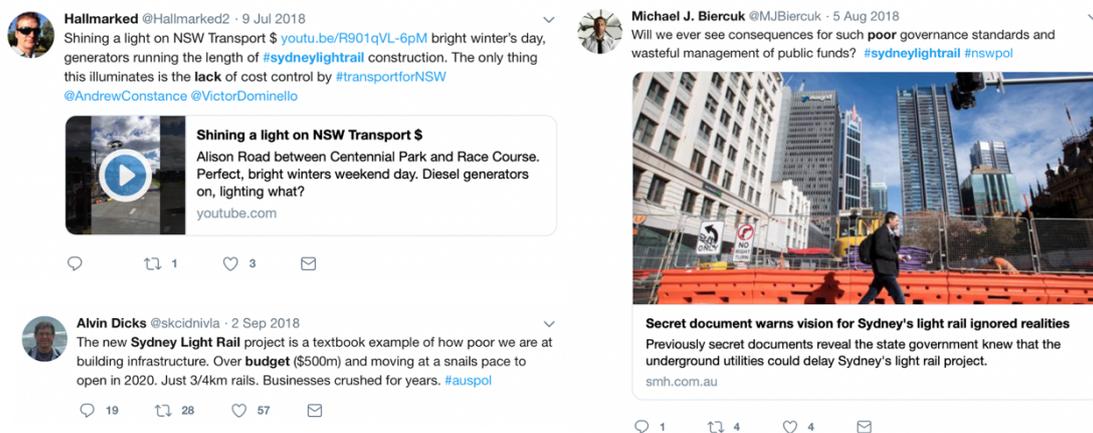


Figure 7: Example of sentiment about over budget

**7) Main Contractor launches \$1.1 billion lawsuit:** Acciona has commenced court proceedings against Transport for NSW claiming they were misled into entering into a contract with ALTRAC (Nile 2019). “Acciona is suing the government for \$1.1 billion for allegedly failing to reveal that it had not secured the agreement of Ausgrid on how crucial cables under the route should be handled.” This misinformation of crucial information raised construction costs of the project from Circular Quay to Randwick, and Kingsford in the city's south east section from \$870 million to approximately about \$1.8 billion (O’Sullivan 2018). The problems that occur in the Sydney light rail project could complicate the delivery of future light rail systems installed because governments will have to take more responsibility for managing timely delivery of contracts (Wiggins 2018).

**Response:** The government insists that the cost to the state of the project, which includes building the line and operating trams, will be \$2.1 billion. The final bill to NSW taxpayers will not be known until the outcome of Acciona's legal action against Transport for NSW (O’Sullivan 2018).

**Public reaction:** The following are examples of sentiments expressed in social media as shown in Figure 8.



Figure 8: Example of sentiment about main contractor lawsuit

Further issues found on the project that gained the public's attention included;

**8) SLRCA** The Sydney Light Rail Class Action against Transport for NSW and the NSW Government was begun by a collective of more than 110 small business in 2018 due to constant business loss and a decrease in business goodwill along the CSELR project route. The purpose of the class action is to represent businesses and residents who have been unfairly impacted by the project (Sydney Light Rail Class Action Group 2019). Action from the group included a Statement of Claim filed in the Supreme Court of NSW on Tuesday 28 August 2018 (Mirty 2019), seeking more than \$400 million in compensation.

**9) Sydney Light Rail Action Group** was formed after over 800 ANZAC and other heritage listed Sydney trees and over 700 other trees were cut down during the CSELR project construction work (Bellamy 2019). Some of the trees that had been removed also had significant impact on flooding which has occurred in some areas (Nile 2019 p. 84).

**10) Teen electrocuted on project site.** In June 2018, a 15 year old girl was electrocuted at the intersection of George Street and Ultimo Road near Haymarket in the Sydney CBD. An independent investigation was ordered to investigate the incident (Kontominas and Kennedy 2018). The investigation concluded that a worn cable and rain in the days leading up to the incident likely caused the electrocution (Probert 2018a).

**11) Human remains found on site.** Construction workers found human bones in the CSELR project site near the Sydney Central Station on October 30th 2018. “NSW Police were immediately called to the Chalmers St discovery, however the appearance and depth of the bones led officers to believe the bones were from an old Sydney cemetery (Wolfe 2018). NSW Government ensured that a full investigation was undertaken into the mishandling of human remains on 29 October 2018 in Chalmers Street, Surry Hills, by workers from Acciona Infrastructure Australia (Nile 2019 p. 44).

**SOCIAL MEDIA ANALYSIS (SENTIMENT ANALYSIS)**

**Feb 2018 - Feb 2019 Case Study:** To make sense of the actions taken by project managers and government officials responsible for the Sydney Light Rail project, we have selected a specific period for analysis. This period is significant for the project as it represents that part of the project plan that corresponds to the original end point and hand over of the project. As we have noted earlier, the project is already delayed and the current expected delivery date will be mid-2020, more than two years late with a massive cost overrun.

The sentiment analysis for the period from February 5, 2018 to February 5, 2019 records the mentions of the Sydney Light Rail project in social media (Figure 9) highlighting some eight points of concentration.

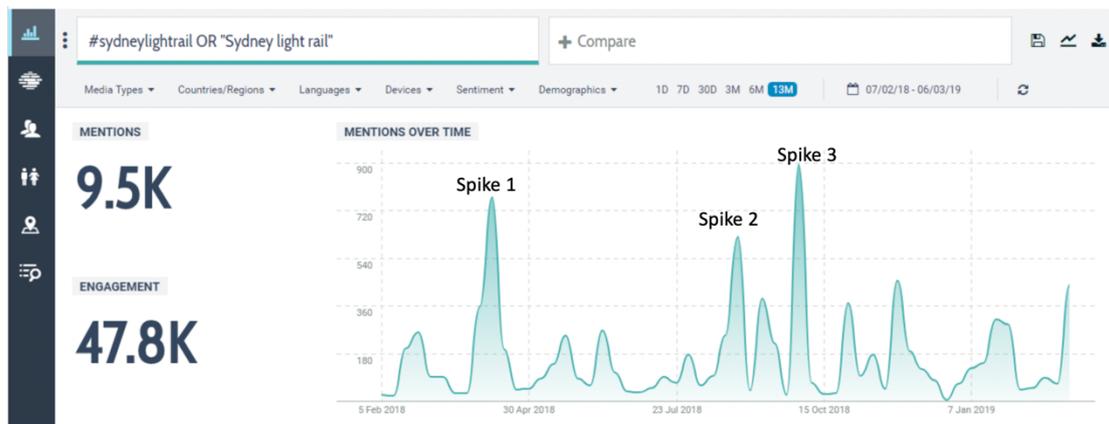


Figure 9: Ongoing sentiment analysis of CSELR project in terms of the project was mention in social media.

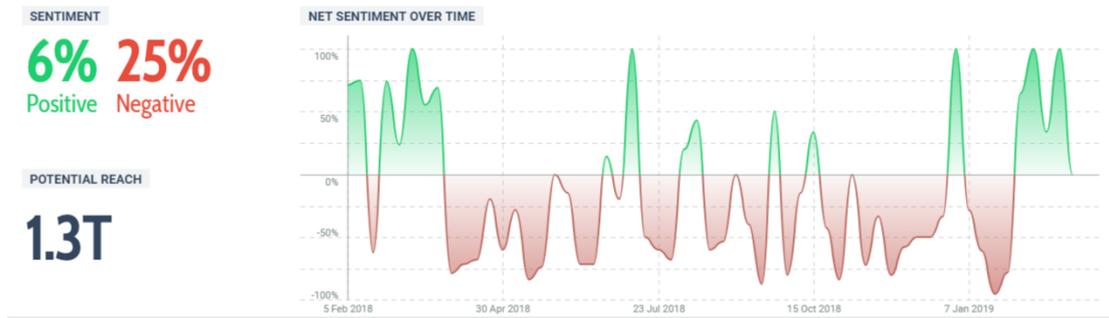


Figure 10: Sentiment analysis of CSELR project in terms of how social media perceived about the project.

The data analysis also shows the relative positivity and negativity - net sentiment over time (Figure 10) showed that in all of the social media posts regarding the projects, 25% deliberately used negative expressions of sentiment and only 6% showed positive sentiment.

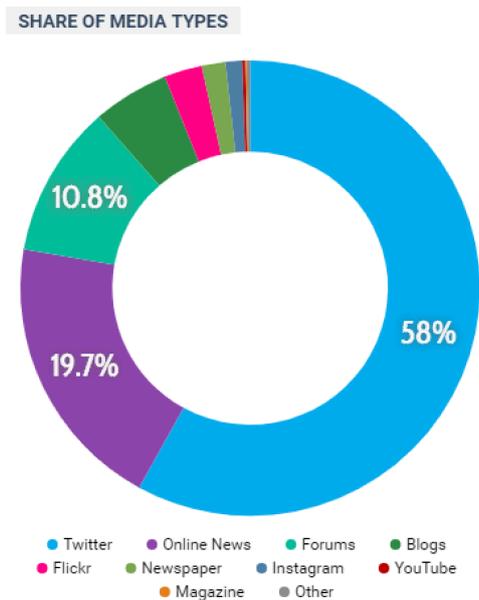


Figure 11: Proportion of the sources of social media that mentioned sentiment on CSELR project.

The three major sources of these posts in social media show that 58% were posts on Twitter, 19.7% from online news and 10.8% from discussion forums. What is important through is to reach down into the social media posts in each of these peaks and identify the issues and correlate that sentiment with the emergent actions from the project managers in Transport NSW.

**Spike 1 - Early April 2018**

As seen in Figure 1, the first spike occurred in early April 2018. Around this time, it was announced that the project was delayed, from the originally scheduled April 2018 to (at that time) April 2019. At that time, some of the tweets indicated the following:

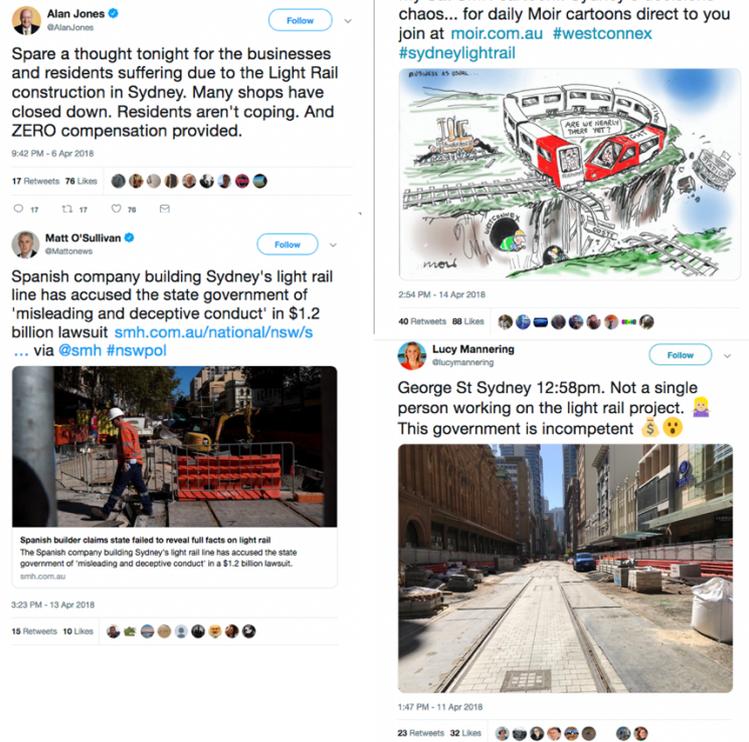


Figure 12: Example of sentiment from spike 1

As can be seen in the tweets above, there is general anger and resentment at the project, particularly towards the New South Wales government (see Alan Moir’s (@moir\_alan) and Matt O’Sullivan’s (@Mattonews) tweets specifically). Fingers were being pointed between the NSW government and the Spanish company managing the project. This generated a few mentions and retweets as the public was getting sick of the constant delays taking place. It was further evidence of dismay that in the tweet from Lucy Mannering (@lucymannering), there was the mention of ‘not a single person working on the light rail project’, which garnered many mentions with many others retweeting, indicating their frustration with the process. Finally, many supported the high-profile Sydney radio commentator, Alan Jones (@AlanJones) by retweeting his message about the lack of compensation being given to the businesses (and residents) surrounding the construction zone. Feelings and words of general disarray from the project, embarrassment, being misled, government blame and incompetence dominated the sentiments of the tweets during this spike.

The data shows that of all sentiments expressed most were neutral or descriptive only and that 25% expressed negative sentiment and only 6% were positive. These positive sentiments included: Whilst the general sentiment at this spike was negative, a positive tweet on the 4th of April was made. This tweet indicated that a minor section of the light rail line was tested with sandbags to simulate passengers and clocked speeds up to 70 km/h (@MySydney).

### Spike 2 - Mid/Late August 2018

The second spike occurred around the second half of August 2018, which coincided with a NSW parliamentary inquiry into the impact of the light rail project on residents and businesses. General sentiment at this time was again, not surprisingly, anger. Many people, residents and businesses alike, were frustrated with the costs incurred and that the taxpayers would be paying for it. Some of the tweets from that time can be seen below:



Figure 13: Example of sentiment from spike 2

During the inquiry, it was indicated that many businesses had been forced to shut for good, given the amount of disruption taking place. There was also increased talk of lawsuits being filed by the impacted businesses, to the value of \$40 million. Many senior Liberal and National party members were unable to answer basic questions about the \$2.1 billion project, further increasing the frustrations felt by those impacted. Finally, to round out this spike, it was indicated that the ‘Sydney Light Rail will be full from day one and won’t carry as many passengers as the buses they are replacing (7 News Sydney, @7NewsSydney). Feelings and words during this spike included troubled, bungled, oversight, impact and lawsuits. Again, a positive tweet emerged on the 17th of August with a map of the Sydney Light Rail lines being made publicly available (@sara\_stace).

### Spike 3 - Early October 2018

The third spike occurred in late September and early October 2018. This spike happened because there was the announcement of yet another delay, to mid-2020. Not only has the project been delayed again, but the \$2.1 billion project could end up costing hundreds of millions of dollars more than originally forecast. Additionally, the inquiry was still taking place, and news of the human toll was presented. Specifically, victims told of marriage break ups, psychiatric treatment, and even violence caused by the relentless effect of the building work around their homes and businesses. Furthermore, a NSW transport representative *allegedly* told 100 business owners they should 'go to Bali for six months' during construction while another was described as a 'standover man'. Some of the reactions via Twitter can be seen below:

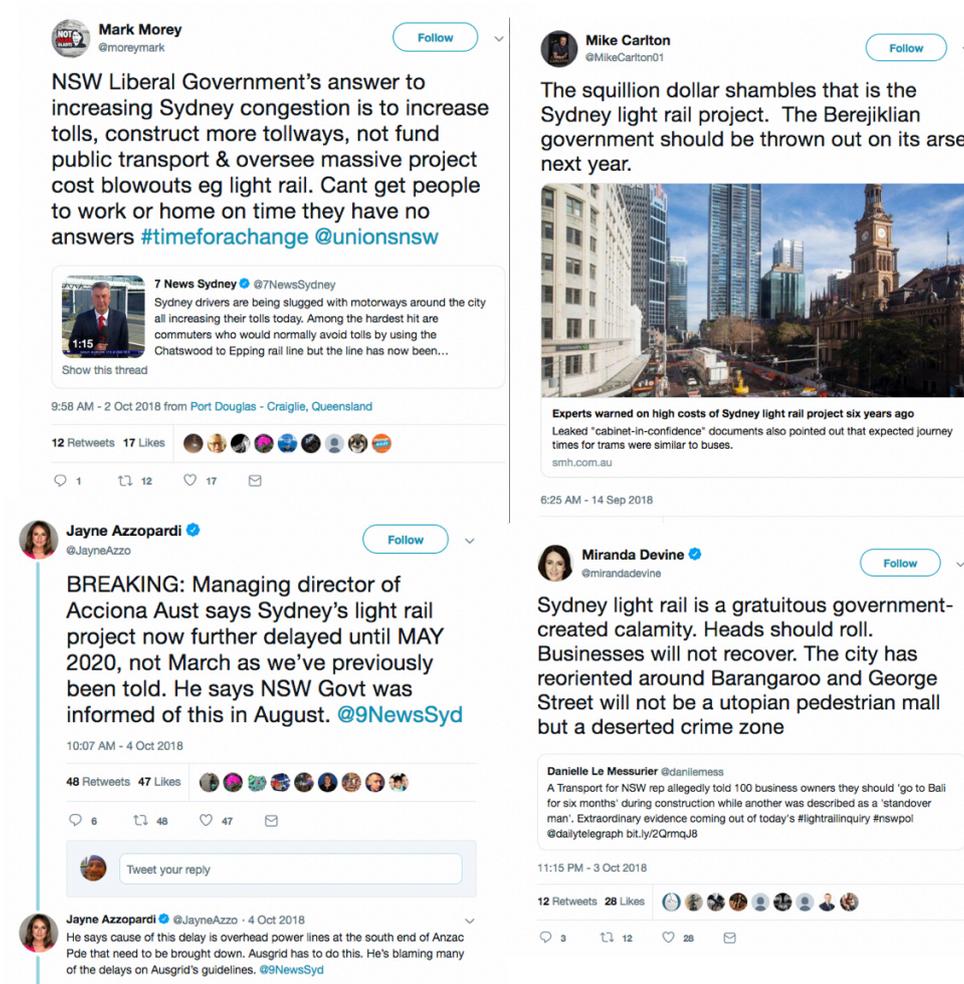


Figure 14: Example of sentiment from spike 3

Unsurprisingly, the general sentiment at this time was anger and frustration. Tweets from Mike Carlton (@MikeCarlton01) and Miranda Devine (@mirandadevine) were direct in their appraisal of the situation that 'the Berejiklian government should be thrown out on its arse next year [referring to an upcoming state election]' and 'heads should roll'. Mark Morey (@moreymark) extended this, citing a number of other

infrastructure-based issues the NSW were responsible for, utilising the hashtag, time for a change (#timeforachange). Whereas Jayne Azzopardi (@JayneAzzo) highlighted the May 2020 delay and the fact that the government had been informed of this back in August. Feelings and words of blame, calamity, delays, businesses ruined, dollars and horrid summarised this particular spike. In terms of positive tweets during this spike, there were very few made as the extra costs mentioned during this spike significantly outweighed the positive. A tweet that was considered positive and garnered some mentions included a photo of George Street with the tracks ready for the trams (@pfwaus). As mentioned, the rest of the sentiment around this spike was resoundingly negative.

Response from the CSELR Project: The only responses that emerged from the project manager were of positive reinforcement of the discourse of potential benefit mirroring the existing light rail project for which they won an award. There was no other official response to the negative sentiment expressed in social media. There were only three official announcements from the Minister for Transport for the period of October 2017 to March 2019. The Sydney light rail website (sydneylightrail.transport.nsw.gov.au) presents a continual discourse of positive outcomes in project progress reports. In only one instance on 13th December 2018 is one of the social media driven issues addressed. 40 trees originally removed were returned. There was no other comment. No other issues highlighted in all three spikes was addressed.

**BOUNDARY SPANNING ANALYSIS**

Boundary Spanning theory suggests that intra organisational and inter-organisational contexts are naturally ones with multiple boundaries of domain expertise and knowledge and responsibility. The theory suggests that for effective business operations there has to be boundary spanning between the various stakeholders or groups or organisations so that common areas of work and common goals can be established through trust. Large scale projects are no different. They have multiple stakeholders at multiple levels who, in effect, must find boundary spanning possibilities to enable the effective operations of that project. These areas where boundaries are spanned create shared, trusted relationships. These theoretical positions are represented diagrammatically (Figure 15). Projects begin with stakeholders as separate entities. During the Project bidding and planning process some of the stakeholders will create boundary connections of trust and shared collaboration, changing dynamically throughout the project implementation as needs arise.

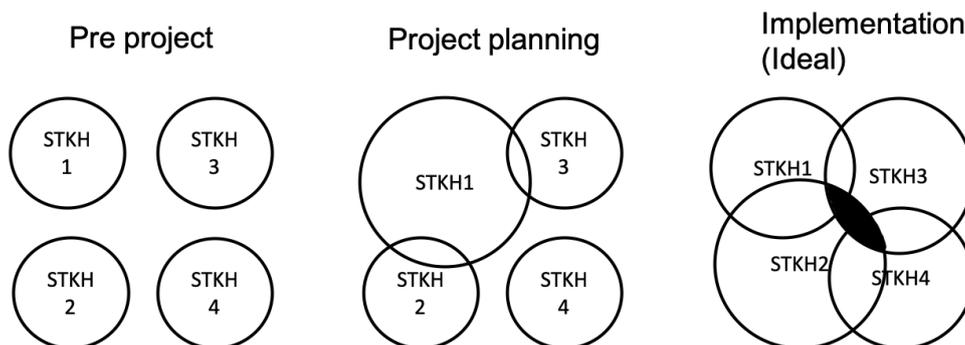


Figure 15: Boundary spanning framework

In the CSELR the project initial process began with a typical call for tenders and EOIs. The overall project management responsibilities were assigned to ALTEC (i.e a team made up of NSW Government and a collective of companies), subject to the control of Transport for NSW. subject to the NSW Government's control through its government Department, Transport for NSW. Any issues dealing with project finance were the joint responsibility of ALTEC, Transport for NSW and the NSW Government. Project Management for the actual construction was the responsibility of the Spanish construction company Acciona. This meant that at all times there were three levels of project management in operation. However, the analysis has highlighted:

1. The initial boundary spanning of the three project managers established by legal contracts (PPP) showed that some agents partially transformed their practices in local settings so as to accommodate the interests of their counterparts. However, relationships were continually eroded and trust was broken down, leading to a complete disintegration of the boundary spanning when the construction company sued the NSW Government for \$1.2 billion for incomplete briefings at the start of the project. The commentary highlighted a mistrust between parties and a significant playing out of these issues publicly. "Every time the contractor digs a hole there is something underneath the ground that they weren't told about" (Railway Technology 2018)
2. Almost all of the issues created by the project via the actual construction process and which generated substantial social media commentary that expressed essentially negative sentiment towards the construction, were effectively ones where decisions were made by Transport for NSW at the direction of government ministers.
3. Trust between those directly affected by the construction of the CSELR project began with promises of goodwill and support but ended quickly as businesses were affected by hoardings, which affected foot traffic to their business, noise that drove customers away and the continued lack of response to complaints ultimately leading to another disintegration of trust and, ultimately, to legal action. Similarly, the trust with residents was broken by the continuous noise, construction through the night and dust issues. Again, promises were made and not kept, which has led to legal action.

As of March 2019, there is no boundary spanning of community and the CSELR, no boundary spanning between business owners along the route with CSELR, and almost total disintegration of trust between the contractor and the government. There are three sets of litigation against the NSW government by small businesses, a community action group and the contractor. Ironically, the project will finish, albeit two years late and billions over cost.

The project team of the CSELR has the client (NSW Government) as an integral member. The NSW Government is expected to represent the views of the general public affected by the CSELR project. However, the degree of negative sentiment posted in social media and the resultant legal cases pending against the NSW government from the community and from the small business owners would suggest that the NSW government is not representing the views of the public. Their responses

as part of the project management team were considered inadequate and forced the two groups to undertake legal action. As project managers their reaction was often to ignore the social media comments and just move forward with a discourse about 'the benefits of the project'. However, as Project Managers, it could/might be argued after the litigation process, that they added to the project cost unnecessarily by ignoring the immediate negative impacts the project was having. The environmental criteria include heterogeneous, stable, and richness and leanness of resources (Aldrich and Herker 1977).

In the context of the CSELR, different stakeholders with their representatives (boundary spanners) are integrated in the project team, serving the interests of their respective organizations. Stable environments, the theory suggests, do not need many boundary spanners because change is not imminent, and any the rapid call for change due to market conditions invokes an increase in spanners. In the CSELR project the project environment was anything but stable with constant delays, significant complaints, substantial social media activity, protests, and ultimately legal action by the community, by the small business and significantly by the project contractors, all against the Project Managers and the NSW government. In this unstable environment they did not react sufficiently or quickly enough. Their non responsiveness resulted in the dispersion of the boundary spanners and the stability they should bring, significant delays, and the threats of the projects expenses growing by up to 100%.

## **CONCLUSION**

The sentiment analysis highlights the following have been continuous issues and that have also been responded to with mitigation action plans put in place by the project team. The mitigation process to alleviate noise, dust and vibration left residents out of pocket for extended periods of time. The impacts of the project on businesses has been significant. Loss of trade and disruption of foot traffic resulting from construction activities are significant impacts, with every business feeling the impact of those activities. The continuing issue of uncertainty as to how long the construction phase is going to continue also affects business decision making processes. Again, the reaction to the social media 'noise' was mitigation to address each issue. Those actions have had limited effect. Compensation has been paid to many businesses, but this prompted even more social chat and significant litigation is ongoing.

The community have consistently raised poor communication as an issue, particularly when it comes to construction activity. The question as to how long the construction works are going to last has been raised by the community for some time, with little clarity. There is real evidence in the data that the Project Managers/Owners have responded, albeit too slowly for the likes of the community. However, their mitigation actions are perceived in the social commentary as mediocre, piecemeal and slow. The project is incomplete (as of March 2019) and ongoing. The value of the litigation action is increasing.

The research outcomes suggest that the management of stakeholders and their requirements, where those requirements were traditionally the front part of the project, are no longer accurate. "The New Project Manager" must change the way they manage both their direct stakeholders and their requirements in a different and more effective manner, and incorporate the challenges of on-going commentary in social media, because sometimes, as in this study of the Sydney Light Rail project,

the additional costs accrued, the increased efforts to communicate with a more diverse stakeholder group, and to manage additional time, were forced by mitigation of these issues.

### **CONTRIBUTION TO THEORY AND PRACTICE**

This research we believe sits within the project-as-practice approach to theorizing in Project Management (Söderholm 2008; Blomquist et al 2010; Floricel et al 2014)). These authors argue that both practical and theoretical advances can result from studying the concrete actions of project participants, situated in context. This approach is supported by Nicolini (2013) who opts for attempts at what he calls ‘rich investigation’, akin to Geertz’s (2008) research in Anthropology, using ‘thick description’ of social and organisational reality. In this study we have examined, through an investigation of the rich investigations or thick descriptions in social media posts in the interplay between a substantial project (CSELR) and its social and community contexts through the reality of the social media the project stimulated. The practice context for the project manager was one fraught, in this case, with ongoing referrals to a discourse promoted from the project’s initiation. Response was slow and often created as much negative sentiment as it was intended to shut down. This is a single project case study and therefore any attempts at theorizing based on this study would be ambitious.

### **FUTURE RESEARCH.**

The current application landscape of sentiment analysis, specifically in construction project management, is still immature. There are significant numbers of algorithms developed and being developed in computer science, information technology and the computing literature to improve the accuracy of sentiment analysis results. Looking at specific words from all social media platform alone cannot give the full picture. There is a need to explore deeper qualitative analysis about how public express their opinion on large infrastructure projects, thus our adoption of the ‘rich investigation/thick description’ approach. In most infrastructure projects the public who are directly impacted often are neglected and excluded from the conversation. That will never be the case again as social media offers everyone the opportunity to have a voice. Traditional Public Relation practice in corporations is no longer effective without reference to social media. The sentiment expressed by the public readily available. In our research we will now revert to more advanced algorithms and re-test the data to explore the richness in the sentiments expressed more and then interview project managers responsible to better understand their lack of responsiveness to the events highlighted in this paper.

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