



# The paths to social licence to operate: An integrative model explaining community acceptance of mining



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## ABSTRACT

We propose that to understand how a social licence to operate in mining is granted and maintained, we need to take account of the processes mining companies use to engage with local communities. The present research measured and modelled the critical elements of social licence by conducting a longitudinal study in an Australian mining region. The results of path analyses showed that building trust with local communities was crucial for mining companies to obtain and maintain a social licence to operate. The mining operation's negative impacts on social infrastructure, community members' perceived contact quality and procedural fairness in dealing with company personnel significantly affected the community's acceptance of the mining operation through inferred trustworthiness of the company. Our results highlight the importance of fair treatment and high-quality engagement of mining companies with communities, alongside mitigation of operational impacts, in securing and holding a social licence to operate.

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*"My company spends US\$7 million per year on community programs. We still face work interruptions from the communities we help. Obviously the money does not buy us the goodwill we need, but I have no idea where we are missing the point."*

(Managing Director of an oil company, from Zandvliet and Anderson (2009, p. 5).)

## Introduction

For mining companies, it is increasingly evident that obtaining a formal licence to operate from governments and meeting regulatory requirements is no longer enough. Instances of mining developments being delayed, interrupted, and even shut down due to public opposition have been extensively documented (Browne et al., 2011; Davis and Franks, 2011; Prno and Slocombe, 2012; Thomson and Boutilier, 2011). Project impacts that may contribute to this opposition are broad and numerous, including operational dust and noise, impacts on or perceived future risks regarding groundwater quality and quantity, mine extensions that necessitate relocation of local communities, and cost of living

increases due to the influx of mine labour and housing speculation. It is widely recognised that mining companies need to gain and then maintain a *social licence to operate* from local communities in order to avoid costly conflicts. A social licence to operate refers to the ongoing acceptance and approval of a mining development by local community members and other stakeholders that can affect its profitability (Prno and Slocombe, 2012; Thomson and Boutilier, 2011). The opening quote by a managing director of an oil company precisely illustrates the frustration and challenge faced by the extractive industries in achieving this acceptance and gaining community approval. Given the risks associated with failing to hold a social licence, it is imperative to understand what constitutes a social licence and the underlying processes to obtain and maintain one.

The term social licence to operate emerged in the mid-1990s from within the mining industry as a response to social risk (Boutilier and Thomson, 2011). Since then, the term has been adopted by a wide range of actors in the resources sector, including mining companies (BHPB, 2011; Kurlander, 2001), civil society and non-governmental organisations (Slack, 2009), research institutions (CSIRO, 2013; McNab et al., 2013), governments (Australian Government, 2006), and consultants (Black, 2013). Social licence to operate has also been adapted by a range of other industries, including pulp and paper manufacturing (Gunningham et al., 2004), alternative energy generation (Hall et al., 2013), and agriculture (Williams and Martin, 2011). However, what constitutes a social licence and the underlying processes to obtain one are less well-understood. Additionally, limited research to date has been conducted to investigate what factors

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contribute toward and/or undermine acceptance of mining developments by host communities.

Of the limited studies on this topic, social licence to operate has been described as intangible and unwritten (Franks et al., 2013), and difficult if not impossible to measure (Parsons and Lacey, 2012). Social licence to operate has also been represented as a set of meaningful relationships between operational stakeholders based on mutual trust (Warhurst, 2001), and as a set of demands and expectations for how a business will operate by local stakeholders and broader civil society (Gunningham et al., 2004). Most studies of social licence are descriptive in nature and seek to provide companies with guidance for securing a social licence. For instance, strategies such as ongoing communication with affected operational stakeholders, transparent disclosure of information to host communities, and strengthening community development agreements have been recommended as practical ways for obtaining a social licence with local communities (e.g., Nelsen, 2006; Owen and Kemp, 2012; Wilburn and Wilburn, 2011).

In their influential theoretical work on the social licence to operate construct, Thomson and Boutilier's (2011) cumulative pyramid model of social licence identified three central components: legitimacy, credibility and trust. They suggested that as a mining operation develops legitimacy and then credibility with its local stakeholders, acceptance and then approval of the operation will follow. As this relationship develops into full trust, the local community would be expected to begin to co-identify with the mining company and actively support its interests. However, the authors' own attempts to empirically validate these hypothesised cumulative relationships have been unsuccessful to date (Boutilier and Thomson, 2011).

To fill this gap in the literature, the present research aims to measure and model the critical elements of a social licence by drawing on social psychological research in intergroup relations. Specifically, we propose that community trust in a mining company will be central in this model of social licence and a strong predictor of community acceptance of its operation. We suggest that the extent to which a mining company manages and mitigates operational impacts (e.g., impacts on social infrastructure) will affect trust in the company. In particular, the way companies engage with communities (i.e., the quantity and quality of contact) and treat community members (i.e., procedural fairness in this relationship) will shape community members' trust in a mining company, and thus their acceptance of its mining operation. Fig. 1 summarises the main elements of our model and the proposed relationships among them. In the following sections, each element of the proposed model will be discussed.

## Trust

Trust is featured centrally in discussions of social licence to operate in mining (e.g., Thomson and Boutilier, 2011; Warhurst, 2001). To have trust is defined as having confidence that the behaviour of an outgroup will match expectations of the trust holder (Cook, 2001; Lewicki et al., 1998). Furthermore, to trust someone or an outgroup is to expect that they will not exploit one's vulnerability and even seek to cooperate (Kramer and Carnevale, 2001; Rousseau et al., 1998). Important in the context of social licence, public trust represents the degree to which the general public as a group holds a collective trust orientation toward a mining organisation (Poppo and Schepker, 2010).

In intergroup settings, such as those between communities and mining companies, Poppo and Schepker (2010) refer to two types of trust. The first is integrity-based which relates to the trustor's perception that the trustee is adhering to a set of principles (Mayer et al., 1995; Kim et al., 2004). The second is competence-based trust that refers to the trustor's view that the trustee, for example a local mining operation, has the skills and knowledge necessary to manage the particular issues of interest to the trustor or community (Butler and Cantrell, 1984). Violating either of these types of trust may lead to negative relational consequences, while trust building is important in de-escalating conflict and enabling members of both groups to accept being vulnerable to one another (Poppo and Schepker, 2010; Tanis and Postmes, 2005). Communities may be expected to respond positively toward mining companies where these entities do not take advantage of their vulnerabilities, demonstrate integrity and competence in the way they manage the risks their operation represents, work collaboratively with them, and meet community expectations regarding company behaviour.

We expect trust to be a central element of a model of social licence to operate, representing a mechanism by which perceptions of impacts from mining operations, intergroup contact experiences and perceptions of procedural fairness relate to acceptance and approval of a mining operation.

## Impacts on social infrastructure

Mining developments generate positive and negative impacts for host communities (Hajkowicz et al., 2011; Haslam Mckenzie et al., 2013). In terms of the former, developments generate local employment, training and development pathways for young people, and often significant investment in infrastructure (Measham and Fleming, 2013; Michaels, 2011). However, in

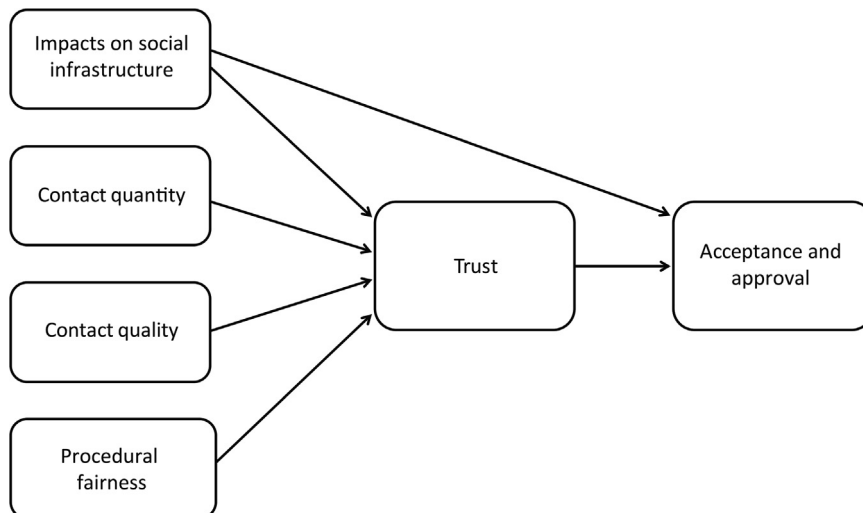


Fig. 1. Overview of relationships between concepts.

regional communities where mining largely takes place in Australia, this development also generally places strain on local social services and social infrastructure (Greer et al., 2010). For example, following the introduction of a new mining operation, the influx of construction and then operational staff often stretches the capacities of local hospitals and child care facilities, alongside having considerable impacts on housing availability and affordability for old and new residents alike (Haslam McKenzie et al., 2009; Measham and Fleming, 2013). These impacts often cause more negative outcomes such as tension and resentment within the local communities (Greer et al., 2011).

The negative impacts can be mitigated, to certain degree, by the regulatory requirements of a mining development. For example, the social impact assessment (SIA) of new mining developments is most commonly conducted prior to the approval of large mining projects (Dale et al., 1997; Lockie et al., 2009; Petkova et al., 2009). This process allows regulators and mining companies to develop strategies to mitigate major social issues before mining developments are permitted to proceed (see Esteves et al., 2012, for a discussion of the strengths and weaknesses of the SIA process). For instance, mining companies construct accommodation facilities to house the growing workforce, work with local councils to develop roads and other facilities, and fund community projects (Lockie et al., 2009; Petkova et al., 2009). As such, the impact on social infrastructure is assumed to be managed to an acceptable level for local residents whose life will be affected by the proposed mining development, although this development is complex and characterised by tensions between development stakeholders (Haslam McKenzie et al., 2013).

We propose that once a mining development has started, *how* local residents have actually experienced the impacts, compared to what they initially expected, may play an important role in the community's acceptance of the mining operation (Salzmann et al., 2006). If the overall impact is worse than expected, this will presumably erode trust in the mining company. This is partly because companies help to establish these expectations through the SIA process and their engagement with communities. Divergence between expected impact and experienced impact may lead the mining company to be perceived as misleading or dishonest in communicating the potential negative impact on the community (Salzmann et al., 2006; Warhurst, 2001). This, in turn, may affect the extent to which community members accept the mining operation. More specifically, if experienced impacts are much worse than expected, affected community members may simply reject the mining development in their area. However, if the actual impact is more positively experienced than the expected level, perceptions of impact should have less influence on trust and acceptance, or even make a positive contribution to community acceptance.

#### *Contact between local community members and mining companies*

For more than 50 years, there has been a strong interest to examine how positive contact, or interactions, between groups can improve intergroup relations (for a review, see Pettigrew and Tropp, 2006). The power of positive intergroup contact on building intergroup relations and establishing outgroup trust has been demonstrated in many contexts and with many different groups (Hewstone and Swart, 2011; Pettigrew and Tropp, 2006; Tam et al., 2009).

The positive effect of positive contact on intergroup relations has been partly explained by elevated intergroup trust. In intergroup contexts, trust has been defined as a social bond characterised by feelings of security and confidence in others' good intentions or behaviour (Lewicki et al., 1998; Tropp, 2008). This feeling subsequently generates perceptions that others genuinely

care about one's welfare and have one's best interests at heart (Kramer and Carnevale, 2001; Tanis and Postmes, 2005; Tyler, 2001; Yuki et al., 2005). Research has shown that mutual trust is a crucial component in developing and establishing positive intergroup relations (Tam et al., 2009). Tam et al. (2009) examined how positive intergroup contact can generate positive behavioural intention toward an outgroup through enhanced trust, among Catholics and Protestants in Northern Ireland. They noted that contact had a positive effect on intergroup trust which, in turn, led to more positive behavioural intentions toward the outgroup. That is, improved intergroup trust was the mechanism through which positive intergroup contact led to more positive judgements of and positive behavioural intentions toward the outgroup. The mediating role of trust between positive contact and cooperation with various outgroups has also been observed in numerous other studies (Dhont and Hiel, 2011; Maoz and McCauley, 2011; Pagotto et al., 2013; Turner et al., 2013; Vezzali et al., 2012).

Applying these findings to the context of mining developments, considering the potentially positive role that intergroup contact may have on relationships between mining companies and local communities may be beneficial in understanding how a social licence is obtained and maintained. Indeed, communities are often cautiously optimistic about cooperating with a mining company in a new development because of the potential for mutual benefit (Thomson and Boutilier, 2011). As such, it is very important for a mining company to establish positive contact, and hence trust, with a community. We therefore predict that positive contact between mining company personnel and community members should engender goodwill and trust, which will subsequently increase the likelihood that mining developments will be accepted by a community, and in turn, that a social licence will be granted. In addition to positive intergroup contact, we expect that how community members feel about their treatment by a mining company will also predict trust in the company and acceptance of its operation.

#### *Procedural fairness*

While contact may affect public trust and acceptance, we further expect that community acceptance of mining activities will also depend on how community members perceive the procedures through which mining companies' decisions are made. Procedural fairness refers to whether individuals perceive that they have had a reasonable voice in a decision-making process (Besley, 2010; Tyler, 2000). That is, when individuals feel that they have actively participated in decision-making processes and decision makers treat them in a respectful way, they regard the procedure as fair. From this finding, we can assume that people infer the procedural fairness of an authority based on the extent to which they feel included in the decision-making process. In the current paper, the focus of the research relates to the fairness with which community members feel how they are treated by a mining company.

Research in both social psychology and economics has demonstrated that providing voice in decision-making promotes cooperation (De Cremer et al., 2005; Rawls, 2001; Tyler and Blader, 2000). For instance, Siegrist et al. (2012) examined the relationship between perceived procedural fairness and acceptance of genetically modified crops in several field experiments. They found a positive relationship between procedural fairness and public acceptance of this controversial new technology. Similar results between procedural fairness and public acceptance of new technologies have also been found in a nuclear power setting (Besley, 2010).

Previous research has noted that the effect of procedural fairness on cooperative behaviour is mediated through trust. The

quality of how one is treated indicates whether the authorities/decision makers value and respect the individual (Smith et al., 1998; Tyler and Lind, 1992). That is, an authority conveys respect and consideration for welfare by adhering to fair procedures. Perceived procedural fairness reflects an overall satisfaction with a decision-making process and is therefore a foundation for people to develop trust in the authority (Turner, 1991). This is consistent with the definition of trust, which focuses on reciprocity and benevolence (Lewicki et al., 1998; Tam et al., 2009). Put differently, people are motivated by trust to cooperate with an authority when it observes procedural fairness (De Cremer et al., 2005).

Terwel et al. (2010) provide more direct evidence of how trust can mediate the effect of procedural fairness on attitudes and behaviour. These authors conducted experimental studies to investigate how procedural fairness influenced acceptance of decisions regarding the implementation of carbon dioxide capture and storage technology (CCS). They found that when opportunities were offered to voice opinions in the decision-making process, participants perceived the process to be fairer, which subsequently instigated inferred trustworthiness in decision-makers. Furthermore, this enhanced trust led to a willingness to accept the decision made by the decision-makers, regardless of whether the decision was congruent or incongruent with participants' own standing on CCS and the nature of the decisions (i.e., for or against CCS).

Moreover, it is noteworthy that the association between perceived procedural fairness and decision acceptance is independent of the content of the decision itself (e.g., Besley, 2010). That is, the extent to which a decision is accepted can be explicitly based on whether the decision-making is perceived as fair or not. Besley demonstrated this effect even for highly controversial issues such as the location of a new nuclear power plant. Specifically, Besley found that community members' concerns about a new nuclear power plant were negatively associated with their acceptance of the plant in their neighbourhood. However, when nuclear concerns and procedural fairness were considered simultaneously while controlling for other factors such as age, education, and perceived competence of authority, the power of concerns about nuclear power in predicting acceptance was reduced dramatically. Instead, the perceived procedural fairness of the decision-making process played a dominant role in predicting community acceptance of the new nuclear power plant.

We propose that similar mechanisms may play a role in explaining local communities' acceptance of mining developments. Mining developments can mean significant economic benefits for a region such as local employment and business opportunities. But at the same time, mining brings negative impacts for local communities including strain on local housing stock and social services. We propose that if mining companies are perceived as being fair in their decision making processes, community members are more likely to accept mining operations in their region despite the negative impacts that may arise.

### *The present research*

In sum, we believe that the research findings offered by existing theories and research can be integrated into a model that views trust as a pathway towards acceptance and approval of mining developments by community members.<sup>2</sup> Our integrative model hypothesises that the negative impact of a mining operation on social infrastructure reduces community trust in the operation, whereas perceived procedural fairness and contact

quality enhance trust. Trust should, in turn, determine the extent to which community members accept or reject a mining development in their region.

We conducted a longitudinal study in order to test our hypothesised model of social licence to operate in a field setting. We proposed four main hypotheses: (1) perceived impacts on social infrastructure will negatively affect trust in the company and the acceptance of the mining operation; (2) contact, and especially high-quality contact, between company personnel and community members will enhance trust in the company; (3) procedural fairness perceived by community members will affect trust in the mining company; and (4) trust in the company will have a positive relationship with acceptance and approval of the mining company's operation. In Study 1, we conducted an online survey with local residents in an Australian mining region to test these predictions. A second online survey (Study 2) was conducted 12 months later in the same region with the aim of replicating the findings of Study 1.

### **Study 1**

The present study took place in the communities where a multi-billion dollar CSG operation was in its development and construction phase. The operation employed approximately 6000 people during this phase and had a large operational footprint due to the nature of CSG extraction. The exploration and extraction wells were located across a broad area with an approximately 400 km pipeline taking extracted gas to a processing plant.

Due to the dispersed nature of the infrastructure associated with this operation, multiple communities were affected by its activities. Communities experienced impacts that ranged from dust and heavy traffic caused by company and contractor vehicles, road construction, and the management of large volumes of water extracted with the gas. At the time of data collection, communities had also expressed concern with broader potential environmental impacts such as groundwater quality and levels, as well as socio-economic impacts (e.g., affordability of housing and cost of living pressures).

### *Method*

#### *Participants*

Participants were 123 local residents who lived in the areas affected by an Australian coal seam gas (CSG) operation and not employed in the CSG industry. There were 72 male participants (58.5%) and 51 female participants (41.5%), with an average age of 47.13 years (SD=11.45). Regarding education, 16.3% of participants had an education of Year 11 or lower, 13% had completed Year 12, 30.9% had post-secondary education, 20.3% had an undergraduate degree, 16.3% had a postgraduate degree, and 3.3% chose not to disclose their education qualification. Participants were recruited using a stakeholder database provided by a CSG company to the researchers for this study. Stakeholders had been included in the database if they had contacted the company for some reason, had a commercial relationship with the company (e.g., landholder agreement), or attended a community information session hosted by the company and agreed to have their details included for future communication. In Study 1 the sample of participants used in analyses represented approximately 12% of those stakeholders invited to participate. This response rate is in line with similar studies conducted online (Dogaru et al., 2009; Loechel et al., 2013). There were a number of reasons for the low responses rate which includes the method chosen and the nature of the stakeholder database itself. For instance, the database was made up of a diverse set of people, some of whom did not live in the region,

<sup>2</sup> In this paper we have used a broad definition of 'mining' to include CSG extraction.



**Table 1**

Study 1: descriptive statistics and bivariate correlations.

	M (SD)	1	2	3	4	5	6
1. Contact quantity	2.73 (1.08)	1					
2. Contact quality	3.90 (1.05)	.37**	1				
3. Procedural fairness	2.69 (1.01)	.33**	.64***	1			
4. Social infrastructure impact	4.02 (.07)	-.26**	-.43***	-.44***	1		
5. Trust	2.92 (1.12)	.24**	.64***	.77***	-.49***	1	
6. Acceptance	3.29 (1.47)	.16	.48***	.64***	-.49***	.82***	1

\*\*  $p < .01$ .\*\*\*  $p < .001$ .

worked in the CSG industry or felt that it was not appropriate for them to participate for some other reason. For these reasons a number of people in the database did not complete the survey after receiving an invitation to participate.

Participants received an email invitation to participate which included a link to the online survey. They were informed that their responses were anonymous and confidential, and that the company would only receive a summary of the results of the survey. Participants were also informed the study had been approved by the appropriate CSIRO Social Science Human Research Ethics Committee (CSSHREC) process and provided with contact details of an ethics officer if they had any concerns.

#### Survey measures

All responses to the scales described below were provided on five-point Likert scales. Following past research on intergroup contact (Brown et al., 1999; Pettigrew and Tropp, 2006), contact quantity and contact quality were measured separately.

**Impact on social infrastructure** was measured with four items asking about the extent to which participants experienced impacts, relative to their expectations, over the past 12 months ( $1 = \text{much worse than expected}$ ,  $5 = \text{much better than expected}$ ). Four areas of impact were assessed, including: access to medical and health facilities, housing affordability, housing availability, and access to community facilities such as social services. Participants' scores were reversed and averaged, such that higher scores indicate worse-than-expected impacts ( $\alpha = .77$ ).

**Contact quantity** was measured with three items adapted from Brown et al. (1999). Participants were asked to rate how much contact they had with people from the CSG company at community meetings or events/informally in their local area/over all social situations ( $1 = \text{none at all}$ ,  $5 = \text{a great deal}$ ). Scores from the three items were averaged, such that higher scores indicated a high frequency of contact with personnel from the CSG company ( $\alpha = .77$ ).

**Contact quality** was measured with two questions adapted from Brown et al. (1999). Participants were asked to rate how pleasant ( $1 = \text{very unpleasant}$ ,  $5 = \text{very pleasant}$ ) and how positive ( $1 = \text{very negative}$ ,  $5 = \text{very positive}$ ) their contact with the personnel from the CSG company were. Scores from the two items were averaged, such that higher scores indicated a high quality of contact with the personnel from the CSG company ( $\alpha = .79$ ).

**Procedural fairness** was measured with three items adapted from Tyler (2000). Participants were asked to rate the extent to which they agree with whether people in their community have opportunities to participate in the decisions made by the CSG company, the extent to which the CSG company listens to and respects their opinions, and is prepared to change its practices in response to community sentiment ( $1 = \text{strongly disagree}$ ,  $5 = \text{strongly agree}$ ). Again scores on these three items were averaged,

such that higher scores indicate higher perceived procedural fairness ( $\alpha = .87$ ).

**Trust** was measured with four items adapted from Tam et al. (2009). Participants were asked to rate the extent to which they have confidence/trust/goodwill toward the company, and, in general, how much they trusted the company to act responsibly ( $1 = \text{none at all}$ ,  $5 = \text{a great deal}$ ). Scores on these four items were averaged, such that higher scores indicate greater levels of trust ( $\alpha = .92$ ).

**Acceptance** was measured with two items asking participants to rate how much they accepted/approved of the CSG company operation in the region ( $1 = \text{not at all}$ ,  $5 = \text{very much}$ ). Scores on these two items were averaged, such that higher scores indicate greater levels of acceptance/approval ( $\alpha = .95$ ).

#### Results and discussion

Table 1 presents the descriptive statistics and bivariate correlations for the key variables. As expected, contact quantity, contact quality and procedural fairness were positively correlated with trust in the company. Contact quality and procedural fairness were also positively correlated with acceptance of the company. Perceived impact on social infrastructure was negatively associated with trust and acceptance. Finally, trust was positively correlated with acceptance.

To more systematically investigate the independent relationships between the variables, we conducted path analysis<sup>3</sup> to test our proposed model using AMOS 17. Due to the small sample size, item scores for each variable were averaged and used as the observed variables in the model. The goodness of fit of the model was assessed using the chi-square test, the comparative fit index (CFI), normed fit index (NFI), and root mean square error of approximation (RMSEA). A satisfactory fit is indicated by a non-significant chi-square test,  $CFI \geq .95$ ,  $NFI \geq .95$ , and  $RMSEA \leq .06$  (Hu and Bentler, 1999; Kenny and McCoach, 2003).

#### Hypothesised path model

Following our hypotheses, the model specified impact on social infrastructure, contact quantity, contact quality, and procedural fairness as exogenous predictors of trust. Trust, in turn, was specified as a predictor of acceptance. In addition, impact on social infrastructure served as an exogenous predictor of acceptance. We also allowed for correlations between the four exogenous predictors.

This hypothesised model provided excellent fit for the data, with a non-significant Chi-square value ( $\chi^2[3df] = 2.519$ ,  $p = .472$ ),

<sup>3</sup> Path analysis is a form of multiple regression that focuses on causality and is a special case of structural equation modelling. Often called 'causal modelling', it allows theoretical propositions regarding the causal relationship between a set of variables to be tested.

indicating that the hypothesised covariance matrix did not differ from the actual covariance matrix. Other fit indices corroborated this evaluation of the model as very good: CFI=1.000, NFI=.993, RMSEA=<.001. The model explained 68% of the variance in acceptance of the mining development, which is quite substantial.

Fig. 2 shows the standardised parameter estimates for the model. As predicted, participants who experienced the impact on social infrastructure as worse than they initially expected reported lower levels of trust ( $\beta = -.16$ ,  $p = .008$ ), but this experience did not directly predict their acceptance of the company ( $\beta = -.11$ ,  $p = .061$ ). Conversely, participants who experienced higher quality of contact reported higher levels of trust in the mining company ( $\beta = .22$ ,  $p = .003$ ). However, counter to expectations, contact quantity did not significantly predict trust ( $\beta = -.08$ ,  $p = .209$ ). Furthermore, participants who perceived that the company had a fair procedure in dealing with local communities reported higher levels of trust ( $\beta = .59$ ,  $p < .001$ ). Lastly, trust significantly predicted the acceptance of the mining operation in the region ( $\beta = .76$ ,  $p < .001$ ).

Next, to compare the strength of the three paths which predict trust, three further path analyses were conducted with equality constraints imposed. Using the same procedure as above, equality constraints were respectively placed on two paths in the three separate path analyses, (i.e.,  $\beta$  [from contact quality to trust]= $\beta$  [from procedural fairness to trust]). The results indicated that procedural fairness was the strongest predictor, contact quality was the second strongest predictor, and impact on social infrastructure was the weakest predictor. These results demonstrate the importance for mining companies to enhance procedural fairness and contact quality when engaging with local communities.

#### Alternative model

A plausible alternative to our model is that participants' trust in the mining company may predict favourable evaluation of their contact with the mining company and perceptions of a fair procedure. Thus, we tested an alternative model which specified impact on social infrastructure, contact quantity, contact quality, and procedural fairness as mediators of the relationship between trust and acceptance of mining development. This model did not meet absolute thresholds for good fit:  $\chi^2$  (7df)=90.30,  $p < .001$ , CFI=.770, NFI=.764, RMSEA=.312. This result provides support for the order of association in our hypothesised model.

#### Discussion

The results of Study 1 demonstrate broad support for our proposed model of social licence to operate. High contact quality and fair procedures in interactions with company personnel, and perceived impact on social infrastructure, were significantly related to community acceptance and approval of the operation through increasing or diminishing trust in the company.

Contrary to our predictions, however, perceived impact on social infrastructure did not have a direct effect on the acceptance of the company. We suggest that this may be related to how we measured impact in this study. The process of comparing experienced versus expected impacts in Study 1 may have underestimated the effect of impacts on acceptance. It is possible that an absolute measurement of impact experience may be a better indicator in predicting acceptance.

Also counter to predictions, contact quantity did not directly predict trust in the company. However, it is noteworthy that contact quantity and contact quality were reasonably correlated ( $r = .37$ ; see Fig. 2). This may explain why contact quantity explained little variance in community members' trust in the company over and above the variance already explained by contact quality.

In Study 2, we aimed to improve the measure of impact on social infrastructure, and to replicate the findings of Study 1, by conducting a survey in the same region one year later.

#### Study 2

The aim of Study 2 was twofold. The first goal was to replicate the main findings of Study 1 by demonstrating further evidence that impact on social infrastructure, contact quality, and procedural fairness affect trust in the mining company, which in turn leads to the acceptance of the company's mining operation in the region.

In Study 1, we examined experienced impact relative to participants' expectations. As such, this relative measurement of impact did not reflect the extent of the impact. In light of this, the second goal of Study 2 was to examine whether the experienced impact on social infrastructure would also have negative impact on trust in the mining company. It was anticipated that the findings from this absolute measurement of impact would indicate the extent to which the impact was experienced, and the extent to which it affected trust in the mining company.

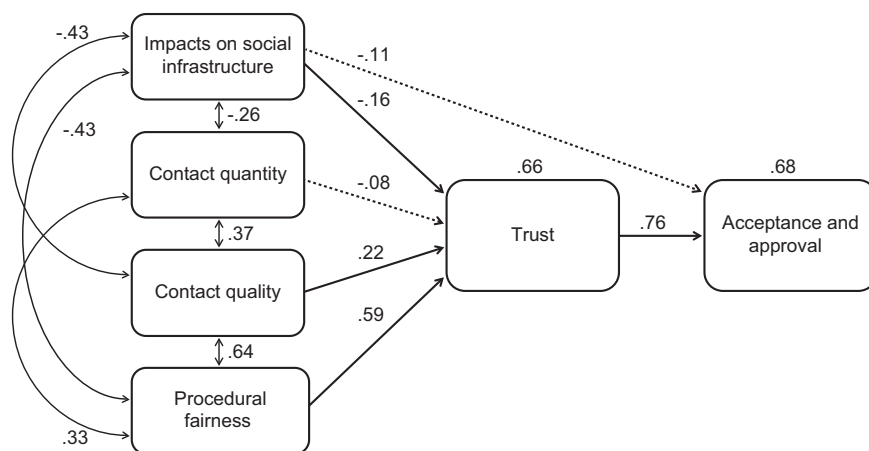


Fig. 2. Time 1 social licence to operate path model. (Note: block lines represent statistically significant relationships; dashed lines represent statistically non-significant relationships. Beta weights (standardised regression coefficients) represent the strength of relationship between variables, with positive numbers indicating positive relationships and vice versa. Values above trust and acceptance and approval represent the variance explained).

## Method

### Participants

Participants were 142 local residents, who lived in the region affected by the operation of the same coal seam gas company as in Study 1 and were not employed in the CSG industry. There were 88 male participants (62%), 48 female participants (33.8%), with 6 participants (4.2%) not reporting their gender. The mean age was 46.82 (SD=12.00). Regarding education, 13.4% of participants had an education of Year 11 or lower, 7.7% completed Year 12, 22.5% had post-secondary education, 19.7% had an undergraduate degree, 29.6% had a postgraduate degree, and 7.0% chose not to disclose their education level. Participants were recruited using a similar stakeholder database as in Study 1 provided by the same CSG company to the researchers. Again, stakeholders were included in this database if they had some relationship or contact with the company. In Study 2 the sample of participants used in analyses represented approximately 10% of those stakeholders invited to participate. As in Study 1, the database used was a stakeholder list compiled by the company and so included a number of individuals that self-selected out of the survey or were screened prior to analysis. Between Study 1 and Study 2, the stakeholder list was reorganised and consolidated by the company, leading to limited overlap between the two lists. Again, participants received an email invitation to participate and were informed the study had received ethical clearance.

### Survey measures

As in Study 1, participants were invited to complete an online survey, which took approximately 23 min to complete. *Contact quantity* ( $\alpha=.78$ ), *contact quality* ( $\alpha=.85$ ), *procedural fairness* ( $\alpha=.77$ ), *trust* ( $\alpha=.89$ ) and *acceptance* ( $\alpha=.91$ ) were assessed using the same measures as in Study 1.

**Impact on social infrastructure** was measured with four items pertaining to experienced impacts over the past 12 months. Using a seven-point Likert scale (1 = *negative impact*, 7 = *positive impact*), participants were asked to rate the extent to which they experienced impacts on the same four areas as in Study 1—medical and health facilities, housing affordability, housing availability, and access to community facilities such as social services—as a result of the mining operation over the past 12 months. Scores on this scale were reversed and averaged, such that higher scores indicate more negatively experienced impacts ( $\alpha=.80$ ).

## Results and discussion

Table 2 presents the descriptive statistics and bivariate correlations for key variables. As in Study 1, contact quantity, contact quality and procedural fairness were positively correlated with trust in the company. Contact quality and procedural fairness were also positively correlated with acceptance of the company. Experienced impact on social infrastructure was negatively associated

with trust and acceptance. Finally, trust was positively correlated with acceptance.

### Hypothesised path model

AMOS 17 software was again used to test the proposed path model. The hypothesised model provided excellent fit for the data with a non-significant Chi-square value ( $\chi^2[3df]=2.190, p=.534$ ), indicating that the hypothesised covariance matrix did not differ from the actual covariance matrix. Other fit indices corroborated this evaluation of the model as very good: CFI=1.000, NFI=.992, RMSEA=<.001. Overall, the hypothesised model explained 57% of the variance in participants' acceptance of the mining operation.

Fig. 3 shows the standardised parameter estimates for the model. In line with our hypotheses and the findings of Study 1, participants who experienced higher negative impact on social infrastructure reported a lower level of trust ( $\beta=-.20, p=.002$ ), however this experience did not directly predict their acceptance of the mining operation ( $\beta=-.08, p=.076$ ). Participants who experienced higher contact quality reported higher levels of trust in the mining company ( $\beta=.40, p<.001$ ). Again, contact quantity did not significantly predict trust ( $\beta=-.07, p=.262$ ). Participants who perceived that the company had a fair procedure in dealing with the local community reported a higher level of trust ( $\beta=.44, p<.001$ ). Lastly, trust significantly predicted acceptance of the mining company ( $\beta=.73, p<.001$ ).

Using the same procedure as Study 1, we compared the relative strength of impact on social infrastructure, contact quality, and procedural fairness as predictors of trust. The results indicated that procedural fairness and contact quality were equally strong predictors of trust, whereas experienced impact was the weakest predictor.

### Alternative model

Again we tested the alternative model specified in Study 1, which describes impact on social infrastructure, contact quantity, contact quality, and procedural fairness as mediators of the relationship between trust and acceptance of the mining operation. In line with the findings of Study 1, this model did not meet absolute thresholds for good fit:  $\chi^2(7df)=56.11, p<.001, CFI=.802, NFI=.792, RMSEA=.223$ . This result provides further support for the order of association in our hypothesised model.

## Discussion

In sum, the findings from Study 2 broadly supported our hypotheses and replicated the results of Study 1. That is, impact on social infrastructure, contact quality and perceived procedural fairness significantly predicted trust in the mining company, which in turn led to the acceptance of the mining operation in the region. Again, contact quantity did not significantly predict trust. Similarly, it is noteworthy that contact quantity and contact quality were reasonably correlated ( $r=.30$ ; see Fig. 3). This may account for the fact that contact quantity explained little variance

**Table 2**

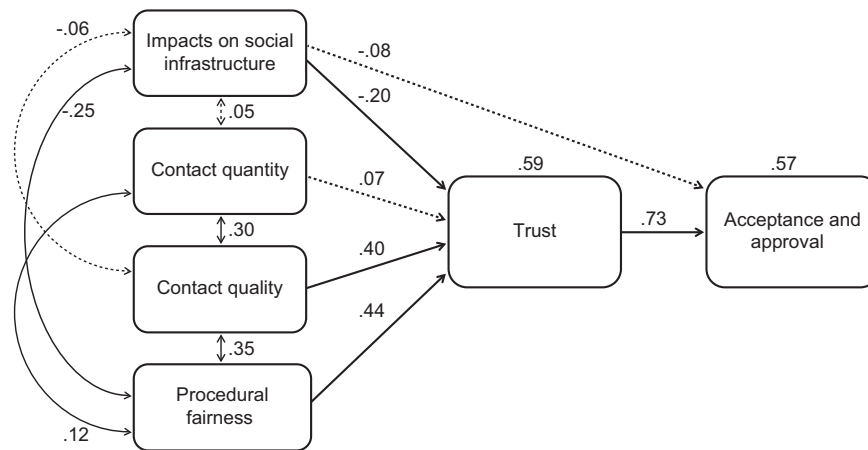
Study 2: descriptive statistics and bivariate correlations.

	M (SD)	1	2	3	4	5
1. Contact quantity	2.69 (1.06)	1				
2. Contact quality	4.11 (.86)	.28**	1			
3. Procedural fairness	2.97 (.76)	.09	.35***	1		
4. Social infrastructure impact	5.07 (1.13)	.06	-.03	-.25**	1	
5. Trust	3.33 (.83)	.23*	.60***	.64***	-.33**	1
6. Acceptance	3.44 (1.03)	.22*	.49***	.52***	-.32**	.77***

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .



**Fig. 3.** Time 2 social licence to operate path model. (Note: block lines represent statistically significant relationships; dashed lines represent statistically non-significant relationships. Beta weights (standardised regression coefficients) represent the strength of relationship between variables, with positive numbers indicating positive relationships and vice versa. Values above trust and acceptance represent the variance explained).

in community members' trust in the company over and above the variance already explained by contact quality. In addition, Study 2 demonstrated that experienced impact on social infrastructure affected participants' acceptance of the mining development through trust in the same way as the relative measure of impact used in Study 1.

### General discussion

Social licence to operate in mining is an emergent concept which has been widely and quickly adopted by a broad range of mining industry stakeholders. Despite the evident fact that it is essential for mining developments to be accepted and approved by local communities to operate successfully, *what* constitutes a social licence and *how* it can be achieved have been rarely investigated and are less well understood. The present research is the first to demonstrate a model of the key elements of a social licence and how they relate to each other. We proposed a conceptual model whereby impact on social infrastructure, intergroup contact, and procedural fairness affect local community members' acceptance of a mining development through trust in the operating mining company.

#### Summary of key findings

Results from two online surveys with community members of a mining region, conducted 12 months apart, provided consistent support for our hypotheses. Participants' experiences of impact on social infrastructure, relative to initial expectations and in absolute terms, negatively affected the acceptance of the mining development through diminished trust in the company. That is, decreased trust was identified as the mechanism through which negative impacts on social infrastructure led to lower levels of acceptance and approval of the mining development. Contrary to expectations, however, participants' perceptions of impact did not directly influence the acceptance of mining development as proposed. The mean level of impact on social infrastructure reported by participants was moderately negative (i.e., an average score of around five on a seven-point rating scale, where higher scores indicated more negative impacts). In the context of a strong regulatory environment and considerable company investment in social infrastructure impact mitigation strategies (e.g., a significant housing strategy), it may simply be that participants did not strongly attribute these impacts to the company of focus in this

particular study. It is also possible that not all participants had been directly or personally affected by the mining operation. For example, impacts on housing availability/affordability were mainly experienced by those who were in the housing market. What emerged as a clear finding, however, is that relative to contact quality and procedural fairness, perception of impacts was the weakest factor influencing community members' trust in the mining company.

Consistent with previous literature, our results provide further evidence of the beneficial effect of positive contact on intergroup relations, and importantly, extend it further to the context of mining development. In our study, contact quantity did not directly contribute to building trust in the mining company. Instead, contact quality appeared to play a more important role. Our finding is consistent with research showing that positive affective processes resulting from good quality of contact lead to more positive outgroup appraisals (Pettigrew, 1998). These results suggest that mining companies may be better rewarded for focusing on establishing and maintaining high quality contact with their community stakeholders compared to a strategy focused solely on a high frequency of contact. The relationship between contact quality and trust suggests that community members are less likely to feel taken advantage of and exploited when these engagement experiences are positive and pleasant.

Furthermore, the results from both studies suggest that procedural fairness is not only a significant positive predictor of trust, but also the strongest predictor of trust in our proposed model. When community members reported feeling heard, listened to, and that the company would act on their concerns, their trust in the company was enhanced. Consequently, acceptance of the mining operation is increased. The important role of procedural fairness observed here is consistent with a growing research into the effect of procedural fairness on acceptance of decisions and outcomes. In the literature, it has been suggested that when decision making processes are perceived as being fair, people are more accepting of decisions even when the eventual decisions are not in their favour (e.g., Besley, 2010).

#### Implications and practical application

Our evidence for the crucial role of contact quality and procedural fairness in holding a social licence has important ramifications for mining companies. Mining companies often focus considerable resources (time, effort, money, etc.) on mitigating or offsetting the negative impacts of their operations through



investing in housing strategies, upgrading local infrastructure such as roads, and providing local employment and other social investments. Our findings suggest that this approach is an important way for companies to build trust with community members; however, acknowledging the experiences of community stakeholders and including them in decision-making processes when dealing with these challenges seem to be more important. In large mining projects, it is inevitable that negative impacts will be experienced by local community members. Yet genuine community engagement, participation, and collaborative approaches to the development of strategies to mitigate these impacts will likely create greater community trust and acceptance in the longer term.

These findings resonate strongly with the observation made by [Zandvliet and Anderson \(2009\)](#). As illustrated by this paper's opening quote, money in and of itself is not enough to 'buy' a community's acceptance. Furthermore, Zandvliet and Anderson have noted that community members do not feel respected when a mining company takes it upon itself to decide what the community needs and how these needs should be delivered, how impacts are experienced by community members, and the best ways to mitigate negative impacts. Fair procedures allow for transparency of the decision making processes and the development of mutually derived strategies to manage the experience of large scale resource development. Our integrative model clearly demonstrates how the processes of interacting with community members may affect a community's trust in a mining company and, as a result, overall acceptance of a mining operation.

The findings of the present research make significant contribution to understanding what constitutes a social licence and how it is granted and maintained in the mining industry. Although social licence is often described as an intangible and fluid construct ([Franks et al., 2013](#)), the present study demonstrates that it can be quantitatively measured and modelled using sophisticated social science methods and analytical techniques. This allows for consistent and robust benchmarking of social performance across time as an operation develops. Furthermore, the proposed integrative model allows mining companies to understand the separate and proportional influence that operational impacts and community engagement activities have on trust in the company, and the resulting acceptance and approval of its operation.

#### Limitations and future research

There are a number of limitations in these two studies, including the nature of the database used, the nature of the measures used and the model tested. The stakeholder database was provided by the CSG company whose operation we examined. While it represented a diverse set of operational stakeholders, future research may consider surveying an additional sample, independent of the company, located in the same region. Second, the measures used are self-report and therefore represent the perceptions of participants. Future research may consider comparing this perception data with independent measures of impacts, such as comparing median house and rental prices for the region with perceptions of housing availability and affordability. Finally, our model demonstrates that the key elements of a social licence may be measured and modelled. This model does not reflect the heterogeneity of communities in regional Australia; future research may explore ways of identifying and including this diversity in conceptualisations of social licence to operate. This paper has also focused on one particular area of concern for the communities within the operational footprint of the focal operation: social infrastructure. Future research may explore how stakeholders' experiences of mining impacts in additional areas (e.g., environmental and economic impacts) relate to trust and acceptance. Additional antecedents of acceptance and approval

may also be examined, including economic dependency on a mine, and distributional fairness (i.e., that impacts and benefits from mining operations are equitably shared).

#### Concluding remarks

To conclude, it is no longer enough for mining companies to simply meet the formal obligations of a licence to mine. Local communities, in particular, require something more. Our research articulates the importance of impact *and* relational variables, and the central role of trust, in obtaining and maintaining a social licence to operate. More importantly, the present research has demonstrated *how* these variables relate to each other, the dynamic process by which community acceptance of mining may be achieved, and in turn how a social licence may therefore be constructed.

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This project was approved through the appropriate CSIRO CSSHREC process in accordance with the requirements specified in the (Australian) National Statement on Ethical Conduct in Human Research.

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