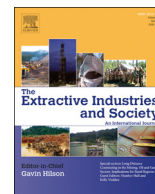




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Original article

## Risk management and risk governance of liquefied natural gas development in Gladstone, Australia

R.G. van der Vegt

Northern Institute, Charles Darwin University, Darwin, Northern Territory, Australia

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## ABSTRACT

This paper is a retrospective analysis of the risk management and risk governance process of liquefied natural gas (LNG) development in Gladstone, Australia. In order to undertake this retrospective analysis, the risk governance framework developed by the International Risk Governance Council (IRGC) is used as a heuristic because it includes and goes beyond the ISO 31000:2009 risk approach that was used in practice. The IRGC framework consists of four different phases reflecting the risk handling chain: pre-assessment, risk appraisal, risk characterisation and evaluation, and risk management. Based on an analysis of the first three phases it was reported that the approach used by the LNG proponents in Gladstone followed relatively robust principles and guidelines despite containing a number of deficiencies. However, during the simultaneous construction of the three LNG facilities a number of environmental, social, and economic impacts and concerns emerged. Therefore, the overall aim of this paper is to explore what can be learned from this type of post-evaluation and to assess the implementation of risk management. The results identify a variety of aspects that have influenced the workability of the risk governance process and point to areas capable of improving similar problems for resource projects in the future.

## 1. Introduction

This paper is a retrospective analysis of the risk management and risk governance process of the development of three recently completed liquefied natural gas (LNG) facilities in Gladstone, Australia: Queensland Curtis LNG, Gladstone LNG, and Australia Pacific LNG. The construction company Bechtel was the primary builder for all three of these LNG facilities. This was the case because the technology that was chosen by each of the three proponents was the ConocoPhillips Optimized Cascading Technology and Bechtel has a relationship with ConocoPhillips and is the primary builder when that technology is used. The focus of the analysis is on the risk management and risk governance process of these LNG developments in order to assess its implementation and to explore what can be learned from post-evaluation. The findings provide insight into risk governance and stakeholder involvement for LNG projects which is important for researchers and decision-makers seeking to increase their understanding and/or improve the effectiveness of the governance of extractive industries.

In this context, risk governance refers to a body of scholarly ideas that points at complex multi-actor networks and processes dealing with collective decision-making on challenging public risks (IRGC, 2005; Van Asselt and Renn, 2011; van der Vegt, 2017). On a normative level risk governance is also understood as a set of principles that can inform

how collective decision-making in the context of risk can be done responsibly (IRGC, 2005; Van Asselt and Renn, 2011). In this paper the risk governance framework developed by the International Risk Governance Council (IRGC) will be used as a heuristic to analyse the risk management and risk governance process of LNG development in Gladstone. The word heuristic is used to refer to an 'investigative' approach looking back at what has happened and seeking improvements on the basis of empirical evidence. It does not mean that the IRGC risk governance framework is seen as an ideal or all-comprehensive model that should be adhered to. Rather, the framework is used as a tool to systematically assess the implementation of risk management during LNG development in Gladstone, by collecting the views of those that were closest to the enactment of that specific governance application – and identify areas that deviated from expectations for specific categories of respondents, and gaps between intentions and outcomes that were considered significant for many. The IRGC framework makes this possible because it constitutes an inclusive risk governance model that aims to integrate scientific, economic, social, and cultural aspects through stakeholder communication and involvement with experts, stakeholders, civil society and the general public (IRGC, 2005; Renn, 2008; Van Asselt and Renn, 2011). As such it represents a broad analytical approach for considering risk management in Gladstone in ways that include, but also go beyond the risk management approach of the

E-mail address: [Rens.vandervegt@cdu.edu.au](mailto:Rens.vandervegt@cdu.edu.au).

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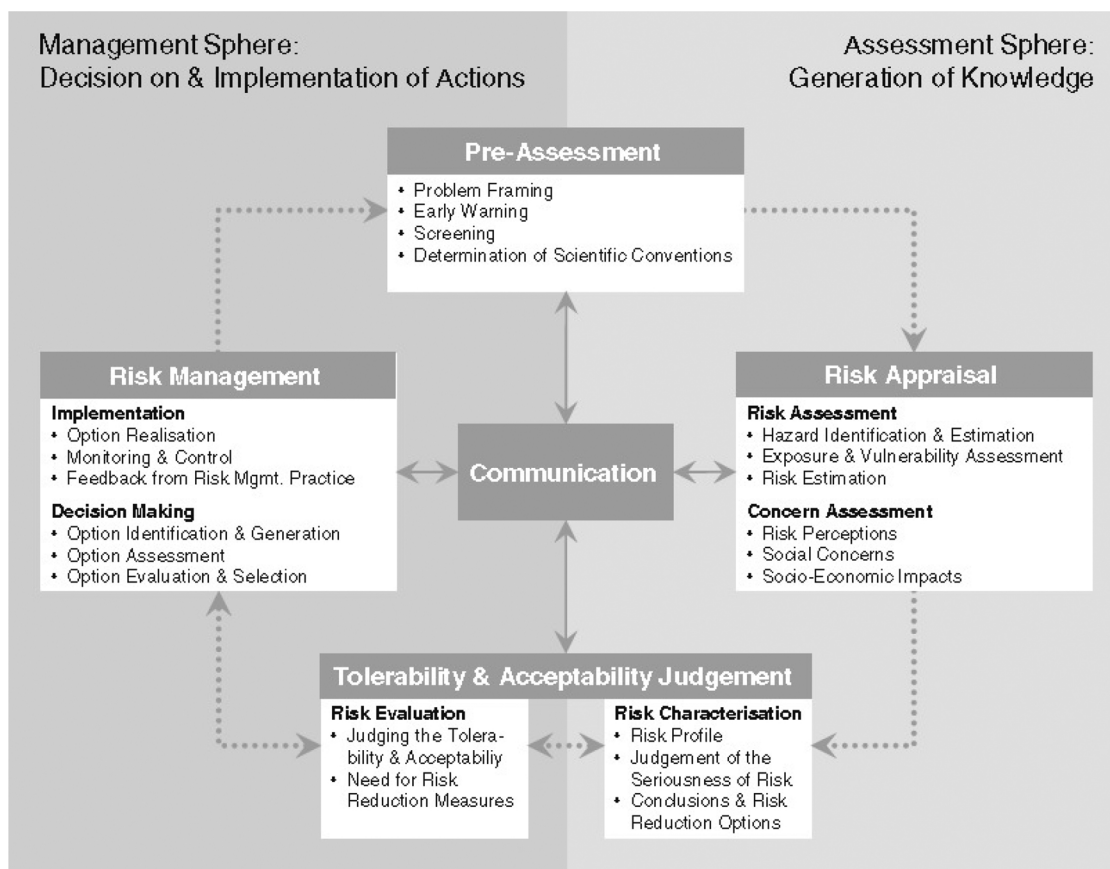


Fig. 1. The IRGC Risk Governance Framework. Adopted from IRGC, 2005.

ISO 31000:2009 standard (ISO, 2009) that was employed at the time.

The framework (Fig. 1) consists of four different phases reflecting the risk handling chain: pre-assessment, risk appraisal, risk characterisation and evaluation, and risk management<sup>1</sup>. The ‘pre-assessment’ phase serves as the baseline for how a risk is assessed and managed, giving guidance on the relevance and interests of the stakeholders involved, the various dimensions of risks, the issues that are associated with the framing of risks, as well as the broader social, institutional, political and economic context. The second phase is ‘risk appraisal’ which includes natural and technical scientific assessments of the risks to human health and the environment, as well as economic and social scientific assessments of the related concerns. The third phase is ‘risk characterisation and evaluation’ during which tolerability and acceptability judgements are made based on the scientific evidence, social values, economic interests and political considerations. The fourth phase and the focus of this paper is that of ‘risk management’. This phase comprises the selection of measures to avoid, minimise, mitigate and offset risk, the implementation of risk management, the acceptance of responsibility, risk monitoring and control, and stakeholder communication and involvement.

This is a fairly general description of the risk handling chain and from a procedural view it largely corresponds to other risk frameworks such as the ISO 31000:2009 risk management standard (ISO, 2009). The main difference is that the IRGC risk governance framework places more emphasis on the inclusion of the societal context and the extent of stakeholder involvement due to the normative believe that this leads to more desirable social and community outcomes (IRGC, 2005; Renn and

Walker, 2008). This normative understanding makes the IRGC risk governance framework compelling as a heuristic to assess the risk management and risk governance process of LNG development in Gladstone. While the IRGC risk governance framework is not necessarily tied to a specific methodological approach, it is framed within a Habermasian approach of inclusive governance for the context of this paper.

### 1.1. LNG development in Gladstone

Gladstone is a small port city in central Queensland, on the Eastern coast of Australia, with a population of 67,000 (ABS, 2016). The economy of the Gladstone region is predominantly based on its heavy industry and since 2010 the port has undergone extensive expansion to facilitate the increasing coal export as well as the new development of three recently completed liquefied natural gas facilities (Tinney et al., 2013). During the approval stages of these projects the LNG companies’ conducted stakeholder engagement, risk-assessments, and cumulative risk assessments to comply with the relevant laws and regulations, international conventions, project finance requirements, and shareholder expectations (APLNG, 2010a; Queensland Coordinator General, 2010; van der Vegt, 2018). Furthermore, environmental and social impact management plans were created that outlined the risk avoidance, mitigation and management measures, including details of alternative options, and proposed arrangements for ongoing management (APLNG, 2010b, 2010c, 2012; van der Vegt, 2018). Within these plans the risks of the projects have been reduced to as low as reasonably practicable (ALARP) and all risks were considered to be tolerable provided that effective cooperation in impact mitigation would take place between the various proponents and the regulatory authorities (APLNG, 2010a; van der Vegt, 2018). Based on an analysis of the first three phases of the

<sup>1</sup> The following description of the framework is based on IRGC (2005) and Klinke and Renn (2012).

IRGC risk governance framework in relation to LNG development in Gladstone, it was found that the approach used by the APLNG project was largely consistent with the IRGC risk governance principles and guidelines despite containing a number of variations that could possibly lead to improved risk governance for future resource projects (van der Vegt, 2018). These elements included: the risk matrix methodology, the reflection of uncertainties, the cumulative risks associated with multiple projects in the area, the regulatory process, and stakeholder communication and involvement (van der Vegt, 2018). However, despite following relatively robust principles and guidelines, a number of environmental, social, and economic impacts and concerns emerged during the simultaneous construction of the three LNG facilities (Benham, 2016, 2017; Douvere and Badman, 2012; Johnson et al., 2014; Tinney et al., 2013). Key impacts occurred in relation to environmental health and amenity (Benham, 2016, 2017; Douvere and Badman, 2012; Gladstone Fish Health Scientific Advisory Panel, 2012; Johnson et al., 2014; Landos, 2012; Tinney et al., 2013); housing prices and the cost of living (Benham, 2016; Tinney et al., 2013); social capital and community safety (Benham, 2016; Tinney et al., 2013); and indirect and cumulative impacts (Benham, 2016; Tinney et al., 2013). Key concerns in connection with the process included inadequate public involvement (Benham, 2017; Tinney et al., 2013; van der Vegt, 2018); the lack of public trust (Benham, 2017; Tinney et al., 2013; van der Vegt, 2018); and the fast-tracking of the governance process (van der Vegt, 2018). Therefore, the overall aim of this paper is to assess the implementation of risk management, to diagnose the role of the risk assessments in the implementation of risk management, and to point to areas capable of improving similar risk governance problems for resource projects in the future.

### 1.2. Methods and materials

To inform the analysis this research entailed a comprehensive examination of the literature, including environmental impact statements, public submissions, reports and policy documents.<sup>2</sup> Based on this literature, interviewees were identified, interview contents prepared, and a plan to structure as well as enrich the data was made.<sup>3</sup> Eventually this generated 46 semi-structured interviews of approximately 30 minutes that were conducted with interview respondents from a variety of stakeholder groups between July and September 2016. These stakeholder groups represent a sample of viewpoints and experiences in relation to LNG development in Gladstone and span across various domains: local, state and federal government (11), private industry (9), non-governmental organisations (7), regional and indigenous representatives (7), peak bodies and service providers (6), research and academia (5), and the media (1). Interviewees included: politicians; government officials with a range of social, economic and environmental responsibilities; mineral and energy resource developers; community service groups; port developers; independent researchers; maritime safety groups; recreational harbour users; natural resource management groups; local businesses; environmental and wildlife conservation groups; and regional and indigenous stakeholders representing their area within the Gladstone region. Interviews focused on respondents' views on the risks associated with LNG development in Gladstone and the efficacy of risk management processes. Interviews were recorded and transcribed for data analysis in NVivo. The NVivo analysis involved coding relevant passages of text into thematic categories while differentiating between the seven stakeholder classifications as mentioned above. Mentions of each theme were counted, and those mentioned by more than 20% of participants were included in the analysis, to include a variety and

workable number of themes.

Finally, the analysis is framed within Neo-Marxist Critical Theory and the Habermasian theory of communicative rationality. Habermas' theory is oriented towards achieving, sustaining and reviewing consensus through communication, discourse, deliberation and persuasion between actors who are willing to listen to a plurality of viewpoints and who are open to changing their minds and positions (Habermas, 1984). The idea is that through public deliberation, the opportunity for new information to be discovered, insights to be gained and preferences to be changed becomes possible (Flynn, 2004). By using this perspective this research aims to intervene in the cultural, social and historical processes to reconstruct the governance process in order to reduce risks for future projects and overcome expressed dissatisfactions. The value of Critical Theory for analysing the data thus lies in mapping and opening the communicative space between participants in order to search for achievable practical goals for social transformation<sup>3</sup> (Horkheimer, 1972; Kincheloe and McLaren, 2002).

## 2. Results & discussion: risk management in Gladstone

The analysis of the interviews indicates that risk management concerns were most prominent in relation to the following four thematic categories that were derived from the interview data: the collaboration between the various actors, the monitoring and compliance mechanisms, the reactive role of the government, and the regulations and requirements in place. Fig. 2 shows the results of this analysis by the number of mentions of each category per stakeholder group. By using these interview results in combination with the grey and academic literature, the remainder of this paper will analyse and discuss the risk management and risk governance process of LNG development in Gladstone<sup>4</sup>.

### 2.1. Collaboration

#### 2.1.1. Problem context & data

This thematic area refers to the perceived lack of collaboration between the various parties involved due to conflicts of interest in dealing with dispersed responsibilities and in balancing transparency and confidentiality. A large percentage of interviewees from all stakeholder groups, and 63% of the total number of interviewees, have pointed to issues of this kind. This included issues between Bechtel, the LNG companies, local and state government departments, and each possible combination of collaboration between and within these parties. According to interviewees this significantly influenced the workability of the risk governance process and was often mentioned to be one of the main causes of the cumulative social and economic impacts that occurred. The following paragraphs will explore why interviewees have these views.

#### 2.1.2. Analysis: conflicts of interest

The position of Bechtel was often mentioned to be of central importance in the overall governance process<sup>5</sup>. That is because their role as the primary builder for all three LNG facilities raised fundamental questions about how to deal with issues surrounding intellectual property and conflicts of interest between the three LNG companies and Bechtel. There were concerns that proprietary processes, trade secrets

<sup>4</sup> Please see the interview coding in Electronic Appendix B to see the exact number of interviewees per stakeholder group for each specific theme as discussed throughout this section.

<sup>5</sup> According to a number of interviewees in industry and government who were involved in the decision-making and implementation of certain aspects of the risk governance process (and whose responses appear to be consistent with the general impression of other interviewees who were somewhat removed from the process).

<sup>2</sup> See Electronic Attachment A for a list of grey literature sources

<sup>3</sup> See Electronic Attachment B for more information on the interview protocol, the list of interview questions, the ethics approval, the methods of data analysis, the limitations of the chosen approach, and the interview coding.



Fig. 2. Risk management concerns in percentages as reported per stakeholder group (N = 46, Government = 11, Industry = 9, NGO = 7, Regional & Indigenous = 7, Peak bodies & service providers = 6, Research and academia = 5).

and other cost competitive information might be inadvertently shared between the LNG competitors. In order to deal with these issues Bechtel reportedly put in place independent teams for each LNG project that were considered to have had limited communication or cooperation between each other. In this way the construction phase and supply chain for all projects could be managed without breaching confidentiality and intellectual property agreements. The interview data suggests that the individual project teams caused a number of issues as they were competing with each other to secure the supply chain before the other project teams could. It was often stated that this internal competition was one of the main reasons for the price inflation in the region to occur.

At the same time, interviewees involved in the decision-making and implementation of certain aspects of the risk governance process, considered that Bechtel was excluded from communicating widely about the projects because that was seen as the responsibility of the LNG companies. Interviewees within government noted that this led to increased transaction costs linked with both the process and the ability of decentralized mechanisms to allocate information for decisions and minimise negotiation and consultation resources. That is because regulators allegedly needed to schedule separate meeting times with the different Bechtel project teams to provide the same general information that would not impact on any issues surrounding confidentiality or intellectual property.

Risk management plans prepared by the LNG companies during the approval phase stated that effective cooperation in impact mitigation would take place between the various proponents and the regulatory authorities in order to make cumulative risks tolerable (APLNG, 2010a; van der Vegt, 2018). The interview data raises questions as to whether this has happened because organizations with different purposes and agendas (and even individual project teams of the same company) did not appear to cooperate effectively on allocating risks which negatively influenced the process. The events in Gladstone thus suggest that risk governance failures can arise when dealing with dispersed responsibilities. It must however be noted that risk management plans are always prepared far in advance and there will always be many aspects that are not foreseeable. The Gladstone case does indeed show that the anticipated risk management plans differ considerably from what happened in practice, which underscores the need for more adaptive capacity in such risk management plans.

### 2.1.3. Analysis: multi-stakeholder bodies

Due to a variety of aspects as outlined above, the data suggests that problems were created with respect to the cooperation between multiple organisations, balancing transparency and confidentiality, and dealing with dispersed responsibilities. All of these aspects appear to have negatively influenced the workability of the risk governance process for the authorities, the regulators and the industry. However, at

a later point in the construction phase the functionality of the risk governance process seems to have been significantly improved through the establishment of two Bechtel units and a variety of multi-stakeholder bodies. Bechtel eventually standardized a number of processes and procedures between the three independent project teams given that all LNG projects shared common challenges with regards to aspects such as logistics, procurement services, and cross harbour marine transport and logistics (Cathcart et al., 2016). This promoted integrated planning with each project management team by providing a single interface to manage the reputation of the projects, to advance stakeholder trust, and to deal with regulatory authorities and other key stakeholders (Cathcart et al., 2016).

One of the multi-stakeholder bodies that was established was the Gladstone Infrastructure Working Group (GIWG), which was a high level meeting of statutory authorities and representatives from the projects. The GIWG was established to allow the LNG proponents to meet with government agencies and stakeholder organisations to ensure a coordinated approach was taken for local logistics activities supporting their construction (GEIDB, 2011). Interviewees in government reported that the group met regularly to discuss and address regulatory issues requiring coordination, risks on the social and economic environment and the mitigation of these risks. A number of interviewees involved in the decision-making and implementation of certain aspects of the risk governance process stated that they considered that Bechtel initially did not participate in these meetings because of issues surrounding confidentiality and intellectual property. However, they indicated that cooperation between the various stakeholder bodies improved once the overarching Bechtel units were established and invited to participate in the GIWG. Since then everything was reportedly managed centrally and collaboratively which significantly increased the workability of the risk governance process.

Another multi-stakeholder body that was established was the Gladstone Region LNG Community Consultative Committee (RCCC). The RCCC was a mandatory component for the LNG companies under the Social Impact Management Plans (SIMP) to facilitate continuous engagement with the Gladstone community (QDIP, 2010). The RCCC consisted of 12 community members representing a specific impact topic or a region, 2 representatives from each of the three LNG companies, and an independent chair from Central Queensland University. The committee held quarterly meetings for the members to discuss issues with the LNG companies, for the companies to give updates on their projects, and to enable meaningful discussion of the development and implementation of the companies' SIMP in order to help minimise the risks on the community. A review of the committee's performance in 2015 (APLNG et al., 2016), as well as the analysis conducted for this research, established that members felt it was an effective approach in helping the LNG companies minimise their impacts on the community. The RCCC further helped to increase stakeholder communication,

involvement and trust which were seen as deficiencies in the other phases of the IRGC risk governance process in relation to LNG development in Gladstone (van der Vegt, 2018).

In hindsight, the data suggests that there may be some value in establishing these cooperation mechanisms at an earlier stage in the process. These cooperation mechanisms could help prevent issues surrounding intellectual property and conflicts of interest which appeared to be one of the most prominent hurdles in the decision-making process in Gladstone. They further could prevent some of the impacts from occurring, including the potential reputational damage, due to a perceived lack of collaboration. Therefore, the need for such bodies constitutes a key learning point from this case study and it is recommended that in the future, the costs and benefits of establishing these bodies prior to construction should be taken into account to assess their potential value for the process and the outcomes of the process.

#### 2.1.4. Summary

An overall interpretation of what was reported by the diverse respondents approached in the research suggests that in the beginning of the construction phase there appeared to be a lack of cooperation between multiple organisations. This subsequently led to an incapacity to balance transparency and confidentiality, and resulted in a level of failure to foresee and deal with dispersed responsibilities which negatively influenced the workability of the risk governance process. As a result it was stated by many interviewees that perceptions of risk governance deficiencies in combination with the impacts that occurred negatively affected the reputation of the companies and the regulators. This was confirmed by respondents unaware about the true nature of those difficulties that hinted there seemed to be a lack of cooperation between the different entities responsible for risk governance. Eventually multi-stakeholder bodies were established by the companies and the government which appeared to have significantly increased the cooperation between the different parties and therefore the functionality of the risk governance process. As such, the case study has shed light on the complexities arising when attempting to simultaneously manage commercial complications and an elaborate risk governance process.

## 2.2. Monitoring and compliance

### 2.2.1. Problem context & data

The second thematic category is in relation to the monitoring and control of risks. Fig. 2 shows that 59% of the total number of interviewees have mentioned risk management concerns regarding monitoring and compliance mechanisms. It must be noted that there are two contrasting views within this graph. The state and federal government representatives argued that the monitoring and compliance mechanisms in place were quite significant. Other interviewees argued that the mechanisms in place were not sufficient or even non-existent.

### 2.2.2. Analysis

It appears that interviewees mentioned the monitoring and compliance mechanisms both due to the outcomes of the process and due to the inner workings of the process itself. The process itself because the institutional capacity of the government departments to undertake monitoring and compliance work was often questioned given the large amount of conditions that were placed on the three LNG projects. Furthermore, the monitoring and compliance mechanisms were often questioned due to the environmental impacts that emerged in the harbour. Although dispute over the following problem and the associated literature remains, at one point there were multiple stressors that were impacting on the environmental health of the harbour that may have led to an increase in dead aquatic animals (Douvere and Badman, 2012; Gladstone Fish Health Scientific Advisory Panel, 2012; Johnson et al., 2014; Landos, 2012; Tinney et al., 2013). One of the main stressors was often argued to be the dredging that was undertaken by

the Gladstone Ports Corporation to provide the necessary port infrastructure for the LNG tankers. The dredging project also included the construction of a bund wall that held dredge spoil from the expansion of the port (GPC, 2013a). The bund wall leaked dredge spoil into the harbour and it has been shown that some aspects of the bund wall did not meet industry standards (Johnson et al., 2014). The other main stressor was an extraordinary flooding event that led to the overflow of the Awoonga Dam which caused an influx of fresh water and up to 30,000 barramundi into the harbour (GAWB, 2013). It is still unclear which of the stressors may have caused the impacts on the environmental health on the harbour due to the lack of baseline data that was available at the time (Tinney et al., 2013). Some monitoring was however conducted by the Department of the Environment, the Gladstone Ports Corporation and the Port Curtis Integrated Monitoring Program<sup>6</sup> (GPC, 2013b; PCIMP, 2018).

At a later stage in the process the lack of monitoring and baseline data was acknowledged. As a response the stakeholder-driven monitoring and advisory body Gladstone Healthy Harbour Partnership (GHHP) was set up. The GHHP brings together 26 partner organisations from government, industry, community and the research sector that have an interest monitoring and maintaining the health of Gladstone Harbour (GHHP, 2016, 2015). The Partnership has a scientific panel that produces transparent report cards on an annual basis that are based on data from 78 measures to develop indicators for the environmental, social, cultural and economic health of the harbour (GHHP, 2016, 2015). The report card is an innovative and accessible tool to support decision-making and communicating the health of the harbour to multiple stakeholders to help guide future management of the harbour (GHHP, 2016, 2015). The analysis of the interviews indicates that this partnership has increased stakeholder trust in the monitoring and compliance mechanisms. The GHHP is one of many pilot card partnerships in Queensland, such as the Healthy Waterways for South-East Queensland, Healthy Rivers to Reef Partnership for the Mackay-Whitsunday area, and the Fitzroy Partnership for River Health for the Fitzroy Basin near Rockhampton which have proven to be good models for engaging people and providing independent information. The technical reports are often used by the proponents or the decision-makers such as the Coordinator General, to look at a general condition or a long-term trend. All stakeholders have praised the establishment of the GHHP and have noted that it should have been established at an earlier stage.

### 2.2.3. Summary

To summarize, there were a variety of perceived risk governance deficiencies in relation to the monitoring and control of risks. One of the main reasons for this is because of the impacts that occurred in the harbour and the resulting negative perceptions that people have of the monitoring and compliance mechanisms. Due to the lack of baseline data the nature of these impacts remains unknown although independent research has shown that certain elements of the dredging project did not meet the appropriate standards (Johnson et al., 2014). Nevertheless, monitoring and control improved over time through the establishment of the GHHP which has significantly helped to improve the risk governance process in relation to risk monitoring and control and in increasing stakeholder communication, involvement and trust. Similar report card partnerships have been established elsewhere in Australia which have also positively contributed to the monitoring data of the regions (Australian Government, 2016). Similar mechanisms may therefore be useful for future industrial developments that can impact on the environment.

<sup>6</sup> Monitoring included data relevant to: air quality; water quality; sediments; bioaccumulation in oysters; megafauna and their habitats.

### 2.3. Governmental inaction

#### 2.3.1. Problem context & data

The third thematic category concerns perceived governmental inaction which originates from diverse statements of dissatisfaction linked to the planning and implementation process. Fig. 2 shows that 50% of the total number of interviewees have mentioned this thematic area while most frequent concerns came from interviewees in local government and regional and indigenous representatives. In most cases comments about governmental inaction appeared because the state government was perceived to be responding to impacts that occurred, instead of trying to mitigate or prevent risks from becoming impacts. While most of the impacts have eventually been addressed, such as the value of housing, the overloading of social services, and the environmental health of the port, it is believed by these interviewees that a more pro-active and visible role by the state government could have led to better outcomes.

#### 2.3.2. Analysis

This perceived lack of governmental inaction appears to point to issues in relation to the way emerging risks were addressed. The IRGC identified that a common and recurring risk governance deficiency is the failure of risk managers to respond and take action when risk assessors have determined that a risk is emerging based on early warning signals (IRGC, 2009). In the Gladstone case study, risk assessments prepared by the LNG proponents had already determined the potential risks along with their potential consequences and likelihood of occurrence (APLNG, 2010a; van der Vegt, 2018). Cumulative social and economic risks were amongst those most highly rated in the risk matrix. Interview data however suggests that mitigation measures were not implemented in the early phases of construction. The impacts on the value of the housing market were raised most often by interviewees as a demonstration of the outcomes of these risk governance failures. It was stated that new housing was built long after peak employment when the housing was no longer needed and the impacts on the value of the market had already materialized. While these statements appear to be true, it must be understood that regulators have little influence over the outcomes of the process. That is because the results were influenced by a number of aspects, including: the uncertainty surrounding the final investment decision of the LNG projects; the increased demand in housing supply because of these developments; the restrictions in building new housing because of complicated and long development approval processes; the speculation of property investors; and the question of whether temporary accommodation would have led to concerns about capital outflow. All of these aspects make the risk governance process complex and may hinder regulators who were trying to reach desirable social and community outcomes.

Another common risk governance deficiency identified by the IRGC is the inability to reconcile the time frame of the risk with the time frames of decision-making and incentive schemes (IRGC, 2009). In the Gladstone case the interview data suggests that the decision-making structures and bureaucratic nature of government had a negative impact on the implementation of risk governance. That is because the interviews indicated that there was much confusion and uncertainty surrounding the decision-making authority as interviewees, including those in government, did not know who could make the decision or respond to risk governance issues. Hood, Rothstein, and Baldwin have previously observed that risk regulation and decision-making regimes are often incoherent and fragmented over several institutional bodies at various administrative levels (Hood et al., 2001). In the case study this uncertainty appears to have negatively affected the workability of the risk governance process and caused unnecessary delays in the process leading to unfavorable social and community outcomes by failing to prevent risks from becoming impacts. The workability of the risk governance process also appeared to be affected by the lack of continuity in government. The LNG projects declared their initial

advice statement in 2009 and sent their first shipment of LNG in 2015. With these long time frames it is unsurprising that there was a change in government halfway through the development process. As a result, the bureaucracy and the people dealing with the process changed which may have led to different priorities and a loss of institutional knowledge and relationships. This can lead to failures in the risk governance process which can be illustrated with the Gladstone Foundation that was set up in 2011 to help fund social infrastructure in the region as a form of risk mitigation (Gladstone Observer, 2015; The Gladstone Foundation). The three LNG companies invested 13.5 million AUD in the Foundation which is managed by the Queensland Public Trustee (Gladstone Observer, 2015; The Gladstone Foundation). In 2015, when the projects finished construction, only 4.6 million of this fund had been used (Gladstone Observer, 2015; The Gladstone Foundation). This means that the foundation fell short of its goal in helping with risk mitigation as all impacts associated with LNG development in Gladstone had already materialized by this time. The change in government that came halfway through the construction of the LNG plants played a role in undermining the effective operation of the Gladstone Foundation. When the Labour government was in office, they were supportive of the Gladstone Foundation, but as soon as the new Liberal/National government came in, the Foundation was no longer supported.

#### 2.3.3. Summary

To conclude, there was some dissatisfaction regarding the inaction of state government departments in the planning and implementation process. The analysis shows that the impediments to the risk governance process that are possibly referred to are not necessarily the responsibility of governments alone but rather that of a wide range of actors. This failure to deal with dispersed responsibilities has already been covered in a previous section dealing with the lack of cooperation. However, the interviews indicate that the decision-making structures and bureaucratic nature of government also had a negative impact on the functionality of the risk governance process by causing unnecessary delays and uncertainty for other actors regarding the best way to pursue desirable social and community outcomes.

### 2.4. Regulations and requirements

#### 2.4.1. Problem context & data

The fourth thematic category concerns the regulations and requirements in place. This thematic category was mentioned by 46% of the total number of interviewees. Most notably, 89% of interview representatives within industry mentioned issues in this thematic category. Their concerns included the large number of prescriptive regulations, requirements and conditions in place. As a result, they stated that they could not conduct their own corporate citizenship activities, or respond to the needs and expectations that the community normally drives into the proponents of resource projects.

#### 2.4.2. Analysis

In this line of thinking corporate citizenship can be seen as the recognition that a business has social, cultural and environmental responsibilities to the community in which it seeks a licence to operate, as well as economic and financial ones to its shareholders or immediate stakeholders (Daikin University, 2005). From this viewpoint the argumentation of industry representatives can easily be understood because companies do not want to risk their reputation or their social licence to operate because it could lead to a range of business risks which could potentially impact on project timelines and budgets (Davis and Franks, 2011; Franks et al., 2014). On the other hand it must be noted that these industry representatives may have an interest in streamlining development approvals.

Furthermore, interviewees in industry stated that the debt financing requirements set by Export Credit Agencies and commercial banks add another level of regulation, as well as requirements for corporate

citizenship to shareholders, that may or may not need to be duplicated with another layer of regulation set by government. For the LNG projects in Gladstone these debt financing requirements were tied to the Equator Principles and the International Finance Corporation (IFC) Performance Standards. These standards are voluntarily adopted by financial institutions to identify and manage environmental and social risk in projects; and to engage and build constructive relationships with host communities (EPFI, 2013; IFC, 2012). While duplication of these regulations does seem unnecessary, the quality of the risk governance process would likely be improved if governments have control over compliance. More specifically, relying on the notion of corporate citizenship and on the regulation of banks whom are both established to maximize profits does not appear to be beneficial for desirable social and community outcomes of the risk governance process.

All interviewees who commented on this subject did agree that regulations and requirements are necessary provided that they are well-designed, well-executed and not detrimental to the local community, or to the corporation and the government in cases they act in the interests of the local community. This did not always appear to be the case and it seems that there were a number of limitations and inconsistencies in the regulations and requirements. In many cases the regulations did not appear to be flexible enough as certain mitigation measures and conditions would be placed on the LNG project proponents whereas it was determined at a later stage that a different measure could produce a better outcome. However, due to the regulatory processes in place it became very difficult to change the initial plans. During the preparation of the Environmental Impact Statement the options are considered and conditions of approval are given. However, there is a limited capacity to use regulatory processes to encourage companies to improve their performance once the approvals are granted, unless companies violate a condition or specific provisions are added upon project approval. Similarly, there is a limited capacity for companies to deviate from the plans outlined in the Environmental Impact Statement. Given that these documents are prepared a number of years prior to starting construction, the situation and measures needed during construction could be quite different than initially outlined. This insufficient flexibility to act in the face of the unexpected therefore negatively impacted on the workability of the risk governance process which ultimately became detrimental to the outcomes. It therefore seems desirable to switch to more adaptive forms of risk regulations and requirements to improve the functionality and the outcomes of the risk governance process. Adaptive forms of risk regulation could facilitate governments and proponents of major projects to respond to risks that were previously uncertain and unknown by incorporating that flexibility in the process.

#### 2.4.3. Summary

To summarize, the regulations and requirements were argued to lead to impediments in the risk governance process by a number of interviewees. Representatives from industry often stated that regulation hindered their corporate citizenship activities and may not need to be duplicated by the debt financing requirements. However, given that industry and banks have a fiduciary obligation to their shareholders to maximize profits, they might not necessarily aim for the most desirable social and community outcomes. But even in cases where industry does strive for these goals, effective regulation that justifies their spending on these aspects is needed from the government (Hamann, 2003). That being said, the regulations in place did appear to be too rigid to reconsider and change any chosen mitigation measures which negatively influenced the risk governance process. Adaptive forms of risk management are widely discussed to be a potential solution to overcome these obstacles.

#### 2.5. Post-evaluation of risk management

An important lesson that can be learned from post-evaluation of LNG development in Gladstone appears to be related to the assessment

and the management of cumulative risks associated with multiple projects in the area. While cumulative risk assessments were conducted, the businesses involved in conducting these assessments had to deal with a high degree of complexity and uncertainty due to dealing with loose conjectures and issues surrounding intellectual property in relation to other projects (van der Vegt, 2018). Despite dealing with a high degree of uncertainty, the reflection of uncertainties was not adequately undertaken within the risk assessments (van der Vegt, 2018), although this is argued to be a necessary and politically significant step in the risk governance process (Aven, 2010; Aven and Renn, 2012).

However, even though the cumulative risk assessments possessed a high degree of uncertainty and complexity, an understanding of the potential risks was reached and objectives for risk management had been set. During the risk management phase these objectives were not achieved due to a range of issues in relation to intellectual property, allocating risks, and collaboration between different stakeholders. These issues appear to be relatively predictable and the risk assessments explicitly referred to the need for effective cooperation between various parties. More effective cooperation did take place at a later stage in the process, although most of the social, economic and environmental impacts had already materialized by then.

The regulations in place and the role of the government were further often seen to be of central concern in the materialization of the impacts. That is because it appears to be problematic that a single proponent is responsible for the assessment and accountability of cumulative risks as is currently the case (van der Vegt, 2018). A regulator acting for the public interest would be in a better position than the project proponents to make the final tolerability and acceptability judgements, and the prioritisation and coordination of mitigation measures associated with cumulative risks associated with multiple projects in the area (van der Vegt, 2018). Furthermore, governments could benefit from post-evaluations such as conducted in this paper in order to improve their planning and development approval system for future occurrences. However, the analysis in this paper has shown that impediments in the risk governance are not necessarily the responsibility of governments alone but rather that of a wide range of actors.

Accordingly, this poses an interesting question with regards to what the risk governance process is intended to achieve and who is responsible for achieving it. Is the process supposed to make sure the risks will be avoided, minimized, mitigated or offset? Is the process supposed to increase the likelihood of achieving the objectives of the organization/department? Is the process supposed to foresee risks and ensure that economic and social agents can act as they see fit? Or is the process supposed to lead to more desirable social and community outcomes by involving stakeholders and the public? Both the interviews and the academic literature suggest that different people with different roles, responsibilities and/or research approaches have different positions with respect to who or what to include, what processes to follow, and what outcomes to expect from the process (Renn and Schweizer, 2009; van der Vegt, 2017). There is a trend towards more stakeholder and public involvement in risk governance (Chilvers, 2007; Hagendijk and Irwin, 2006; Petts, 2004) but key issues still include ways to systematically involve stakeholders (Renn, 2008; Stern and Fineberg, 1996) and include the public in risk decision-making processes (De Marchi, 2003; Walls et al., 2005). Participatory modes of risk decision-making have sometimes been called a hindrance to the governance process (Lofstedt and Van Asselt, 2008; Renn, 2008). Authors have expressed concerns that it could open the door to lobbyism and increase the influence of vested interests though the framing power of certain stakeholder groups and their resistance to compromise (Lofstedt and Van Asselt, 2008; Tait, 2008). Others have also pointed to the technical, institutional, regulatory and cultural barriers to participation and deliberation in risk decisions (Petts, 2008, 2004).

Nonetheless, this empirical case study has shown that multiple major project developments in one area at the very least requires the cooperation of a range of governmental authorities, private

**Table 1**  
Cooperation mechanisms used in Gladstone.

Initiative	Description	Strengths	Weaknesses
Bechtel Units (PJET and CSO)	Allowed the transformation of three independent procurement teams into one unit. Also established a single interface to deal with regulatory authorities and other key stakeholders.	<ul style="list-style-type: none"> <li>- Promoted integrated planning within and between project teams.</li> <li>- Improved collaboration with other stakeholders.</li> </ul>	<ul style="list-style-type: none"> <li>- Time and costs of establishing such units.</li> </ul>
Gladstone Infrastructure Working Group (GIWG)	High level stakeholder body consisting of statutory authorities and representatives from the LNG companies.	<ul style="list-style-type: none"> <li>- Allowed a central and collaborative approach to address issues requiring coordination.</li> </ul>	<ul style="list-style-type: none"> <li>- No direct link between state government employees and the community (neither here nor in the RCCC).</li> </ul>
Gladstone Regional Community Consultative Committee (RCCC)	Multi-stakeholder body consisting of 12 community members representing a specific impact topic or a region, 2 representatives from each of the three LNG companies, and an independent chair from Central Queensland University.	<ul style="list-style-type: none"> <li>- Enabled meaningful engagement between community members and the LNG companies.</li> <li>- Increased stakeholder communication, involvement and trust.</li> </ul>	<ul style="list-style-type: none"> <li>- There were concerns that the average worker in town was not represented.</li> <li>- It was difficult to get the indigenous people to participate.</li> <li>- Agenda mainly controlled by LNG representatives.</li> </ul>
Gladstone Healthy Harbour Partnership (GHHP)	Stakeholder-driven monitoring and advisory body that brings together 26 partner organisations that have an interest in monitoring and maintaining the health of Gladstone Harbour. The scientific panel of the Partnership produces report cards that show the environmental, social, cultural and economic health of the harbour.	<ul style="list-style-type: none"> <li>- Provider of independent information.</li> <li>- Supports decision-making and helps guide future management regarding the health of the harbour.</li> <li>- Increased stakeholder trust in monitoring and compliance.</li> </ul>	<ul style="list-style-type: none"> <li>- Time and costs of setting up such a comprehensive governance arrangement.</li> <li>- There is continued debate about the financial contribution between stakeholder groups.</li> </ul>

organizations, stakeholders and the public in a risk governance process that can take a number of years. For mining and energy developments this is a complex process due to the controversial nature of the sector (Jenkins and Yakovleva, 2006; Parsons et al., 2014) and the divergent perspectives, values, and beliefs of the variety of stakeholders involved. The risk governance process is further complicated because of political, cultural and economic forces at play. Given these difficulties it may take some time before suitable governance arrangements are found. This paper has however pointed to a variety of effective cooperation mechanisms that could increase the functionality of the risk governance process, increase the reputation of multiple projects, and advance stakeholder communication, involvement and trust. The cooperation mechanisms used in Gladstone are summarized in Table 1 below.

### 3. Conclusion

The IRGC risk governance framework was used as a heuristic in a case study of LNG development in Gladstone in order to explore what can be learned from this type of post-evaluation; to assess the implementation of risk management; to diagnose the role of the risk assessments in the implementation of risk management; and to point to areas capable of improving similar risk governance problems for resource projects in the future. The findings provide insight into risk governance and stakeholder involvement for LNG projects which is important for researchers and decision-makers seeking to increase their understanding and/or improve the effectiveness of the governance of extractive industries. To inform the analysis the research entailed extensive interviews as well as a comprehensive examination of the literature, including environmental impact statements, public submissions, reports and policy documents. The focus of the paper was the risk management phase comprising the selection of measures to avoid, minimise, mitigate and offset risk, the implementation of risk management plans, the acceptance of responsibility, risk monitoring and control, and stakeholder communication and involvement.

Although there was some divergence in stakeholder views, the case study results identified a variety of aspects that have influenced the workability of the risk management phase of the IRGC risk governance process for LNG development in Gladstone. Weaknesses that negatively influenced the workability of the risk governance included the insufficient cooperation between multiple organisations, the failure to balance transparency and confidentiality, the failure to deal with dispersed responsibilities, the monitoring and control of risks, the

decision-making structures and bureaucratic nature of government that caused unnecessary delays and uncertainty for other actors, and the rigid nature of the regulations in place which were detrimental to acting in the face of the unexpected. Strengths included the establishment of a variety of multi-stakeholder bodies and the GHHP report card partnership that significantly increased the cooperation between the different parties, improved the monitoring and control of risks, and helped to improve the functionality of the risk governance process in relation to stakeholder communication, involvement and trust.

Therefore, the following key points were identified to improve similar risk governance problems in the future: (i) the need for risk governance to start early, (ii) the importance of risk regulation and risk governance to have adaptive capacity, (iii) the value of multi-stakeholder bodies and third party facilitation, (iv) the value of stakeholder-driven mechanisms to support decision making such as the monitoring and advisory body outlined in this case study, and (v) the importance of post-evaluation and structured systemic improvement in planning and development assessment at a governmental level. These findings could help minimize the risks, or at least point to the potential value of an inclusive, adaptive and integrative risk governance process for both future resource projects and future research purposes.

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