MANAGING CONFLICT IN ENGINEERING PROJECS: NEW ZEALAND EXPERIENCES

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ABSTRACT

There is a wealth of knowledge concerning conflict management and its resolution in the workplace, however there is a dearth of information relating to conflict management and its resolution in engineering project management. This paper set out to examine the reality of conflict management in engineering project management in New Zealand. This was achieved through a review of credible literature sources and the completion of a pilot study to gain subject matter expert perspectives. The research suggests that conflicts can be destructive, resulting in anxiety and strong emotional responses leading to reflexive reactions including avoidance, aggression, fight, hostility and a breakdown in communications and relationships. Findings indicate that managing a project structure is synonymous with handling conflict and these disagreements can be detrimental to the success of a project. The initial results suggest that a number of factors act as drivers of conflict in engineering projects in New Zealand. These drivers are: power, personality, group dynamics and organisation culture. The conflict resolution tools cited as being widely used for engineering projects are collaboration and negotiation. The paper also offers recommendations for future research.

KEYWORDS: Conflict, Conflict Resolution Tools, Engineering Project Management, New Zealand.

INTRODUCTION

In an age of globalization, workplaces have become an epicenter of diverse cultures (Daria & Bahaudin, 2015). New Zealand is a stable economy with a Gross Domestic Product (GDP) increase of 6.7 percent in 2014 (Regional Gross Domestic Product: Year Ended March 2014, 2015), and a migration increase of 11 percent in 2015 as compared to 2014 (International Travel and Migration: June 2015, 2015). This signifies a more diverse culture, with people from different backgrounds, workplace environments are breeding grounds for multiple disagreements. Conflicts consume as much as 42 percent of employee's time and managers spend 20 percent of their time in resolving these (Cloke & Goldsmith, 2005). The results of conflicts are varied and range from financial and economic losses, decreased productivity, low employee morale, lost customers and dysfunctional relationships with colleagues (Cloke & Goldsmith, 2005). This suggests that managing organisational conflicts is a challenge to any successful organisation.

Projects environments are not averse to workplace conflicts and resolution practices exist to provide direction in managing these conflicts (Kerzner, 2001). The construction industry is highly complex and high risk in nature and conflict are widespread (Semple, Hartman, &

Jergeas, 1994). Conflict resolution attempts to reduce or eliminate conflict by adapting established strategies of analysing, mediating, collaborating and negotiation to minimize the effect of conflict so that organisational goals can be achieved effectively (Rahim, 2001). Work environments in New Zealand experience workplace conflict at a similar level to elsewhere in the world (Harris, 2011). The intention of this study is to examine the reality of conflict management in engineering projects in New Zealand. It aims to understand the drivers of conflict and to establish which tools and techniques are being utilized for workplace conflict resolution in this context.

LITERATURE REVIEW

The literature review begins by defining conflict, examining its features including the destructive and constructive impacts of conflicts. It suggests that a number of drivers to conflict exist and it examines these in more detail including: power, culture, personality and group dynamics. It introduces techniques and tools for conflict resolution.

What is Conflict?

Conflict has been defined as "the interaction of interdependent people who perceive incompatibility and the possibility of interference from others as result of this incompatibility" (Folger, Poole, & Stutman, 2005, p. 4). Conflict has been likened to a contest stating that "the contest is inevitable when the goals of opponents are mutually exclusive as a result of the negative impact of one's side choice on the other" (Jeong, 2008, p. 11). Conflict exists when it is psychologically perceived and felt by at least one of the entities that are disturbed by the presence of this situation (Cahn, Abigail, & Lulofs, 2007; Cloke & Goldsmith, 2005; Deutsch, Coleman, & Marcus, 2006; Folger, Poole, & Stutman, 2005; Rahim, 2001; Tillett, 1999).

Conflict is believed to have both positive and negative impacts in the workplace. Its destructive impact resulting in anxiety and strong emotional responses leading to reflexive reactions including avoidance, aggression or fight, hostility and a breakdown in communications and relationships (Deutsch, Coleman, & Marcus, 2006; Gupta, Boyd, & Kuzmits, 2011; Tillett, 1999; Cloke & Goldsmith, 2005; Eunson, 2007; Gosselin, 2007; Masters & Albright, 2002). Workplace conflicts span all levels of an organisation from the individual, professional to the strategic and can negatively affect the productivity of an organisation (Masters & Albright, 2002, p. 11).

In contrast conflicts can arguably have a constructive impact and can hold the power to transform (Ann, 2008; Cloke & Goldsmith, 2005; Folger *et al.*, 2005). Conflicts can force groups within an organisation to think radically, fuel innovations and creativity as well as increasing the understanding each other's perspectives (Pinto & Morris, 2004).

Conflict in the Workplace and Project Management

Conflicts are thought to be inevitable in organisations (Folger *et al.*, 2005; Pinto & Morris, 2004). Managers in workplaces spend around 18 to 26 percent of their time in dealing with conflicts (Thomas & Schmidt, 1976). More recently research conducted by CPP, Inc. (previously Consulting Psychologists Press) confirmed that 85 percent of respondents have experienced conflicts in the workplace. The top three reasons cited for these conflicts were personality clashes (49 percent), stress (34 percent) and heavy workloads (33 percent). On an

average, workers spend from 2 to 3 hours per week dealing with conflicts (Workplace Conflict and How Businesses Can Harness it to Thrive, 2008).

Kerzner (2001) stated that conflicts are inevitable in a project environment and that managing a project structure in any organisation is synonymous with handling conflict and disputes at all levels in the organisation. He also stated that these disagreements can be due a number of contributing factors. These factors include misplaced interests of the stakeholders involved in the project, differences in the opinion of team members, supplier or contractual issues, resource allocation, delay in schedules, cost overruns, technical trade-offs, ambiguous roles and responsibilities or customer dissatisfaction. The project manager is also expected to keep all the stakeholders satisfied, keeping in view of their expectations needs and wants at different stages of the project (PMBOK, 2013). In a conflict scenario of a project, the project manager has to exercise influencing skills (Pinto & Morris, 2044). These influencing skills are required for negotiating internal and external conflicts. Semple *et al.* (1994) suggested that there is seldom one cause of conflicts and the causes can be very specific to a particular project. They also went on to confirm that the increase in scope of work was the main cause of dispute in approximately half of the claims that they analysed as part of their research.

Drivers of Conflict

The literature suggests that a number of drivers exist in steering conflict these include: power, culture, personality and group dynamics. Power is arguably an important aspect that affects the conflict and its resolution. Power can be defined as "ability to make things happen or to bring about desired outcomes" (Coleman, 2006, p. 121) and any power imbalance can jeopardize constructive conflict resolution. Folger *et al.* (2005) suggested that conflict is sustained by the participant's power dependent moves and countermoves. However Cahn *et al.*, (2007) and Tillett (1999) challenged this theory, placing no emphasis on the issue of power or its imbalance in the conflict resolution process.

Power is thought to be dependent on the resources people hold and it is conferred on people who utilize these resources to influence decisions (Folger *et al.*, 2005). Having more power than the opposing party is considered as an advantage as this will help in steering the direction of the conflict. A number of sources of power exist, ranging from formal authority, control of scarce resources, hierarchy in the organisation, control of knowledge and information sharing, ability to act in case of adversities, interpersonal relations and societal factors (Condliffe, 2008).

Culture is believed to play a significant role when collecting information, reasoning and arriving at a decision (Kimmel, 2006). Culture has been defined as a group level construct that embodies a distinctive system of traditions, beliefs, values, rituals, norms, symbols and meanings that is shared by a majority of interacting individuals in a community (Lulofs & Cahn, 2000). Culture is also known as a collective phenomenon "It is the collective programming of the mind that distinguishes the member of one group of people from others" (Hofstede & Hofstede, 2005, p. 4). It has been suggested that when the focus of negotiations is on effective and constructive communication, culture cannot be overlooked, (Avruch, 1998). Lulofs & Cahn (2000) and Deutsch *et al.*, (2006) stated that interpersonal conflicts are easier to resolve if the parties are from the same culture and that the resolution becomes comparatively complex when a cultural paradigm is added to the equation. They also stated that it is

imperative that parties come to terms with each other's 'ethnocentric' views when resolving intercultural conflicts.

Personality has been defined as "the dynamic organisation within the individual of those psychophysical systems that determine how they uniquely adjust to their environments" (Gordon Allport as cited in Robbins, Judge, & Campbell, 2010). They also suggested that personality is a set of measurable traits an individual exhibits repeatedly on many occasions, as a result of both hereditary and environmental factors. Sandy, Boardman, and Deutsch (2006) observed that individual differences in conflicts are a major concern that further will shape the conflict resolution process, yet there is no in depth research to date to underpin the effect of personality traits on conflicts and its resolution process. Evidence has also suggested that personality clashes and warring egos are a significant cause of conflicts in organisations (Workplace Conflict and How Businesses can Harness it to Thrive, 2008).

Personality traits are believed to be linked with job performance and conflict handling strategies in organisations. People with personality traits of positive agreeableness tend to avoid conflicts (Hodges, 2000). Extroverted people tend to have a collaborative approach to conflict resolution (Ahmed, Nawaz, Shaukat, & Usman, 2010). Individuals measuring high on openness and conscientiousness are more likely to be competitive and tend to use direct conflict resolution techniques (Jr, Phipps, & Xu, 2010). People with narcissist behaviour and low self-esteem are more inclined towards incidents of conflicts and indifferences and tend to incite retaliation and conflict (Pruit, 2008). In contrast, Folger *et al.*, (2005) dismissed any direct link between personality traits and the behaviour expected in conflict resolution situations, as people tend to behave differently in adverse and varied circumstances.

Group Dynamics

Conflicts in groups and organisations is believed to revolve around the opposing principles of collaboration and competition (Condliffe, 2008). Within groups conflicts are believed to be governed by the group culture, values and beliefs and group principles, conflicts within a group can also lead to a group being polarized or becoming more cohesive (Condliffe, 2008). Pruitt (2008) argued that group characteristics play the fundamental role in conflict confrontation or escalations. It is believed that group conflicts are generally based around gaining social dominance, accessibility to scarce resources and control or gaining other basic necessities (Fisher, 2006). Groups are thought to be cohesive in nature in circumstances of intergroup conflicts due to the increased threats that competition and cohesiveness play. Pruitt (2008) also mentioned that conflicts and their escalation are normal and integral in the workplace as a way for groups to gain favorable outcomes, suggesting that the overall organisations' effectiveness can be achieved with slight escalations of conflicts in group dynamics.

Conflict Resolution

Conflict resolution is defined as a way of terminating conflict by methods that are analytical and get to the root of problem, offering an outcome that is a permanent solution to the problem (Burton, 1999). Conflict resolution implies the reduction, elimination or termination of conflict by using tools such as negotiation, bargaining, mediation and arbitration. It also employs effective strategies to minimize the dysfunctions of conflict and enhancing the constructive functions of conflict to enhance the effectiveness of an organisation (Rahim, 2001). Five key conflict resolution techniques are prevalent in the literature: avoidance, accommodation,

competition, compromise and collaboration (Cahn *et al.*, 2007; Cloke & Goldsmith, 2005; Eunson, 2007; Falconer, 2004; Folger *et al.*, 2005; Lulofs & Cahn, 2000; Masters & Albright, 2002; Tillett, 1999).

There are also techniques that employ the intervention of a third party to settle the disputes. These techniques are collectively known as alternative dispute resolution (ADR) (Cahn *et al.*, 2007; Cloke & Goldsmith, 2011; Condliffe, 2008; Masters & Albright, 2002; Roche, Teague, & Colvin, 2014; Tillett, 1999) and can be listed as: conciliation, ombudsperson, arbitration, mediation. The main advantages of using ADR is that it is economical, speedy and more efficient when compared to litigation (Lipsky, Seeber, & Fincher, 2003).

More recently Lee, Yiu, and Cheung (2016) completed a comprehensive review of research on the use of ADR in the construction industry, (which shares a number of characteristics with the engineering project domain). Their study presented a systematic review of factors influencing ADR selection and its use in construction projects (for the last 32 years) and confirmed that ADR techniques are incorporated in the standard forms of project contracts as a designated way to avoid and resolve project disputes (Jannadia, Assaf, Bubshait, & Naji, 2000, Chong & Zin, 2010). Dispute resolution methods in construction projects can be largely categorized into non-binding methods and binding methods (Fenn *et al.*, 1997, Cheung, 1999) which show similarities to the ADR routes available in the workplace generally.

The use of ADR in construction projects is greatly affected by perceptions that impede its attractiveness (Lee *et al.*, 2016). Brooker & Lavers (1997) revealed a range of factors influencing ADR use. These factors included the knowledge of ADR, agreement of both disputants in using ADR and confidence in ADR process. Other factors include perception of relative advantage in time and cost, manipulation by legal practitioners and the use of ADR as a means of achieving delay. Brooker (1999) went on to confirm that the majority of construction project professionals are not confident in the advantages of ADR. The non-binding nature of ADR was proffered as the primary influential factor. Interestingly Tsai and Chi (2009) suggested that people's intention and behaviour in managing disputes and preferences concerning appropriate resolution techniques are greatly influenced by cultural orientations.

In the context of New Zealand and conflict resolution generally, the New Zealand Ministry of Justice report in 2004 stated that arbitration and mediation are the main ADR conflict resolution techniques being used and that mediation is more the preferred method between the two (Alternative Dispute Resolution, 2004). The report indicated that in unfiled High Court cases, 36.6 percent were settled through mediation while 6.9 percent were settled through arbitration. Further, Lipsky, Seeber & Fincher (2003) suggested that a number of barriers to ADR exist. These include the lack of support by senior management, ADR perceived as complicated, arbitration and mediation not confined to legal system, the unwillingness of the opposing party to consider ADR and the lack of confidence in the neutral third party.

Summary

The literature reveals that the subject of workplace conflict is not a new one, however very little research is evident in engineering projects in New Zealand. The review suggests that workplace conflicts in general are well defined, natural and can be destructive and constructive in nature. It goes on to critically describe a number of drivers that play a role in conflict generally, namely power, individual personality, culture and group behaviours. A number of

methods exist to resolve work place conflict generally ranging from effective communication, collaboration and negotiation. Arbitration, mediation and litigation are also being utilized when third party intervention is required to settle conflicts. Whilst some studies concerning conflict exist in New Zealand and some studies exist globally reviewing conflict in a construction industry context, the literature reviewed failed to identify any specific studies in engineering projects in New Zealand. This indicates a dearth of research in this industry context and geographic area, which warrants further investigation. The aim of this paper is to investigate the workplace conflict theory presented in the review in an engineering project setting to establish if any similarities or differences exist and whether further more in depth research is warranted.

RESEARCH METHOD

The purpose of the research was to gain insight from industry experts on their perceptions of conflict in engineering projects. The nature of this research problem required an inductive approach to be taken as this is more open ended and exploratory in nature and would enable initial findings to emerge from thet context. A qualitative research methodology was chosen as it is ideal for establishing perspectives and answering the 'how' and 'why', this was appropriate given the complex nature of workplace conflict and its resolution. The data collection method of semi structured interviews was chosen as it is well suited for the exploration of opinions and perceptions of respondents regarding complex and sensitive issues, and it also facilitates the ability to probe the respondent for more information and clarification of answers (Barriball & White 1994).

Semi Structured interviews incorporated both open-ended and more theoretically driven questions which helped to draw participants more effectively into the topic under study (Galletta & Cross, 2013). The semi structured interview schedule was developed based on the key themes from the literature including the definition of conflict, approaches to conflict management, the drivers of conflict and conflict resolution tools in organisations.

In terms of sample size, qualitative research focuses on exclusivity of text and possibility of different interpretations from the data, the size of the sample is limited (Marsh & White, 2006). They further stated that the focus of research should be transferability rather than generalisability per se. For the purpose of this study, a homogeneous sampling method was adopted. This method involves selecting a small homogeneous group of engineering project managers (unit of analysis) for examination. This method is beneficial as it is useful for understanding and describing a particular group in depth (Patton, 1990). In terms of sample size, "Adequacy of sample size in qualitative research is relative" (Sandelowski, 1995), a sample size of ten in number may be sufficient for homogeneous sampling, the actual number of the sample needed depends upon on a situation where concepts and themes begin to be redundant and no new concept or theory is discovered.

The sample selection process involved selecting individuals due to their subject matter experiences, with the intention that their experience would provide rich data. The qualitative face to face semi-structured interviews were conducted with six highly experienced practitioners from the engineering management field. They were identified through personal networking, social media and company websites and selected on the basis of a homogeneous purposeful sampling technique (Patton, 1990). This method ensured that all participants were selected based on specific criteria including their position, industry, role and experience. The

respondents selected have an engineering project management background and an average of 15 years or more relevant work experience. They were involved in multiple stakeholder engagement, manage small to large-scale projects and hold a position of middle or senior management in their organisations. Table 1 outlines the respondents' demographic profiles, indicating their breadth and depth of relevant industry experience. This indicates richness and reliability of opinions gained from the respondents for such a pilot study. This also supports Patton's theory (1990) that the 'logic and power' of purposeful sampling in qualitative research lies primarily in the quality of the information obtained per sampling unit, as opposed to their number per se.

Table 1: Respondents' demographic profiles

CONSTRUCTS	EXPERIENCE (YRS)	PROFILE	ORGANISATION TYPE
1	15	Engineering project manager for the production of special purpose machinery	Global market player in providing engineering handling solutions for customers with heavy lift and transfer requirements
2	18	Head of national project management for the organisation	International market leader in diversified technology, in healthcare, consumer lifestyle and lighting
3	17	Project manager for the production of specialist medical devices	Global sustainable engineering product design organisation
4	25	Specialist SAP/ERP consultant	National SAP consultant catering to different engineering companies for ERP/SAP solutions and implementation
5	16	Centre manager heading a team of more than 150 employees	National engineering environmental consulting organisation.
6	15	Engineering project manager across a wide range of projects	World leader in conveyor systems for airport and cargo handling; from expert consulting, design, manufacture, installation and integrated software control systems

The interview data was analysed using content analysis as this method allows for data interpretation and making inferences for identifying the key message conveyed (Stemler, 2001). Content analysis was considered beneficial and appropriate as it allows for the researcher to make for making valid inferences from the data to their context, with the purpose of providing knowledge, new insights, a representation of facts and a practical guide to action (Krippendorff, 1980; Elo & Kynga, 2008). This approach meant that the data collected was rich and in depth in nature captured from highly experienced industry practitioners. Content analysis was performed by focusing on the repetitive words and phrases used by the respondents in response to each question. Attention was given to take into account the synonyms and words used that refers to the same idea that actually represented the thought process of the respondent. Focus was also placed on the situational examples given in support of the answers provided. Common words, phrases and their meaning were categorized until a

priori condition started to emerge where responses got exhausted and data started to duplicate. Based on refining of the data again, the emergent themes were identified. The themes were linked back with the data to understand the themes and that the data were in coherence with each other. The themes that emerged from the data are now presented.

FINDINGS

The emergent themes from the data are the definition of conflict, the drivers of conflict namely power, cultural diversity, personality, group dynamics, and the conflict resolution tools of choice in an engineering project management context, each theme is presented in turn.

Defining Conflicts

Different respondents expressed different opinions when defining conflict. Two of the respondents described conflicts as full-fledged disputes that they were having with their suppliers, contractors and other stakeholders. In contrast two were of the opinion that conflicts are disagreements among people working together. One respondent believed that conflicts arise when one of the stakeholders expressed that they were in a difficult position. The other respondent labelled conflict as confrontation that takes place within or outside organisations.

The majority stated that conflict was negative, making the situation difficult at work and it hindered results. One of the respondents said, "*I see challenges every day, if you call those conflicts, I go on solving them step-by-step*". Only one respondent considered some aspects of conflict as constructive stating that *"Sometimes it becomes important to challenge teams and get them in thinking mode and further bring in change and transformation*".

Many of the respondents were wary of conflict and one of them made a statement that "*In New Zealand, we are of very compromising nature, we prefer to maintain a harmonious work environment*", while another stated "*We do not talk about conflicts in the open*".

The Power of Power

Most respondents cited power as the key factor that affects conflicts and their resolution. One respondent stated that in their organisation, it was the director who was the main authoritarian figure and it was difficult to win an argument with him, as he was very aggressive. Another respondent cited an example of where the program director was not open to share all the relevant information required to complete the tendering and specification of the work in hand, which in turn led to conflict. A further respondent described a situation when they had to utilize their power when a supplier was not able to fulfill their terms of the contract and the overall project schedule started to slip. The same respondent made a statement that "*Due to the power vested in me, I was able to take my suppliers and my team members with me to deliver expected results*".

Two respondents focused on positive examples of the use of power. One at a senior level in the organisation made a claim that in their work environment, every individual was a professional in their own field and they were encouraged to make decisions. They explained that collaboration and cooperation were practiced and that other members in the organisational pyramid were encouraged to follow suit. One respondent suggested that their organisation worked on a flat structure and all team members were heard and their opinion mattered to the managers at the top.

Cultural Diversity

Many of the respondents were aware that New Zealand has become a range of diverse cultures due to the scarcity of skilled people and it being an attractive country to live in. They expressed a positive view concerning cultural diversity in the engineering projects. One respondent stated that they have to take multicultural people into their teams to stride forward. Another respondent confirmed that "*New Zealand people are quite tolerant and we welcome people from other nations with open arms*". While another respondent expressed their view that as long as people are professional in their work and they add value to the organization, it does not make any difference which cultural background they come from.

The respondents also outlined a number of challenges faced associated with cultural diversity in engineering projects. One respondent raised their concerns of amalgamating diverse cultures suggesting that "*It becomes difficult to interpret whether our actions and thinking are in sync with other people of different cultures. In some situations, we have to specifically tell them the way things are done over here*". The view expressed by another respondent was that in New Zealand, most of the organizations operated with a flat structure in hierarchy while it took time for employees of other nations to adjust to this. One particular respondent gave an example of a traditional small-scale business where the owner preferred to hire people of kiwi origin only. Most of respondents were very responsive to cultures and suggested that it is an element that plays a part in conflicts and different cultures should be well understood for better handling the issues arising out of these.

Personality

Differing views on the importance of personality in conflicts were provided, four of the respondents provide examples of negative personality behavior linked to conflicts during their engineering project experiences. One of the respondents referred to their workplace as being single handedly dictated by the authoritarian and aggressive director. Respondents were also of the opinion that where a bossy leader exists the real problems were not brought to their notice and remained unattended unless they became unmanageable. One respondent revealed that one organization's reputation and profits were at stake because of ego clashes between two senior members. They explained that although these two people had minor conflicts when they were working for the same company, larger conflicts occurred when one of them left the organization and became a client with another company. Another respondent referred to personality as a major source of conflict, citing an example where the marketing manager would over commit to clients and this would upset the project teams causing inter-department conflicts.

In contrast, another respondent suggested that their work environment provided every employee need. One respondent provided an example where each employee was respected and this behavior had a cascading effect, resulting in an amicable and fun loving place to work. A further respondent stated that they personally loved to be amongst positive and like-minded people proactively distancing themselves from people who are not team players and difficult to work with.

Group Dynamics

When asked to cite the different conflict scenarios in their engineering projects respondents referred to internal conflicts at peer level, at a hierarchical level and within different departments. While external conflicts concentrated more with stakeholders such as suppliers, contractors and clients. One respondent cited an example of where supplier delivery schedules were not in line with the overall project schedules and conflict occurred.

Another respondent cited an example where a customer wanted the deliverables ahead of the agreed schedule and how different departments met collectively to resolve the conflict. One respondent suggested that "*It is the resistance from cross functional teams within the organization that sometimes it becomes difficult for us to give 100 percent*". Here the behaviour of the service department of the organization that was creating problems for the supply chain group when equipment had to be relocated.

A respondent further explained that the major conflict begins when two different project managers want the same resources allocated to their project team to achieve end results. "*Different teams working on a project will have particulars tasks and they are there for that. Their goals and agendas would be not similar to the team working next to them, but it our job to get them together and function to achieve common targets*".

Conflict resolution Tools of Choice

All respondents had experienced conflicts in their normal working environments and all were aware of the conflict resolution techniques that were widely practiced. Most of the respondents confirmed their personal use of collaboration and negotiation for resolving conflict scenarios in their engineering project environment. One respondent suggested collaboration was mostly used with contractors and suppliers. They suggested that the expectations from each party should be clearly communicated at the beginning of the contract so that there are no ambiguities at a later stage. One respondent reflected that "In conflict scenarios, it is not always that we get what we want but more than often, we have to compromise and take what best is possible".

Two of the respondents provided specific examples of using negotiation as the tool of choice for conflict resolution. One cited an example where a client was making additional demands outside of the terms of the agreement. By negotiating with the supplier and the customer the conflict was resolved. Another respondent expressed thoughts that they have to negotiate with their customers in order to match the customer requirements to the available portfolio of products.

Another respondent explained that arbitration and external mediation were seldom practiced as the organization had robust internal conflict resolution procedures in place. When probed further on their experiences of the proportion of cases referred to mediation or arbitration, one respondent stated that during seventeen years they had witnessed only three cases referred to arbitration and a handful of mediation cases.

DISCUSSION

This section of the paper aims to draw together the findings from the primary data and the literature review to highlight any similarities and differences between the theory and practice of conflict management in engineering project management.

Defining Conflict

Engineering project managers were aware of conflicts around them and this supports the work of CPP Inc. (Workplace Conflict and How Businesses can Harness it to Thrive, 2008) which suggested that more than 85 percent employees encountered workplace conflicts. The definitions of conflict provided by the respondents were coherent with the literature supporting the views of Tillett (1999) that conflict is a clash of opposing ideas and objectives and is mostly undesirable. The data also supports the work of Cahn *et al.,* (2007) and Rahim (2001) who refer to conflict as problematic when one or more party feels disturbed by it.

The results support the work of Cahn *et al.* (2007); Deutsch (1973); and Gupta, Boyd, & Kuzmits (2011) who suggested that the negative or destructive side of conflict is more influential and people associate more with this. The constructive side of conflict was suggested by one respondent, which is in line with the theory that some element of conflict is helpful in bringing in creativity in project environment (Falconer, 2004; Pinto & Morris, 2004; Pruitt, 2008).

The conflicts discussed by engineering project managers were internal and external in nature, external ones referring specifically to contractors, suppliers and clients. This supports the general view that the project environments are highly likely to have conflicts and that project managers have to be conflict managers (Kerzner, 2001).

The Power of Power

All respondents agreed that power is a crucial factor affecting conflict that cannot be neglected. They cited examples of power being misused within engineering projects and the persuasive nature of power that made teams achieve good results. Folger (2005) stated that the actions and reactions observed in conflicts are resultant of the amount of power the parties have, indicating that power is arguably a key factor affecting conflict.

One of the engineering project managers referred to the constructive feature of the power. This supports the work of Condliffe (2008) who pointed out that power has both a constructive and destructive paradigm. However many authors including Tillett (1999) and Cahn *et al.,* (2007) do not agree that power has an influencing tendency in shaping conflicts. This is an area suggested for further investigation and research.

Another aspect raised by the respondents was that employees in their engineering project management organizations take inspiration from their top managers who are more powerful due to their hierarchical position or experience. This behaviour of imitation has not been observed in the literature, although Folger *et al.,* (2005) suggested that power is downplayed most of the time. This could suggest that that the conflict resolution approaches adopted by engineering project management organizations are top down and become embedded in the organizations' culture over time. However caution is needed and further research around this theme is advised.

Cultural Diversity

The respondents indicated generally that they are open to embrace cultural disparities and shared their experiences on how people from different cultural backgrounds exhibited different behaviors at their workplaces. This is aligned with the view of Folger *et al.,* (2005) that conflict

escalation is more prevalent in cases where a cultural gap exists as people's perception are different and so are their expectations. However there were some mixed responses concerning the impact of cultural diversity, making it difficult to accurately conclude if cultural disparity plays a crucial role in conflicts overall. As the findings were mixed it is suggested that this theme should be investigated in more detail.

Personality

The findings suggest a link between personality and conflict escalations and how well conflict is handled by individuals with different personality types within engineering projects. Characteristics displayed by the top management were reflected and imitated by the rest of the team, suggesting that conflict management follows a top down approach in a hierarchal pyramid structure of the organization. This supports the work of Robbin *et al.*, (2010) who proposed the five behavior traits and how different these traits relate to individual characteristics that are displayed in the workplace. Warring egos was also reported as a root cause of conflicts which is in line with the example cited by one of the respondents that caused major setback to their organization (Workplace Conflict and How Businesses can Harness it to Thrive, 2008).

Group Dynamics

The results suggest that groups play a vital role in conflicts and some of the experiences shared by the participating engineering project managers were coherent with the literature. One respondent explained that engineering project managers wanted particular resources for their groups and this was the source of conflict between them, these views were expressed by Fisher (2006) explaining that groups often have conflicts to gain resources and materials for their benefit.

De Dreu and Gelfand (2008), and Condliffe (2008) reasoned that groups tend to become cohesive when threatened by negative outcomes, this was the case when groups in an organization worked together to satisfy the demands of the customer even though these were outside the scope agreed at beginning of the project. Further, respondents cited examples where groups with different ideologies and objectives tended to work together or against each other supporting the theory that groups collaborate and compete to gain maximum benefit in the whole process (Condliffe, 2008; Pruitt, 2008; Fisher, 2006).

Conflict Resolution Tools of Choice

Although most of the respondents were aware of conflict resolution techniques available to them they preferred to use collaboration and negotiation as their tools of choice. Condliffe (2008) suggested that collaboration is the best strategy when the parties involved are willing to engage in open discussions and this is also supported by Cahn *et al*., (2007) and Tillett (1999). Further Tillett (1999) and Lulofs and Cahn (2000) stated that negotiation is a part of collaboration process where the best alternative are decided and implemented between the two parties.

The findings also indicate that the use of external mediation was uncommon and most of the time the senior management from both the parties in question intervened and issues were settled, referring to arbitration and mediation as less preferred tools. This supports the findings

of the Ministry of Justice of New Zealand (2004) where arbitration is practiced in 6.9 percent and mediation is used for only 36 percent for the High Court cases.

CONCLUSION

To summarise, the factors that emerged from the data are a clear definition of conflict and a set of drivers of conflicts in engineering projects in New Zealand. The paper suggests that the destructive side of conflict is more influential than the constructive side of conflict in an engineering project setting. One of the key factors affecting conflicts and its resolution is the balance of power between the two parties. It is believed that power can either shape the conflict or help its resolution. The role of individual personalities in engineering projects was also found to be an influencing factor on conflict with individual personality issues and ego clashes act as a catalyst for conflict. Group dynamics was outlined as another critical driver, based on the different perspectives shared by the engineering project managers from industry. The nature of conflicts are wide ranging and can be interpersonal, intragroup and intergroup. The responses received concerning culture demonstrated an openness and ability to embrace different cultures and that conflict resolution is easier to achieve when conflicting parties share the same values.

The preferred tools for conflict resolution practiced on engineering projects are collaboration and negotiation, for both internal and external conflicts. This study suggest that ADR tools of arbitration and mediation are not generally practiced to resolve engineering project conflict in a New Zealand context.

The theoretical implications of the findings are that the definition of conflict and the issues of power and groups dynamics in engineering project management tie closely with the generic literature base presented. However, individual personality in engineering projects emerges is a key issue, yet the literature indicates an inability of conflict theorists in underpinning the facts related to personality. The study also has some practical implications for consideration. Research that would focus on engineering project conflict from either an internal or external perspective would be beneficial as this pilot study has considered the issue of conflict in general terms only. The study suggests that formal ADR conflict tools are used in a limited number of cases in a New Zealand context, further investigation into the reasoning behind this lack of uptake would be interesting and informative. Is it a lack of experience of ADR, is it its prohibitive cost and time requirements or other issues that drive the use of collaboration and negotiation as the chosen tools for conflict resolution in an engineering project management context? Most of respondents suggested that there is a need for organizations and projects to be responsive to cultures as culture can play a part in engineering project conflict. Different cultures should be well understood for better handling of the issues and conflict, this is another interesting area for further investigation and industry engagement.

The focus of this study has been on the experiences of a small group of practitioners within the engineering project management domain. As a pilot study the findings are interesting, however the study has some limitations. Whilst the study is transferable the findings of the current study should be approached with caution due to the limited sample size. The themes presented should be tested in a wider study to establish their generalizability, this could be locally or nationally, a comparative study would also be beneficial to establish what role the New Zealand context or other context does play. The current study was limited to subject matter experts rather than all of the project stakeholders. A wider qualitative study to examine the perspectives of all stakeholders in the engineering management domain would provide an opportunity to examine

the drivers of conflict in more detail. Further research is needed to gain a wider and deeper understanding of conflict management and its complexity in engineering projects. By undertaking further research a practical toolkit for conflict management could be formulated and validated for industry dissemination.

The research on conflict management in New Zealand engineering projects is new, very little research has been undertaken in this arena. This paper has been able to provide an initial examination of the underlying concepts of conflict and the appropriate conflict resolution tools being utilized in an engineering projects including culture, power and group dynamics.

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