

PREDICTING TOTAL QUALITY MANAGEMENT IN NEW ZEALAND: THE MODERATING EFFECT OF ORGANISATIONAL SIZE

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This paper examined the adoption of total quality management (TQM) by 228 New Zealand enterprises of all sizes, ranging from one employee to 8,800. Overall, 33% of firms in New Zealand used TQM, with an additional 5% of firms no longer using TQM. This indicates strong TQM adoption rates by current international standards. Factors tested to predict TQM adoption were organisational size, workplace autonomy, performance standards, use of teams and group problem solving. All these direct effects were supported. Further, the interacting effect of organisational size on these factors and TQM adoption was tested, with all effects significantly interacted by organisational size. When workplace autonomy, performance standards, use of teams and group problem solving factors were high for larger firms, they were all more likely to adopt TQM than larger firms with low values for these predictor factors. As a result, strong support was found for the interacting effect of organisational size. The implications for organisations and future research are discussed.

Keywords: Total Quality Management, workplace autonomy, performance standards, teams, group problem solving, organisational size, interaction effects.

The strategic approach to quality management is not a new phenomenon (Leonard & McAdam, 2004). Tan, Kannan, Handfield and Ghosh (2000) stated that total quality management (TQM) forms strategy through providing the characteristics for responding to economic trends and impacts. Leonard and McAdam (2004) maintained that TQM could be integrated with strategic planning and with strategic architecture. Consequently, the links between TQM and organisational strategy are well established. As a result, Harber, Burgess and Barclay (1993) maintained that TQM has moved beyond being an important operational-level element, to being a vital strategy for all organisational aspects and disciplines. Thus, organisational adoption of TQM has become an acceptable business practice linked to the overall strategic ideal of performance maximisation.

A major driver of TQM adoption has been changes associated with globalisation. These factors include intense competition, expanding international trade, removal of trade protection, deregulation, labour reforms, and rapid technological changes (Hatzichronoglou, 1999; World Trade Organization, 2000). For instance, in the Pacific Rim context, leading New Zealand and Australian firms have entered each other's markets in attempts to gain greater market growth through exploiting markets within a close geographical location. In response to these factors, Foley, Barton, Busted, Hulbert and Sprouster (1997) contended that firms have responded by using quality-based strategies, as these are associated with gains in productivity and profitability, and can provide a competitive advantage (Crosby, 1979; Deming, 1986). Consequently, firms may take quality and performance standards in one country and replicate these in additional markets. Other authors have supported the notion that TQM has been embraced due to the globalisation of industries (Vecchio, Hearn & Southey, 1996; Harte & Dale, 1995). Given that New Zealand firms operate in a global market, with similar changes factoring on their competitive environment, the exploration of TQM strategy in New Zealand is warranted.

1 TOTAL QUALITY MANAGEMENT

TQM involves an organisational commitment to continuous improvements and meeting the needs of the customer (Schermerhorn, 1996). Hill and Wilkinson (1995) stated TQM has three central principles of customer orientation, process orientation and continuous improvement. It is the interaction of these factors with a strategic focus on quality that can make TQM a major influencer on a firm's performance. Baron and Kreps (1999) noted that TQM is a philosophy and style of management, in which management, workers and suppliers focus together on quality, and where defects are never tolerated. As such, the fundamental performance of a firm can be enhanced through lowering production costs, and providing exceptional customer service. Terziovski, Sohal, and Moss (1999) stated that TQM has been a fundamental business strategy of the world's leading organisations throughout the 1980s and will continue to be a major competitive advantage in the future. The financial benefits for firms associated with a quality strategy have also been extolled, and this in turn suggests a strong link with competitive advantage. In the New Zealand context, Maani, Putteril, and Sluti (1994) found manufacturing companies gained greater productivity and performance benefits from TQM, which in turn, encouraged adoption.

Many employer, employee, and customer benefits have been associated with TQM. Easton and Jarrell (1998) cited cost reductions, greater employee and customer satisfaction, and improved financial performance. Singh and Smith (2004) noted that elements of TQM and innovation are similar, for example, continuous improvement is a key concept of both. Thus, TQM may play a role in innovative industries and firms. Given the important role that TQM strategy can play in organisations, especially those operating in a continually globalised marketplace, this paper explores the characteristics of New Zealand firms with a TQM strategy to gain a greater understanding of the types of firms implementing a strategic approach to quality.

Within the New Zealand context, there are a number of different opinions regarding why TQM is being embraced, and the extent of this embrace. For example, Balasoglou (1995) contended that TQM, along with the National government's Employment Contracts Act 1991, should be the catalyst for solving all of New Zealand's business problems. Fowler (1996) stated New Zealand was one of the world's most dynamic economies, with many firms adopting new management philosophies. Thus, we'd expect TQM adoption to be an accepted business practice. However, Fowler (1996) found TQM adoption in New Zealand was still relatively new in the mid-1990s, with the majority of firms adopting TQM within the past one to four years. This is supported by Humphries (1998), who contended that some New Zealand managers were only just discovering TQM in the early 1990s. As a result, the adoption of TQM as a strategy for innovation and competitive advantages appears to lag behind other industrial nations.

While many critics contend the worldwide adoption rates of TQM are in decline (e.g. Ismail & Hashmi, 1999), adoption rates have been found to be still high in New Zealand. For example, Gilson, Wagar, and Brown (2002), in a study of New Zealand firms with 50 or more employees, found TQM adoption rates of 61%. This means exploring TQM is not belated given the late adoption timeframe in New Zealand, and instead presents an opportunity for researchers. Further, Lee and Palmer (1999) noted that the majority of studies of TQM in New Zealand are case studies, or of small data sets, hence a larger study of New Zealand firms may provide greater insight into TQM strategy in New Zealand. As such, exploring firm adoption of TQM in a wide range of New Zealand firms appears worthwhile to understand why a firm adopt TQM. Compared to international firms, the lag in New Zealand firms adopting TQM is important, because if TQM is still relatively an emerging business practice, there may be both established and unique aspects in New Zealand to understand. The next section outlines hypotheses to better understand TQM adoption in New Zealand.

2 HYPOTHESES

The present study also explores the role of organisational size in TQM adoption, and takes a two-prong approach. Firstly, we hypothesise direct relationship between organisational size and TQM adoption, and then we also explore the interacting effects organisational size may have on the other hypotheses noted above. In a longitudinal study of Australian firms, Terziovski et al. (1999) concluded that larger companies with many employees were more inclined to have TQM programs. Mann and Kehoe (1995) also found a strong relationship between TQM adoption and employee numbers. They also found high gross sales were associated with TQM adoption and that TQM practices were used significantly less by firms with small sales revenues. Ismail and Hashmi (1999) also support the link between firm size and TQM adoption, having found smaller organisations were less likely to adopt TQM.

Further, Edwards, Collinson and Rees (1998) reported British TQM adoption rates around 75% for large firms, which are similar to those of Mohrman, Tenkasi, Lawler and Ledford (1995) with regard to the largest 1000 US firms. One reason is that larger organisations have greater financial resources available for implementing TQM. Further, larger organisations are also more likely to face greater institutional pressures for adoption, and this implies that organisational practices such as TQM attain legitimacy through the social construction of reality (Wright and McMahan, 1992). These influences may come from the state, society and inter-firm relations (Oliver, 1997). For example, a competitor winning an award for quality may trigger an institutional response to adopt TQM in competitors. Further, with institutional theory, organisations need to demonstrate conformity to institutionalised expectations of rational practice (e.g. a quality focus), and as such, this behaviour may influence a firm's choice of action (Gupta, Dirsith, and Fogarty, 1994), such as what type of strategy to adopt. Given strong support in the literature, we hypothesise that firm size will predict TQM adoption. *Hypothesis 1: Larger sized firms will have higher adoption rates of TQM.*

Lin, Madu and Kuei (1999) found that organisations likely to have a TQM program would have a different organisational climate than those not oriented towards quality. They found organisations orientated towards TQM would let employees make their own decisions. Ambroz (2004) suggested that autonomous workplaces will allow employees to have a greater belief in TQM, thus aiding its adoption. This author found significant links between a quality focus and autonomy. Further, Mersha (1997) found employee involvement an important predictor of TQM adoption. Thus, organisational cultures with higher employee autonomy should be linked with TQM adoption. Since autonomy has long been associated with employee empowerment (Hackman, 1987), we hypothesise that TQM will foster a climate of autonomy as TQM drives continual improvement, so that employees may have the independence and discretion to improve whenever possible. *Hypothesis 2: Firms with higher workplace autonomy will have higher adoption rates of TQM.*

Prajogo and Brown (2004) noted that while there are many links between TQM adoption and performance measures, there is still some confusion, stating "Despite the positive relationships between quality and performance, there is still a lack of clarity on how TQM should be implemented in organizations" (p. 31). However, Nyhan and Marlowe (1995) suggested that measuring performance and TQM are strongly linked, with TQM benefiting the development and operation of performance measures. Further, in the United Kingdom, the government maintained that performance measurement is a fundamental building block of TQM (U.K. Department of Trade and Industry, 2005). Consequently, there is support for a link between performance standards and TQM adoption. Boudreaux (1994) noted that TQM requires performance standards to ensure managers have standards to describe how well performance is achieved. As such, we'd expect firms with clearer performance standards to be more likely to adopt TQM than firms with ambiguous performance standards. *Hypothesis 3: Firms with clearer performance standards will have higher adoption rates of TQM.*

Given that TQM involves continual processes of employee involvement (Hill and Wilkinson, 1995; Schermerhorn, 1996), it is envisaged that firms adopting a TQM strategy will be more likely to

provide work situations involving team work, and related to teamwork, greater use of group problem solving. Boudreaux (1994) noted that TQM and teams are growing influences in modern organisations, and Keck (1996) found TQM teams to be successfully implemented within the US Government. Similarly, Ambroz (2004) found strong links between TQM and teams. The creation, use and success of TQM teams have been well noted in the literature (e.g. Richard, 2000; Milas, 1996). In addition, the links between problem solving and TQM adoption have been noted (Lawrence, 1996). Indeed, Sohal and Morrison (1995) wondered if there was any difference between the TQM philosophy and organisational learning. Consequently, we argue that employers who regularly create teams in their workplace, and who provide training in group problem solving, are more likely to be aligned with the fundamental goals of TQM through continuous involvement and refinement of quality processes. Therefore, we hypothesise that firms that provide greater teamwork opportunities and training in group problem solving will be more inclined to adopt TQM. *Hypothesis 4: Firms with higher use of teams will have higher adoption rates of TQM. Hypothesis 5: Firms with higher group problem solving will have higher adoption rates of TQM.*

As mentioned above, the present study explores the interacting effects of organisational size on the direct relationships hypothesised above. This is because organisational size appears to play a fundamental role in TQM adoption. Given the links between organisational size, income, and TQM adoption (Mann & Kehoe, 1995), testing the interaction effects are warranted. The rationale for this approach is that larger organisations may have greater financial resources to implement factors that contribute to TQM adoption. For example, larger firms may have greater resources to operate more autonomous workplaces, require clearer performance standards, use teams more often and provide training of group problem solving opportunities for employees. These leads to the last set of hypotheses, which build on the direct relationships outlined above. *Hypothesis 6: Organisational size will interact with TQM adoption and workforce autonomy, with larger firms being more likely to be autonomous and adopt TQM. Hypothesis 7: Organisational size will interact with TQM adoption and performance standards, with larger firms being more likely to have clearer performance standards and adopt TQM. Hypothesis 8: Organisational size will interact with TQM adoption and use of teams, with larger firms being more likely to encourage teamwork and adopt TQM. Hypothesis 9: Organisational size will interact with TQM adoption and group problem solving, with larger firms being more likely to train employees in group problem solving and adopt TQM.*

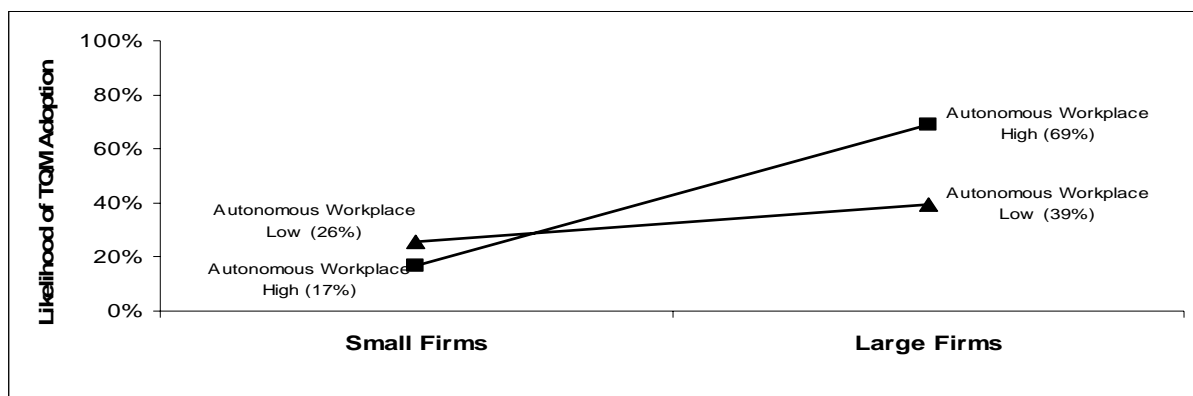
3 METHOD

Data were collected from a mail survey of 997 randomly assigned New Zealand companies, drawn from the Kompass New Zealand company list. The survey was conducted in late 2001. CEO's or HR Managers were surveyed regarding TQM adoption, workplace characteristics, and organisational characteristics (number of employees, annual turnover etc.). In total, 229 responses were returned. However, one respondent failed to respond to the TQM adoption question and was removed from the study. As a consequent, a total of 228 surveys were used in this analysis (a response rate of 22.9%). Overall, respondents ranged from two single owner firms to one enterprise with 8800 employees. On average, respondents employed 146 people (SD=660) and had an average turnover rate of 8.5%. Measures used: TQM Adoption (coded 1=yes, 0=no); Organisational Size - log transformed to induce normality; Workplace Autonomy, 3-items coded 1=to a small extent, 5=to a great extent, Cronbach's alpha of .74; Performance Standards, 4-items coded 1=strongly disagree, 5=strongly agree, Cronbach's alpha of .68; Use of Teams, coded 1=strongly disagree, 5=strongly agree; Group Problem Solving (coded 1=yes, 0=no). Control variables were: Turnover Rate, % of Managers and Females, and Repetitive Workplace, coded 1=to a small extent; 5=to a great extent. To examine the direct effects of predictors of TQM adoption (Hypotheses 1 to 5), and the potential moderating effects of organisational size (Hypotheses 6 to 9), separate hierarchical regression analysis were conducted. Control variables (turnover rate, % managers, % femalses, and repetitive workforce) were entered in Step 1. Predictor variables were added separately in Step 2. The potential moderator (organisational size) was entered in Step 3, and both interaction effects (predictor multiplied by moderator) were

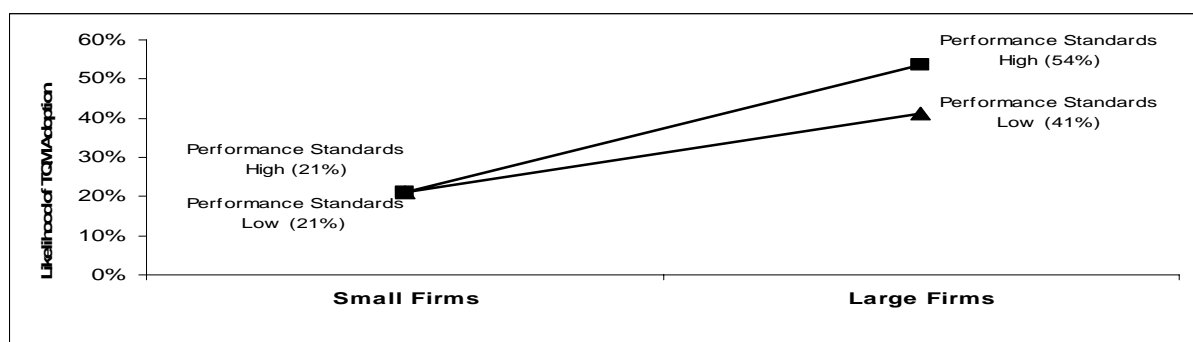
entered in Step 4. Following Aiken and West's (1991) recommendation, the centring procedure was used where interaction variables are z-scored.

4 RESULTS

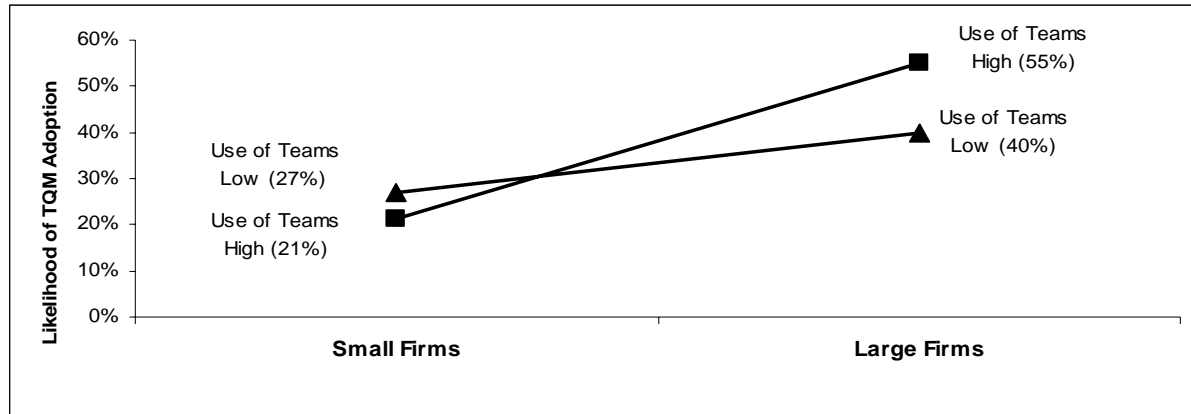
The mail survey response indicated 33% of New Zealand organisations had a TQM strategy, with an additional 5% indicating they had had a TQM strategy but it was no longer in effect. Results of the regressions for Hypotheses 1 to 5 (tables to shown) shows that all the direct effects are significant as hypothesised. Organisational size is significantly associated with TQM adoption ($\beta = 1.24$, $p < .001$), as is autonomous workplace ($\beta = .51$, $p < .01$), performance standards ($\beta = .38$, $p < .05$), use of teams ($\beta = .24$, $p < .1$), and group problem solving ($\beta = .34$, $p < .05$). These findings support Hypotheses 1 to 5. All the regression models were significant (all had chi-square scores $p < .001$), and all had adequate R squared values (Cox & Snell R-Square $> .14$, and Nagelkerke R-Square $> .20$). In addition, all the interaction effects of organisational size were also supported. Organisational size had a significant interaction effect on workplace autonomy and TQM adoption ($\beta = .53$, $p < .01$), as well as on performance standards ($\beta = .63$, $p < .01$), use of teams ($\beta = .56$, $p < .01$), and group problem solving ($\beta = .31$, $p < .1$). These effects support Hypotheses 6 to 9. Plotting the interaction terms (below) illustrates that when firms are small in size, there is only a minor difference between TQM adoption rates when workplace autonomy is low (less than 10%). However, when firm sizes are large, there are markedly different levels likelihood of TQM adoption, with larger firms almost twice as likely to adopt TQM when they have high workplace autonomy compared to larger firms with low workplace autonomy (69% versus 39%).



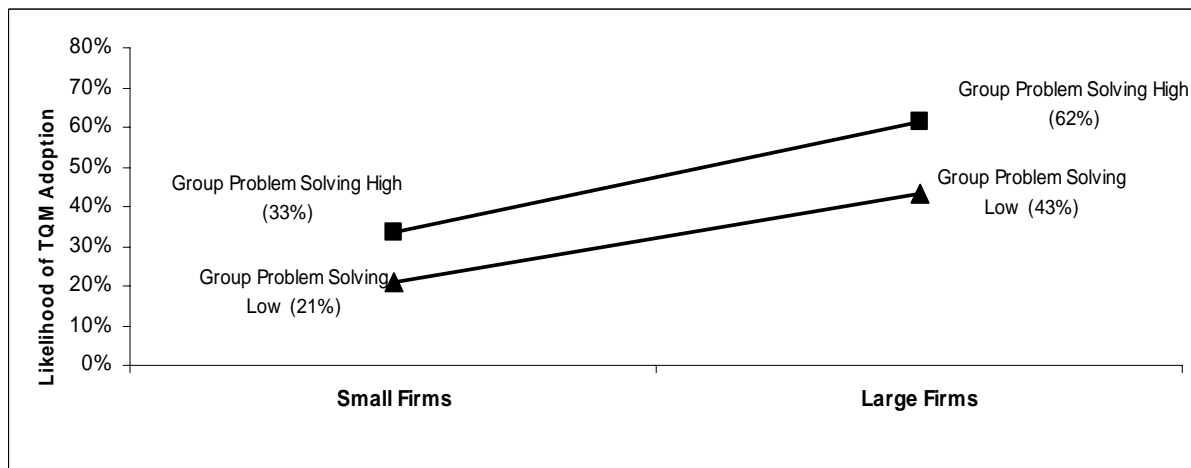
Plotting the interaction terms (Figure 2, left) illustrates that when firms are small in size, there is no difference between TQM adoption rates irrespective of performance standards being low or high (both 21%). However, when firm sizes are large, there are distinctly different levels regarding likelihood of TQM adoption, with larger firms with high performance standards reporting a 54% likelihood of adopting TQM compared to 41% for larger firms with low performance standards.



Plotting the interaction terms (below) illustrates that when firms are small in size, there is only a minor difference between TQM adoption rates when use of teams are low or high (less than 7%). However, when firm sizes are large, there are noticeably different levels regarding likelihood of TQM adoption, with larger firms with high use of teams reporting a 55% likelihood of adopting TQM compared to 40% for larger firms with low use of teams.



Plotting the interaction terms (below) illustrates that when firms are small in size, there is only a difference between TQM adoption rates when group problem solving are low or high (a 12% difference). This indicates that small firms who don't provide any training in group problem solving are 12% less likely to have TQM. Further, when firm sizes are large, there are also noticeably different levels regarding likelihood of TQM adoption, with larger firms with group problem solving reporting a 62% likelihood of adopting TQM compared to 43% for larger firms with no group problem solving.



5 DISCUSSION

This study aimed to provide an insight into firm adoption of a TQM strategy in New Zealand. An interesting finding was the level of TQM adoption at 33%. The adoption rate is higher than those offered by Ismail and Hashmi (1999), especially with regard to United Kingdom data (15-20%), but this may indicate that an international comparative analysis is limited with regard to adoption rates given variability of methodologies utilised. Notably, this figure is much lower than the 61% reported by Gilson, Wagar, and Brown (2002). This might be explained by sample size in the studies. Gilson, Wagar, and Brown (2002) study included many larger organisations than sampled here with a

minimum threshold of 50 employees, unlike the present study, where New Zealand firms of all sizes were sampled. Given the present study had data from a range of organisation sizes (ranging from one employee to 8,800 employees), we are confident a more representative sample of New Zealand firms is covered in this study. This also indicates that TQM adoption rates are more popular in New Zealand than in other countries like the United Kingdom.

A number of factors were explored as predictors of TQM adoption, and these were all supported. Organisational size was supported and indicates that larger firms appear to have the resources to adopt TQM, and this is very consistent with the literature. However, more unique factors were explored in the present study that sought to link organisational characteristics with philosophical aspects of TQM, which might suggest the right conditions are apparent for TQM adoption. These included workplace autonomy and performance standards. These factors show that workplaces that allow employee's more input into the decision making process and allow them to make decisions on their own, and also provide managers with clearer and more accurate forms of performance standards, are more to adopt TQM. These factors tie in with TQM because allowing employees more autonomy means that minor changes and modifications to productivity can be made without requiring supervisory clearance, which would suggest more trust in employees towards making quality a natural and continuous process within the firm. Further, accurate performance measures allow managers to pinpoint areas of concern to ensure quality is achieved at all levels in the organisation, and by all organisational members.

Exploring the organisational environment further, support was also found for greater use of teams and training in group problem solving as determinants of TQM adoption. Again, these findings indicate a culture where employees work together and solve problems together, which reiterates the TQM philosophy where management, workers and suppliers focus together on quality (Baron & Kreps, 1999), and there is a process orientation and focus on continuous improvement (Hill & Wilkinson, 1995). A further development of the present study was the exploration of organisational size as a moderator, which in effect, suggested that larger firms would be more able (e.g. through financial resources) to leverage the factors explored above (autonomy, performance standards etc.) and thus be more likely to adopt TQM. Universal support for this effect was found. Consequently, larger firms with higher workplace autonomy, clearer performance standards, greater use of teams, or those providing group problem solving, were all more likely to adopt TQM than larger firms not using these factors as much, and more than any smaller firm. The greatest difference was in workplace autonomy, where larger firms with high workplace autonomy had a 69% likelihood of TQM adoption, compared to just 39% for larger firms with low workplace autonomy (a 30% difference). While the other factors were all significantly different for larger firms, the differences were more modest at 13% difference between high and low performance standards in larger firms, 15% difference between high and low use of teams in larger firms, and finally 19% difference between training employees in group problem solving or not in larger firms. Consequently, organisational size intensifies the likelihood that firms will adopt TQM for the factors explored in this study.

In conclusion, the aim of this paper was to examine the adoption of TQM strategy in New Zealand firms. With a 33% adoption rate, there appears to be many New Zealand firms who still perceive competitive advantages to having a focus on quality. The importance of this paper was in exploring new predictors of TQM adoption and identifying the major role that organisational size plays in TQM adoption in New Zealand. It is worth noting that New Zealand does have a predominance of smaller sized firms, thus these findings may be related to the context of New Zealand. The moderation effects based on organisational size may provide us with a greater understanding of how TQM adoption can be influenced by firm size in a small country like New Zealand. Only further study will confirm the role that organisational size plays in TQM adoption. Overall, the results here indicate unique aspects operating within the New Zealand context, which makes examination of TQM in New Zealand worthy of more attention.

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