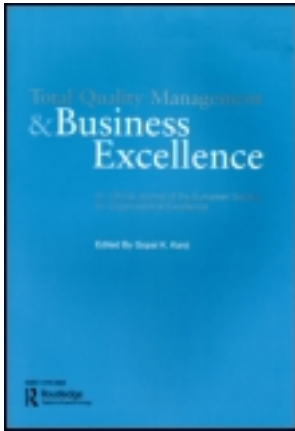


This article was downloaded by: [Universitat Jaume I]

On: 15 July 2013, At: 01:51

Publisher: Routledge

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



## Total Quality Management & Business Excellence

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/ctqm20>

### Does quality management drive labour flexibility?

Ana Belén Escrig-Tena<sup>a</sup>, Juan Carlos Bou-Llusar<sup>a</sup>, Vicente Roca-Puig<sup>a</sup> & Inmaculada Beltrán-Martín<sup>a</sup>

<sup>a</sup> Departamento de Administración de Empresas y Marketing, Universitat Jaume I, Av. Sos Baynat, s/n, 12071, Castellón, Spain  
Published online: 31 Jan 2012.

To cite this article: Ana Beln Escrig-Tena , Juan Carlos Bou-Llusar , Vicente Roca-Puig & Inmaculada Beltrn-Martn (2012) Does quality management drive labour flexibility?, Total Quality Management & Business Excellence, 23:2, 159-176, DOI: [10.1080/14783363.2012.647845](https://doi.org/10.1080/14783363.2012.647845)

To link to this article: <http://dx.doi.org/10.1080/14783363.2012.647845>

PLEASE SCROLL DOWN FOR ARTICLE

Taylor & Francis makes every effort to ensure the accuracy of all the information (the "Content") contained in the publications on our platform. However, Taylor & Francis, our agents, and our licensors make no representations or warranties whatsoever as to the accuracy, completeness, or suitability for any purpose of the Content. Any opinions and views expressed in this publication are the opinions and views of the authors, and are not the views of or endorsed by Taylor & Francis. The accuracy of the Content should not be relied upon and should be independently verified with primary sources of information. Taylor and Francis shall not be liable for any losses, actions, claims, proceedings, demands, costs, expenses, damages, and other liabilities whatsoever or howsoever caused arising directly or indirectly in connection with, in relation to or arising out of the use of the Content.

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden. Terms & Conditions of access and use can be found at <http://www.tandfonline.com/page/terms-and-conditions>

## Does quality management drive labour flexibility?

Ana Belén Escrig-Tena\*, Juan Carlos Bou-Llusar, Vicente Roca-Puig and Inmaculada Beltrán-Martín

*Departamento de Administración de Empresas y Marketing, Universitat Jaume I, Av. Sos Baynat, s/n, 12071 Castellón, Spain*

This study aims to shed light on the contribution of quality management (QM) to labour flexibility by analysing the influence that QM has on internal and external labour flexibility. The study presents pioneer research in the empirical analysis of how QM impacts on labour flexibility. The hypotheses put forward are tested in an empirical study carried out on a sample of Spanish service companies. Structural equation modelling was used to analyse the data. The results indicate that QM is shown to have a positive effect on internal flexibility, as it promotes training or job enrichment. However, QM fosters job security with a negative effect on external flexibility.

**Keywords:** quality management; labour flexibility; internal flexibility; external flexibility; structural equations models

### Introduction

Quality management (QM) is a widely recognised means of pursuing higher performance and greater competitiveness (Nair, 2006; Zairi & Alsughayir, 2011). However, some authors argue that this is accomplished by reinforcing stability and encouraging a structured organisational environment based on control (Hackman & Wageman, 1995; Soltani, Lai, Javadeen, & Gholipour, 2008). Consequently, QM would hinder employee flexibility. This argument is especially important in the current competitive environment characterised by greater international competition, fast-changing technologies and more volatile and segmented markets, in which sustainable competitive advantage based on greater labour flexibility is required (Roca, Beltrán, Bou & Escrig, 2008).

This increasing interest in labour flexibility has given rise to a research stream that suggests the existence of two types of labour flexibility: internal and external (Atkinson, 1984; Cappelli & Neumark, 2004; Martínez, Vela, Pérez, & de Luis, 2011). These two labour flexibility approaches are conceptually different. While internal labour flexibility involves modifications to the internal labour market (or work organisation) and focuses on the human capital already present in the company, external labour flexibility is based on the market, and flexibility comes from the external movement of workers.

The existence of two types of labour flexibility may help to explain the conflicting arguments put forward in previous literature on the relationship between QM and labour flexibility. On the one hand, Hackman and Wageman (1995) or Soltani et al. (2008) argue that QM is a means of tightening managerial control over the workforce, suggesting that QM can hinder labour flexibility. On the other hand, studies such as

---

\*Corresponding author. Email: [escrigt@emp.uji.es](mailto:escrigt@emp.uji.es)

Martínez, Pérez, Vela, and de Luis (2008) consider QM to be one of various work practices that can enhance workplace flexibility. The introduction of QM implies the use of certain human resource practices that have traditionally been linked to this type of flexibility.

Taking into account these *a priori* opposed views, the aim of this paper is to shed light on the relationship between QM and labour flexibility by analysing the influence that introducing QM might have on internal and external labour flexibility. We suggest that the effects of QM on flexibility may differ according to the type of flexibility. Some previous research has found evidence for a positive relationship between QM and flexibility, by analysing flexibility as an operational result (Merino, 2003), or as strategic flexibility (Gómez & Verdú, 2005). However, no previous work has attempted to show the relationship between QM and the two types of labour flexibility.

The rest of the study is structured as follows. First we present the theoretical arguments that enable us to defend the relationship between QM and internal and external flexibility, respectively. Structural equation modelling (SEM) is then adopted to test the hypotheses derived from the preceding discussion. Finally, the most important results and conclusions from the analysis of the hypotheses are presented.

## Literature review

To explore the influence of QM on labour flexibility we turned to the competence-based perspective literature (Heene & Sanchez, 1997). From this perspective, according to Winter (1994, p. 93) or Grant (1995), QM is considered an important inter-functional competency capable of generating a set of routines and some performance standards within the organisation. By applying a particular collection of problem-solving heuristics and organisational practices, QM could contribute to enhance labour flexibility. Similarly, labour flexibility is understood as the company's capability to match its human resources and work organisation to the changing environmental conditions (Atkinson, 1984; Valverde, Tregaskis, & Brewster, 2000). In the following subsections we introduce the types of labour flexibility and explain how they are related to QM.

### *Labour flexibility and enabling elements*

Previous literature has essentially focused on two types of labour flexibility (Atkinson, 1984; Bacon & Blyton, 2001; Kalleberg, 2001; Cappelli & Neumark, 2004; McIlroy, Marginson, & Regalia, 2004; Martínez et al., 2011)<sup>1</sup>: internal and external flexibility.

Following Martínez et al. (2011), different types of internal labour flexibility could be described as *functional flexibility* or *working time flexibility*. Functional flexibility is understood as the versatility of employees to adapt their efforts and tasks to the demands of the company. Functionally flexible employees are polyvalent, with a wide repertoire of competences (Riley & Lockwood, 1997; Van den Berg & Van der Velde, 2005). Although there are other ways of achieving internal flexibility, some authors (Looise, van Riemsdijk, & Lange, 1998; Michie & Sheehan, 2001 or Zhou, Dekker, & Kleinknecht, 2011) link the concept of internal labour flexibility to the idea of functional flexibility. This is the approach we take in this paper, and hereafter, we refer to internal flexibility as functional flexibility. Cordery, Sevastos, Mueller and Parker (1993); Riley and Lockwood (1997); Friedrich, Kabst, Weber and Rodehuth (1998), or Van den Berg and Van der Velde (2005) report that functional flexibility can be fostered through aspects such as job enlargement, job enrichment, job rotation, training programmes and work groups. Whichever aspects the company chooses, their aim will be to increase

employees' skill repertoires so that they acquire the capacity to carry out a large number of tasks and to work across traditionally distinct occupational boundaries.

External flexibility is defined as the company's ability to adjust the size of its workforce to deal with fluctuations in demand through the external movement of workers (Atkinson, 1984; Martínez et al., 2011). This type of flexibility involves changes in the job relation, moving away from the fulltime, permanent job, and using hiring to bring in new skills as needed, and layoff to eliminate redundant or obsolete skills. Short-term relationships between the organisation and its workers are thus favoured, and job security is practically non-existent.

### *QM as an enabler of labour flexibility*

Some studies (Dean & Bowen, 1994; Douglas & Judge, 2001; Sila & Ebrahimpour, 2005; Zairi & Alsughayir, 2011) focus attention on identifying a series of dimensions that draw together a set of practices which allow QM to be introduced into the organisation. Although no consensus has been reached on exactly what these dimensions are, common denominators are found, and all the contributions reiterate the same aspects, which Douglas and Judge (2001) summarised in the following practices: focus on the customer, continuous improvement of processes, top management team involvement, adoption of a quality philosophy, emphasis on QM-oriented training, management by fact and use of QM methods. Moreover, QM is made up of essentially interdependent dimensions (Hackman & Wageman, 1995; Sun, 1999; Yong & Wilkinson, 2001; Rahman, 2004). The capacity of QM to generate long-lasting changes and create value lies in the combination of all its elements and, as a consequence, the above-mentioned practices are interrelated, and mutually support each other.

### *QM and internal labour flexibility*

A company that is in the process of introducing QM should pay particular attention to the design of its human resource strategies to ensure that they promote quality-oriented attitudes and behaviours in employees in order to improve performance (Wilkinson, Redman, Snape, & Marchington, 1998; Soltani, Gennard, & Williams, 2004; Ooi, Arumugam, Safa, & Bakar, 2007; Akdere, 2009). To achieve this, QM emphasises *training*, and encourages a *job design* characterised by limited job specialisation, employee participation and interdepartmental work teams. Through the promotion of these practices QM enables the workforce's repertoire of skills and abilities to expand, thereby improving its polyvalence and versatility.

Brown (1994) suggests that possibly the greatest benefit of *training* arising from the introduction of QM is that it covers a wide range of knowledge, going beyond the skills associated with a defined job. QM training programmes normally cover all dimensions of QM: management skills such as leadership and team building; team leader skills; tools and techniques such as statistical process control, problem solving technologies or quality measurement systems; and a customer-oriented culture change (Brown, 1994; Snape, Wilkinson, Marchington, & Redman, 1995; Yong & Wilkinson, 1999). Therefore, QM can improve employees' competencies and advance the skills necessary to develop a diverse range of tasks, thereby improving functional flexibility. As Edwards and Sohal (2003) point out, a new training model designed to extend employees' skills will enable traditional job demarcation lines to be broken down and lead to greater employee flexibility.

With regard to the *design of jobs*, QM encourages involvement and participation in diverse organisational processes (Wilkinson, Godfrey, & Marchington, 1997; Ooi et al.,

2007; Prajogo & Cooper, 2010). More specifically, workers can increase their skill variety (Victor, Boynton, & Stephens-Jahng, 2000; Taveira, James, Karsh, & Sainfort, 2003) through their participation in goal setting, and the development of quality-improvement tasks, such as measuring customer needs, or using methods of information analysis that inform employees about work process performance and enable them to put improvement plans into practice. Likewise, the sort of work teams set up to introduce QM can also foster labour flexibility. This kind of teams, created to supervise their own work or to solve problems, grant the organisation a high degree of functional flexibility since individuals take on wider responsibilities in aspects such as quality control. Moreover, these teams provide workers with opportunities to learn by exchanging their skills and experiences in team meetings (Bacon & Blyton, 2001; Edwards & Sohal, 2003).

As Cordery et al. (1993) and Friedrich et al. (1998) suggest, these job enrichment activities increase the skill repertoire of employees and consequently, their functional flexibility. Furthermore, these activities can foster employee functional flexibility through motivation, since enriched jobs may lead to a more satisfied workforce that is more willing to be flexible (Van den Berg & Van der Velde, 2005). The above arguments lead us to our first hypothesis:

*H1: QM has a positive relationship with internal flexibility.*

#### *QM and external labour flexibility*

The very nature of QM is at odds with high personnel turnover, due to the loss of skills and knowledge, continuous lack of experience and low performance of training that a high turnover rate entails (Edwards & Sohal, 2003). QM aspires to win employees' long-term commitment by fostering job security (Schuler & Jackson, 1987; Psychogios, 2010). If employees do not feel secure in their jobs, they may not take risks to make improvements.

Moreover, firms with a QM-based strategy use a high percentage of high commitment practices (Wilkinson et al., 1998; Michie & Sheehan, 2001; Bou & Beltran, 2005; Ooi et al., 2007; Bayo, Merino, Escamilla, & Selvam, 2011). Appelbaum, Bailey, Berg and Kalleberg (2000) indicate that high commitment practices improve workers' job conditions, including job security.

All these arguments lead us to consider that companies committed to QM will be less likely to use practices based on external flexibility. This notion is justified once the assumption has been made that the basic premises and principles of QM reject the type of practices associated with external flexibility, since they may be counterproductive if their use creates an obstacle to the company's commitment to hire, develop and retain the most skilled employees (Appelbaum et al., 2000). According to Looise et al. (1998), a unilateral choice for external flexibility creates high risks in terms of employee performance, product quality, co-operation between fixed and temporary workers, lack of commitment and motivation. The above reasoning leads us to our second hypothesis:

*H2: QM has a negative relationship with external flexibility.*

## **Methodology**

### ***Sample***

The data required to test these hypotheses were obtained from a sample of service companies taken from the information provided by the Spanish national ARDAN database.

ARDAN is an information service that provides access to a database of more than 100,000 firms in Spain. The research was completed in service sectors, which were chosen according to their SIC code (SIC 70 to SIC 89). The service sector provides an appropriate field to study labour flexibility due to the high levels of variability and heterogeneity that characterise services. In addition, certain studies such as that of Friedrich et al. (1998) have observed different trends in manufacturing and service sectors with regard to functional and external flexibility. By limiting our analysis to service sectors we are able to avoid confounding influences.

We selected medium-sized and large firms according to European Union criteria (Recommendation of the European Commission 2003/361/EC), that is, firms with 50 workers or more. Firms were selected according to the number of employees reported in the ARDAN database.

The fieldwork was carried out during January and February 2006 by means of a structured questionnaire that was administered to members of top management in each organisation. The items were measured according to the managers' evaluations using a seven-point Likert scale, where 1 represented a very low score and 7 a very high one. 237 complete questionnaires were used in our empirical research. The average number of employees per firm for the whole sample was 859.6 (S.D. = 3102.3). According to ARDAN the population comprised 1373 firms, which considering a confidence level of 95% and in the worst-case scenario ( $p = q = 50\%$ ), implies a sample error of  $\pm 5.8\%$  for the overall sample.

### Measures

Following Douglas and Judge (2001) we operationalise QM as a multidimensional construct made up of seven dimensions that capture the domain of QM (Table 1). To measure QM dimensions, items proposed by Douglas and Judge (2001) were chosen, since these items gather common elements of QM, and were designed for research in the service sector. Taking into account the interdependence between the dimensions we estimate a first order factor that depicts the relationship between all the QM dimensions. In order to reduce the number of parameters to be estimated and to lower the complexity of the model, we decided to use the formation of composite variables (Landis, Bela, & Tesluk, 2000). Thus, to measure each of the individual dimensions of QM, we considered a single indicator derived from averaging all the items initially used to measure each dimension.

To measure *internal flexibility* we adopted the approach of Volberda (1998) and Verdú (2002), which aims to evaluate the extent to which workers are able to move between jobs and tasks. Following this approach, we evaluated internal flexibility with an indicator used by Hoque (1999) to measure workforce skill in moving between tasks and jobs. For *external flexibility*, following Cappelli and Neumark (2004), we analyse external flexibility as the result of the external churning of employees. We measured external churning through behaviours that generate insecurity in the attachment of workers to the firm. Other papers such as Bacon and Blyton (2001) analyse external flexibility as a form of job insecurity. We used three items that represent whether or not the firm used permanent contracts and employee layoff (Table 1).

Figure 1 presents the model proposed and reflects the way each latent variable was measured.

### Statistical procedure

The estimation of the proposed causal relationships was carried out using SEM. Several features of SEM make it a suitable methodology in our study, since it allows for the

Table 1. Indicators used to measure each factor.

## QM

*Customer orientation (V1)*,  $\alpha = 0.734$ , c.r. = 0.759

Employees know who their customers are

Employees attempt to measure their *internal* customers' needs (customers inside this organisation)

Employees attempt to measure their *external* customers' needs (customers outside this organisation)

The organisation uses customer requirements as the basis for quality

Our organisation is more customer-focused than our competitors (\*)

*Continuous improvement (V2)*,  $\alpha = 0.820$ , c.r. = 0.822

Employees in the organisation try to improve the quality of their service

Employees in the organisation believe that quality improvement is their responsibility

Employees in the organisation analyse their work products to look for ways of doing a better job

*Emphasis on QM-oriented training (V3)*,  $\alpha = 0.890$ , c.r. = 0.892

Quality-related training is given to hourly employees throughout the organisation

Quality-related training is given to managers and supervisors throughout the organisation

Training is given in the 'quality concept' (i.e. philosophy of company-wide responsibility for quality) throughout the organisation

Training is given in the basic statistical techniques (such as histograms and control charts) in the organisation as a whole (\*)

The organisation's top management is committed to employee training for quality

Resources are provided for employee training in quality

*Top management team involvement (V4)*,  $\alpha = 0.892$ , c.r. = 0.894

The top executive assumes responsibility for quality performance

The major department heads participate in the quality improvement process

The organisation's top management has objectives for quality performance

The goal-setting process for quality within the organisation is comprehensive

Importance is attached to quality by the organisation's top management in relation to cost objectives (\*)

Quality issues are reviewed in the organisation's top management meetings

*Quality philosophy (V5)*,  $\alpha = 0.797$ , c.r. = 0.808

There is a strong commitment to quality at all levels of this organisation

People in this organisation are aware of its overall mission

Members of this organisation show concern for the need for quality

Continuous quality improvement is an important goal of this organisation

Managers here try to plan ahead for changes that might affect our performance

*Management by fact (V6)*,  $\alpha = 0.929$ , c.r. = 0.932

Quality data (defects, complaints, outcomes, time, satisfaction, etc.) are available

Quality data are timely

Quality data are used as tools to manage quality

Quality data are available to managers and supervisors

Quality data are available to hourly workers (\*)

Quality data are used to evaluate supervisor and managerial performance (\*)

*Total quality methods (V7)*,  $\alpha = 0.813$ , c.r. = 0.818

Employees use the basic statistical techniques (such as histograms and control charts) to study their work processes

Employees analyse the time it takes to get the job done

Employees keep records and charts measuring the quality of work carried out in their work area

Statistical techniques are used to reduce variation in processes in the organisation

QM procedures (such as brainstorming, cause-and-effect diagrams, Pareto charts) are used to analyse information for process improvement

(Continued)

Table 1. Continued.

## LABOUR FLEXIBILITY

*Internal flexibility*

V8. Employees' skills in moving between tasks and jobs when the need arises

*External flexibility*,  $\alpha = 0.673$ , c.r. = 0.680

V9. Employees can stay in the company for as long as they like (R)

V10. Employees' job security is guaranteed as it is promoted through permanent contracts (R)

V11. When economic problems arise, layoffs would be one of the last measures to be adopted by this company (R)

Notes: R, inverse indicator; \*, the eliminated indicators are marked with an asterisk.

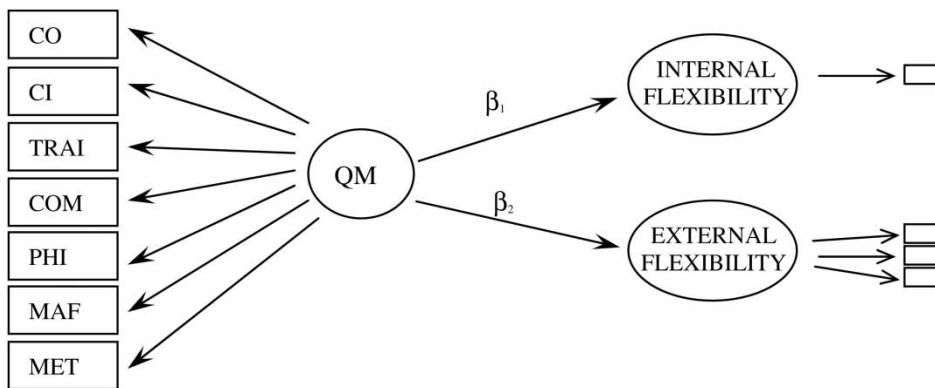


Figure 1. The hypothesised model of the relationships between QM and labour flexibility.

specification of latent (unobservable) variables measured through a set of observable indicators, it takes into account the existence of measurement error, and offers the possibility of simultaneously estimating all the relationships proposed in the theoretical model. All the analysis was carried out with the statistical software EQS 6.1 (Bentler, 2006), using the maximum likelihood estimation method. All the reported chi-square values (as well as standard errors) correspond to Satorra and Bentler's (1994) scaled goodness-of-fit test statistics. This procedure protects our results from possible deviations of normality assumption. For the chi-square scaled difference test statistics, we used the Satorra and Bentler (2001) procedure to compute the appropriate value.

In the estimation of the models, we follow the two-step procedure usually recommended in SEM (Anderson & Gerbing, 1988). Hence, the *measurement models* (i.e. the relationship among observed variables and latent factors) of QM, internal and external flexibility were fitted in the first step and the *structural model* (i.e. the relationship among the latent factors as hypothesised by theory) in a second step.

## Results

### Scale validation

Regarding the *measurement models*, in accordance with Mueller (1996, p. 125) we used the confirmatory factor analysis (CFA) technique to evaluate the dimensionality of the



measurement scales. To assess the reliability and construct (convergent and discriminant) validity we followed the procedure usually recommended in the literature (Fornell & Larcker, 1981; Ahire & Ravichandran, 2001).

### Dimensionality

Based on recommendations by Jöreskog and Sörbom (1996), we have followed two steps. Firstly, an individual CFA was performed for each QM dimension to ensure that all QM practices possessed adequate unidimensionality. An adequate fit was obtained in all the dimensions, as attested by the goodness-of-fit values (Table 2). Secondly, we conducted a single CFA taking the seven QM practices simultaneously, considered as correlated first-order factors. Each observed variable was allowed to load only on the target factor. The *Lagrange multiplier tests* (LMTEST) were used to introduce successive modifications to the scales until the fit indices reached values within the recommended limits. Only one parameter was altered in each iteration to avoid over-modifying the model (Jöreskog & Sörbom, 1996). As a result, some items were dropped from the analysis because they showed a reliability of below 0.4, and/or presented significant cross-loadings (Bollen, 1989). Items excluded are marked with an asterisk in Table 1. The same procedure was applied to test the dimensionality of the external and internal flexibility. A CFA model with two correlated first-order factors was estimated to analyse the properties of the flexibility scales. The fit of the model confirms the existence of two correlated factors (Table 2).

### Reliability

Table 1 shows Cronbach's alpha (Cronbach, 1951) and composite reliability (c.r.) (Fornell & Larcker, 1981) for the final scales, the value of which allowed us to verify the reliability of the measurement. These indices are above the 0.7, except for external flexibility, which showed reliability coefficients slightly below from the threshold. However, as leaving them out would affect the content validity of the model, we decided to retain them.

Table 2. Dimensionality of the scales.

	Satorra–Bentler chi square	d.f.	<i>p</i> -Value	BB-NNFI	CFI	RMSEA
Customer orientation <sup>a</sup>	16.0846	13	0.2446	0.986	0.991	0.032
Continuous improvement <sup>a</sup>	16.0846	13	0.2446	0.986	0.991	0.032
QM-oriented training	18.0919	9	0.0341	0.954	0.973	0.066
Top management involvement	13.0291	9	0.1613	0.963	0.978	0.044
Quality philosophy	5.0149	5	0.4140	1.000	1.000	0.004
Management by fact	15.613	9	0.0754	0.943	0.966	0.056
Total quality methods	4.3777	5	0.4964	1.000	1.000	0.000
QM	499.53	384	0.0001	0.934	0.942	0.036
FLEX <sup>b</sup>	0.0896	2	0.9561	1.000	1.000	0.00

Notes: Where recommended values are: BB-NNFI  $\geq$  0.90; CFI, comparative fit index  $\geq$  0.90; RMSEA, root mean square error of approximation  $\leq$  0.08.

<sup>a</sup>To avoid negative degrees of freedom, a pooled measurement model was executed, with indicators loading on the corresponding QM practice (Ahire & Ravichandran, 2001) for those QM practices with fewer than four indicators (customer orientation and continuous improvement).

<sup>b</sup>Pooled measurement model with indicators of the two factors of labour flexibility.

### Validity

Convergent validity was assessed using the Bentler–Bonett normed fit index (BBNFI) (Bentler & Bonett, 1980). Considering the cut-off value of 0.90, a high level of convergent validity was found for all the factors, as Table 3 shows.

Three approaches were used to assess discriminant validity (Ghiselli, Campbell, & Zedeck, 1981; Bagozzi & Phillips, 1982). First, for all scales Cronbach's alpha was higher than the average interscale correlation (AVISC) (Table 3). Second, the average correlation between the scale and non-scale items (last column in Table 3) was lower than the average correlation between the scale and the scale items (penultimate column in Table 3). Finally, for each pair of factors, we conducted a 'pair-wise test' (Bagozzi & Phillips, 1982) to test whether a CFA with two factors fits the data significantly better than a single-factor model. The scaled chi-square difference values (Satorra & Bentler, 2001) for all pairs were found to be statistically significant at a 5% level (and hence they are not presented), providing evidence of the existence of discriminant validity.

### Descriptive statistics of the validated measurement scales

Correlations and descriptive statistics of the factors identified in the scale validation process are shown in Table 4. As we can observe in this table the internal and external flexibility factors are shown to have a very low negative correlation, which is not statistically significant. This result indicates that internal flexibility is not linked to the external churning of employees. All the other correlations were positive and significantly different

Table 3. Convergent and discriminant validity.

	Convergent validity BBNFI	Discriminant validity			
		AVISC	(Cronbach's alpha – AVISC)	Average scale/item-scale correlations	Average scale/non-item scale correlations
Customer orientation	0.986 <sup>a</sup>	0.224	0.510	0.806	0.269
Continuous improvement	0.986 <sup>a</sup>	0.380	0.440	0.857	0.337
QM-oriented training	0.954	0.430	0.460	0.833	0.368
Top management involvement	0.963	0.361	0.531	0.939	0.390
Quality philosophy	1.000	0.309	0.488	0.677	0.394
Management by fact	0.943	0.351	0.578	0.908	0.321
Total quality methods	1.000	0.419	0.394	0.756	0.319
Internal flexibility	1.000 <sup>b</sup>	0.342	0.659	–	–
External flexibility	1.000 <sup>b</sup>	–0.173	0.846	0.776	–0.155

<sup>a</sup>To avoid negative degrees of freedom, a pooled measurement model was executed, with indicators loading on the corresponding QM practice (Ahire & Ravichandran, 2001) for those QM practices with fewer than four indicators (customer orientation and continuous improvement).

<sup>b</sup>Pooled measurement model with indicators of the two factors of labour flexibility.

from zero, a result that is not surprising in the case of the QM practices since they form part of the integrated approach of QM.

### ***Structural model: the relationship between QM and labour flexibility***

The relationships to be estimated for the *structural model* are those resulting from the stated hypotheses presented in Figure 1. The goodness-of-fit indices of this proposed model (Satorra–Bentler  $\chi^2 = 96.23_{43}$  [ $p = 0.0000$ ]; BB-NNFI = 0.881; RMSEA = 0.073) suggest a lack of fit of the model. Following Bollen (1989), by inspecting modification indices scholars can determine whether the data suggests alternative theoretical models. Taking into account the information reported by the LMTEST, and based on theoretical arguments, we re-specify the initial model by classifying the QM practices into two dimensions: social, soft or instrumental QM; and technical, hard or core QM (Yong & Wilkinson, 2001; Rahman, 2004; Lewis, Pun, & Lalla, 2006; Bou, Escrig, Roca, & Beltrán, 2009; Fotopoulos & Psomas, 2009; Gadenne & Sharma, 2009; Zu, 2009; Psychogios, 2010; Zairi & Alsughayir, 2011). In this final model QM was conceived as a latent construct that accounts for the correlation between the hard and soft dimensions (Figure 2), a correlation that captures a widespread idea in QM literature: that soft or hard QM issues cannot be managed in isolation because both dimensions are needed for successful QM implementation (Hackman & Wageman, 1995; Sun, 1999; Zu, 2009).

Table 5 shows the reliability and validity tests of the QM measurement model considering the hard and soft dimensions. To analyse the properties of the model, we followed the same procedures explained in the ‘scale validation’ section. The measurement model shows an acceptable fit, as shown by the Satorra–Bentler chi-square statistic (Satorra–Bentler  $\chi^2 = 30.9201$ ; d.f. = 13 [ $p = 0.004$ ]; BB-NNFI = 0.922; RMSEA = 0.076).

The goodness-of-fit indices for the modified structural model posed in Figure 2 show the adequacy of the model to the data (Satorra–Bentler  $\chi^2 = 69.88_{41}$  [ $p = 0.003$ ]; BB-NNFI = 0.932; RMSEA = 0.055). Note that although in this modified structural model QM is now measured using hard and soft dimensions, the hypothesised relationship remains the same. As Table 6 shows, all loadings of the QM construct on the QM dimensions are statistically significant, thus indicating that all dimensions represent the QM construct to a large degree.

The second part of Table 6 shows the relationship between QM and labour flexibility. The statistical significance of the values of the regression parameters reveals a positive relationship of QM with internal flexibility, while introducing QM is seen to have a negative relationship with external flexibility. These results support the hypotheses put forward. The values of the coefficients of determination indicate that the introduction of QM appears to explain around 16% of the variance of internal flexibility. QM considered as a whole has a meaningful impact on functional flexibility. Finally, we estimated an additional model with direct effects of the hard and soft dimensions on internal and external flexibility. This model allows us to test the existence of a unique influence of the hard and soft dimensions on flexibility, taking into account the influence of QM. The results show that the hard and soft dimensions have no significant influence on flexibility after controlling for the effect of QM, a result that supports the holistic approach to QM.

### **Discussion and conclusions**

This study has examined the way the introduction of a QM influences internal and external flexibility. In recent years, firms have made great efforts to introduce QM in an attempt to

Table 4. Descriptive statistics and correlation matrix ( $N = 237$ ).

Variable	Mean	S.D.	V1	V2	V3	V4	V5	V6	V7	V8	V9
Customer orientation (V1)	5.564	0.980	1.000								
Continuous improvement (V2)	5.093	1.095	0.531**	1.000							
QM-oriented training (V3)	5.553	1.264	0.351**	0.544**	1.000						
Top management team involvement (V4)	6.032	0.969	0.319**	0.488**	0.688**	1.000					
Quality philosophy (V5)	5.8712	0.826	0.425**	0.594**	0.614**	0.700**	1.000				
Management by fact (V6)	6.1706	0.916	0.249**	0.315**	0.562**	0.652**	0.577**	1.000			
Total quality methods (V7)	4.3254	1.287	0.456**	0.504**	0.514**	0.457**	0.454**	0.348**	1.000		
Internal flexibility (V8)	5.6017	1.100	0.224**	0.313**	0.236**	0.270**	0.366**	0.166**	0.270**	1.000	
External flexibility (V9)	2.3425	1.047	-0.079	-0.249**	-0.238**	-0.226**	-0.292**	-0.138*	-0.116	-0.049	1.000

\* $p < 0.05$ .\*\* $p < 0.01$ .

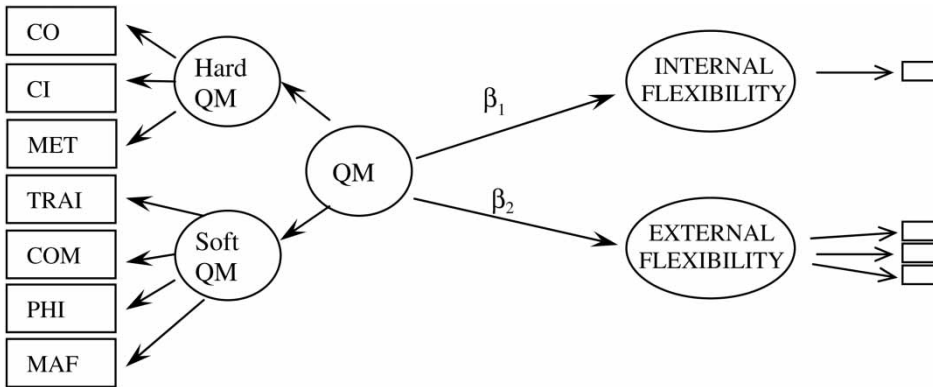


Figure 2. The modified model of the relationships between QM and labour flexibility.

improve their profits. The conclusions of this study suggest that, at the same time, these efforts represent a valid response to improving internal labour flexibility in the company. However, QM does not emerge as a relevant mechanism to improve external flexibility.

#### *Influence of QM on internal flexibility*

Our results suggest that possible antecedents of functional flexibility might emerge from the training activities and the kind of job design promoted by QM, which favours employees' development of a wide range of skills and the opportunity to be flexible by breaking down demarcations. The present study may put forward certain ideas related to a controversial issue in the literature, namely the consideration of QM as a competency that fosters a structured environment in the organisation due to the fact that it uses work methods and standards that as a consequence, encourage stability and control as opposed to flexibility (Soltani et al., 2008). Our results support the alternative view that the introduction of QM does not limit company flexibility. These results are coherent with the conclusions by Ng and Dastmalchian (1998) who find evidence that functional flexibility has a positive association with the formalisation and the existence of rules in the organisation. In other words, a structured organisational environment and the use of formalised methods and procedures are compatible with practices of training and job enrichment and enable the organisation to take an active approach to how employees do their job and to ensure that they do actually make full use of their newly acquired skills.

#### *Influence of QM on external flexibility*

Relative to external flexibility, QM negatively influences the firm's capacity to vary the number of workers it hires in order to make rapid and efficient adjustments to the volume of work and changes in demand. These results support the theory put forward by Appelbaum et al. (2000), because the presence of high performance work practices, such as those promoted by QM, and the rise of insecurity would create a tension in the organisation since employee commitment is not compensated by management commitment to job security. Nevertheless, our conclusions disagree with results by Hanratty (2000) or Bacon and Blyton (2001) who conclude that practices characteristic of QM

Table 5. Reliability, convergent and discriminant validity of QM measurement model considering the hard and soft dimensions.

M	Reliability		Convergent validity BBNFI	Discriminant validity			
	Cronbach's alpha	c.r.		AVISC	(Cronbach's alpha – AVISC)	Average scale/item-scale correlations	Average scale/non-item scale correlations
Hard	0.746	0.745	0.922 <sup>a</sup>	0.254	0.492	0.813	0.373
Soft	0.873	0.874	0.922 <sup>a</sup>	0.212	0.661	0.849	0.306

<sup>a</sup>To avoid negative degrees of freedom, a pooled measurement model was performed, with indicators loading on the corresponding QM dimension (Ahire & Ravichandran, 2001) since one of the dimensions has fewer than four indicators.

Table 6. Standardised solution for the multidimensional modified model.

Effect	Parameter estimates	s.e.	z test	R <sup>2</sup>
<i>Item-factor loadings</i>				
Hard QM → customer orientation	0.628	–	–	0.394
Hard QM → continuous improvement	0.797	0.181	7.728	0.636
Hard QM → total quality methods	0.672	0.185	7.586	0.451
Soft QM → QM-oriented training	0.792	0.127	11.667	0.627
Soft QM → top management team involvement	0.864	0.124	9.997	0.746
Soft QM → quality philosophy	0.821	–	–	0.674
Soft QM → management by fact	0.702	0.163	5.844	0.492
QM → hard QM	0.872	0.066	8.194	0.761
QM → soft QM	0.882	0.063	9.441	0.777
<i>Structural effects</i>				
QM → internal flexibility	0.400	0.095	4.662	0.160
QM → external flexibility	–0.351	0.071	–3.995	0.123

such as the use of self-autonomous work teams for job supervision or problem solving are positively related to practices linked to external flexibility.

#### ***Further advances from previous contributions***

Our conclusions coincide with other research that examines the link between QM and flexibility, such as those by Gómez and Verdú (2005). However, the present study contributes certain additional aspects of interest by focusing on one particular type of flexibility, namely labour flexibility, and by taking into consideration the two types of labour flexibility.

A further interesting contribution concerns the way we deal with the concept of QM, which is examined from a holistic perspective and, as a consequence, the introduction of QM is evaluated according to the introduction of a whole set of different practices. Thus, in line with other studies such as those of Yong and Wilkinson (2001); Rahman (2004); Bou et al. (2009); Zu (2009) or Zairi and Alsughayir (2011) we conclude that organisations take a holistic approach to introduce QM by considering hard and soft dimensions of QM. As our modified structural model shows, QM is a broad framework in which different practices coexist in order to influence labour flexibility. The results obtained show that the influence of QM on flexibility requires a holistic orientation towards QM in which both social and technical dimensions are jointly considered. Social and technical practices in isolation do not exert any significant influence on flexibility, beyond the influence of QM.

Finally, our results show that the introduction of QM stimulates the organisation to choose internal over external labour flexibility. The results support the idea that in a QM context the two seem to be incompatible and that the decisions a company takes to develop a multi-skilled and versatile workforce are not linked with the actions necessary to achieve external flexibility. Companies should opt for a consistent system of QM practices, and the same system of practices cannot be used to achieve internal and external flexibility at the same time. This research therefore supports the need to decide on one coherent system of practices, in line with configuration theory in human resource management (Schuler & Jackson, 1987). Firms reach their decisions on flexibility adopting practices that are coherent with each other.

### ***Implications for management, limitations and future research***

The results of this study have practical implications for managers. A series of practices linked to QM are outlined, which managers can use to improve levels of functional flexibility. These practices are related to the investment in the development of workforce skills and abilities through training, or job enrichment through worker participation in QM, by taking part in data collection, evaluating their work according to these data, and participating in continuous improvement activities. In addition, results suggest that QM is not an effective supporter for managers wishing to improve external flexibility.

The design of the research entailed analysing the types of flexibility through managerial perceptions. This particular assessment method should be borne in mind when considering the results. Here we analyse managerial perceptions of QM and the consequences it has on flexibility. The point of view will therefore vary from an employee perspective and this could have a bearing on some differences in the research results. For example Chow (1998) finds differences between employers and employee perceptions of human resources practices, since HR managers claimed that empowerment was being exercised (using own judgement, making own rules), while employees did not see it the same way. The use of employee representatives as respondents in previous studies could be a factor in explaining the differences in the results. From the cognitive bases of strategy, according to Jackson and Schuler (1995, p. 253), human resource managers, acting individually or as a group, interpret their environments, and this process impacts on the actions they put into practice. In this vein, this research considers managers' underlying values when they take decisions on human resource systems and practices, and thus provides a better understanding of the decisions human resource managers take. Future research could include other information sources in order to incorporate employees' points of view into the study. Similarly, we did not analyse the implication on the organisational results that considering QM as an antecedent of labour flexibility might have. Furthermore, our study is limited to service companies in Spain. As pointed out by the results of other studies such as that of Bacon and Blyton (2001), there is a danger of generalising single-country findings across national boundaries. The results should therefore be interpreted in the context in which they were obtained.

### **Acknowledgement**

Work Supported by the Bancaixa Foundation (Ref. P1.1A2008-06) and by the Ministerio de Ciencia e Innovacion (Ref. ECO2008-01674).

### **Note**

1. Other classifications of flexibility have been proposed (Valverde et al., 2000) identifying other types of flexibility, such as financial flexibility or wage flexibility. However, a common feature of these classifications is their emphasis on internal and external flexibility.

### **References**

- Ahire, S.L., & Ravichandran, T. (2001). An innovation diffusion model of TQM implementation. *IEEE Transactions on Engineering Management*, 8(4), 445–464.
- Akdere, M. (2009). A multi-level examination of quality-focused human resource practices and firm performance: Evidence from the US healthcare industry. *The International Journal of Human Resource Management*, 20(9), 1945–1964.



- Anderson, J.C., & Gerbing, D.W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, 119, 411–423.
- Appelbaum, E., Bailey, T., Berg, P., & Kalleberg, A. (2000). *Manufacturing advantage: Why high-performance work systems pay off*. Ithaca, NY: Cornell University Press.
- Atkinson, J. (1984). Manpower strategies for flexible organizations. *Personnel Management*, August, 28–31.
- Bacon, N., & Blyton, P. (2001). High involvement work systems and job insecurity in the international iron steel industry. *Canadian Journal of Administrative Sciences*, 18(1), 5–16.
- Bagozzi, R.P., & Phillips, L.W. (1982). Representing and testing organizational theories: A holistic construal. *Administrative Science Quarterly*, 27, 459–489.
- Bayo, A., Merino, J., Escamilla, S.A., & Selvam, R.M. (2011). The impact of ISO 9000 and EFQM on the use of flexible work practices. *International Journal of Production Economics*, 130, 33–42.
- Bentler, P.M. (2006). *EQS structural equations program manual*. Encino, CA: Multivariate Software, Inc.
- Bentler, P.M., & Bonett, D.G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin*, 88, 588–606.
- Bollen, K.A. (1989). *Structural equations with latent variables*. New-York, NY: John Wiley & Sons.
- Bou, J.C., & Beltran, I. (2005). Total quality management, high commitment human resource strategy and firm performance: An empirical study. *Total Quality Management & Business Excellence*, 16(1), 71–86.
- Bou, J.C., Escrig, A.B., Roca, V., & Beltrán, I. (2009). An empirical assessment of the EFQM excellence model: Evaluation as a TQM framework relative to the MBNQA model. *Journal of Operations Management*, 27, 1–22.
- Brown, A. (1994). TQM: Implications for training. *Training for Quality*, 2(3), 4–10.
- Cappelli, P., & Neumark, D. (2004). External churning and internal flexibility: Evidence on the functional flexibility and core-periphery hypotheses. *Industrial Relations*, 43, 148–182.
- Chow, I.H.S. (1998). The impact of rules and regulations on workforce flexibility in Hong Kong. *The International Journal of Human Resource Management*, 9(3), 494–505.
- Cordery, J., Sevastos, P., Mueller, W., & Parker, S. (1993). Correlates of employee attitudes toward functional flexibility. *Human Relations*, 46(6), 705–723.
- Cronbach, L.J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16, 297–334.
- Dean, J.W., & Bowen, D.E. (1994). Management theory and total quality: Improving research and practice through theory development. *Academy of Management Review*, 19(3), 392–418.
- Douglas, T.J., & Judge, W.Q. (2001). Total quality management implementation and competitive advantage: The role of structural control and exploration. *Strategic Management Journal*, 44(1), 158–169.
- Edwards, R., & Sohal, A.S. (2003). The human side of introducing total quality management. Two case studies from Australia. *International Journal of Manpower*, 24(5), 551–567.
- Fornell, C., & Larcker, D.F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39–50.
- Fotopoulos, C.B., & Psomas, E.L. (2009). The impact of ‘soft’ and ‘hard’ TQM elements on quality management results. *The International Journal of Quality & Reliability Management*, 26(2), 150–163.
- Friedrich, A., Kabst, R., Weber, W., & Rodehuth, M. (1998). Functional flexibility: Merely reacting or acting strategically. *Employee Relations*, 20(5), 504–523.
- Gadanne, D., & Sharma, B. (2009). An investigation of the hard and soft quality management factors of Australian SMEs and their association with firm performance. *The International Journal of Quality & Reliability Management*, 26(9), 865–880.
- Ghiselli, E.E., Campbell, J.P., & Zedeck, S. (1981). *Measurement theory for behavioral sciences*. San Francisco, CA: Freeman.
- Gómez, J.M., & Verdú, A.J. (2005). TQM, structural and strategic flexibility and performance: An empirical research study. *Total Quality Management*, 16(7), 841–860.
- Grant, R.M. (1995). *Contemporary strategic analysis: Concepts, techniques, applications* (2nd ed.). Cambridge, MA: Blackwell Publishers.
- Hackman, J.R., & Wageman, R. (1995). Total quality management: Empirical, conceptual, and practical issues. *Administrative Science Quarterly*, 40, 309–342.

- Hanratty, T. (2000). The impact of numerical flexibility on training for quality in the Irish manufacturing sector. *Journal of European Industrial Training*, 24(9), 505–512.
- Heene, A., & Sanchez, R. (Eds.). (1997). *Competence-based strategic management*. Chichester: John Wiley & Sons.
- Hoque, K. (1999). Human resource management and performance in the UK hotel industry. *British Journal of Industrial Relations*, 37(3), 419–443.
- Jackson, S.E., & Schuler, R.S. (1995). Understanding human resource management in the context of organizations and their environments. *Annual Review of Psychology*, 46, 237–264.
- Jöreskog, K.G., & Sörbom, D. (1996). *LISREL 8: User's reference guide*. Chicago, IL: Scientific Software.
- Kalleberg, A.L. (2001). Organizing flexibility: The flexible firm in a new century. *British Journal of Industrial Relations*, 39, 479–504.
- Landis, R.S., Bela, D.J., & Tesluk, P.E. (2000). A comparison of approaches to composite measures in structural equation models. *Organizational Research Methods*, 3(2), 186–207.
- Lewis, W.G., Pun, K.F., & Lalla, T.R.M. (2006). Empirical investigation of the hard and soft criteria of TQM in ISO 9001 certified small and medium-sized enterprises. *International Journal of Quality & Reliability Management*, 23(8), 964–985.
- Looise, J.C., van Riemsdijk, M., & Lange, F. (1998). Company labour flexibility strategies in the Netherlands: An institutional perspective. *Employee Relations*, 20, 461–482.
- Martínez, A., Pérez, M., Vela, M.J., & de Luis, P. (2008). Telework adoption, change management, and firm performance. *Journal of Organizational Change Management*, 21(1), 7–31.
- Martínez, A., Vela, M., Pérez, M., & de Luis, P. (2011). The dynamics of labour flexibility: Relationships between employment type and innovativeness. *The Journal of Management Studies*, 48(4), 715–736.
- McIlroy, R., Marginson, P., & Regalia, I. (2004). Regulating external and internal forms of flexibility at local level: Five European regions compared. *International Journal of Human Resource Management*, 15, 295–313.
- Merino, J. (2003). Quality management practices and operational performance: Empirical evidence for Spanish industry. *International Journal of Production Research*, 41(12), 2763–2786.
- Michie, J., & Sheehan, M. (2001). Labour market flexibility, human resource management and corporate performance. *British Journal of Management*, 12, 287–306.
- Mueller, R.O. (1996). *Basic principles of structural equation modeling. An introduction to LISREL and EQS*. New York, NY: Springer Texts in Statistics.
- Nair, A. (2006). Meta-analysis of the relationship between quality management practices and firm performance-implications for quality management theory development. *Journal of Operations Management*, 24, 948–975.
- Ng, I., & Dastmalchian, A. (1998). Organizational flexibility in Canada: A study of control and safeguard rules. *International Journal of Human Resource Management*, 9(3), 445–455.
- Ooi, K.B., Arumugam, V., Safa, M.S., & Bakar, N.A. (2007). HRM and TQM: Association with job involvement. *Personnel Review*, 36(6), 939–962.
- Prajogo, D.I., & Cooper, B.K. (2010). The effect of people-related TQM practices on job satisfaction: A hierarchical model. *Production Planning & Control*, 21(1), 26–35.
- Psychogios, A.G. (2010). A four-fold regional-specific approach to TQM. *The International Journal of Quality & Reliability Management*, 27(9), 1036–1053.
- Rahman, S. (2004). The future of TQM is past. Can TQM be resurrected. *Total Quality Management*, 15(4), 411–422.
- Recommendation of the European Commission 2003/361/EC, 6 May 2003, on SME definition. *Official Journal of the European Union*, 50(124), 36–41.
- Riley, M., & Lockwood, A. (1997). Strategies and measurement for workforce flexibility: An application of functional flexibility in a service setting. *International Journal of Operations and Production Management*, 17(4), 413–419.
- Roca, V., Beltrán, I., Bou, J.C., & Escrig, A.B. (2008). External and internal labour flexibility in Spain: A substitute or complementary effect on firm performance. *The International Journal of Human Resource Management*, 19(6), 1131–1151.
- Satorra, A., & Bentler, P.M. (1994). Corrections to test statistics and standard errors in covariance structure analysis. In A. von Eye & C.C. Clogg (Eds.), *Latent variables analysis: Applications for developmental research* (pp. 399–419). Thousand Oaks, CA: Sage.

- Satorra, A., & Bentler, P.M. (2001). A scaled difference chi-square test statistic for moment structure analysis. *Psychometrika*, 66, 507–514.
- Schuler, R., & Jackson, S. (1987). Linking competitive strategies and human resource management practices. *Academy of Management Executive*, 1, 202–219.
- Sila, I., & Ebrahimpour, M. (2005). Critical linkages among TQM factors and business results. *International Journal of Operations & Production Management*, 25(11), 1123–1155.
- Snape, E., Wilkinson, A., Marchington, M., & Redman, T. (1995). Managing human resources for TQM: Possibilities and pitfalls. *Employee Relations*, 17, 42–51.
- Soltani, E., Gennard, J., & Williams, T. (2004). HR performance evaluation in the context of TQM: A review of the literature. *The International Journal of Quality & Reliability Management*, 21(4), 377–396.
- Soltani, E., Lai, P.C., Javadeen, S.R.S., & Gholipour, T.H. (2008). A review of the theory and practice of managing TQM: An integrative framework. *Total Quality Management*, 19(5), 461–479.
- Sun, H. (1999). Diffusion and contribution of total quality management: An empirical study in Norway. *Total Quality Management*, 10(6), 901–914.
- Taveira, A.D., James, C.A., Karsh, B.T., & Sainfort, F. (2003). Quality management and the work environment: An empirical investigation in a public sector organization. *Applied Ergonomics*, 34, 281–291.
- Valverde, M., Tregaskis, O., & Brewster, C. (2000). Labor flexibility and firm performance. *International Advances in Economic Research*, 6(4), 649–662.
- Van den Berg, P., & Van der Velde, M. (2005). Relationships of functional flexibility with individual and work factors. *Journal of Business & Psychology*, 20(1), 111–129.
- Verdú, A.J. (2002). *Relación entre Flexibilidad y Desempeño Organizativo. Una Aproximación desde la Perspectiva de la Gestión de la Calidad Total*. Elche, Spain: Ed. Universidad Miguel Hernández.
- Victor, B., Boynton, A., & Stephens-Jahng, T. (2000). The effective design of work under total quality management. *Organization Science*, 11(1), 102–117.
- Volberda, H.W. (1998). *Building the flexible firm. How to remain competitive*. New York, NY: Oxford University Press.
- Wilkinson, A., Godfrey, G., & Marchington, M. (1997). Bouquets, brickbats and blinkers: Total quality management and employee involvement in practice. *Organization Studies*, 18(5), 799–819.
- Wilkinson, A., Redman, T., Snape, E., & Marchington, M. (1998). *Managing with total quality management. Theory and practice*. Hong-Kong: McMillan Business.
- Winter, S.G. (1994). Organizing for continuous improvement: Evolutionary theory meets the quality revolution. In J.A. Baum & J.V. Singh (Eds.), *Evolutionary dynamics of organizations* (pp. 90–108). Oxford: University Press.
- Yong, J., & Wilkinson, A. (1999). The state of total quality management: A review. *International Journal of Human Resource Management*, 10, 137–161.
- Yong, J., & Wilkinson, A. (2001). Rethinking total quality management. *Total Quality Management*, 12(2), 247–258.
- Zairi, M., & Alsughayir, A.A. (2011). The adoption of excellence models through cultural and social adaptations: An empirical study of critical success factors and a proposed model. *Total Quality Management & Business Excellence*, 22(6), 621–654.
- Zhou, H., Dekker, R., & Kleinknecht, A. (2011). Flexible labor and innovation performance: Evidence from longitudinal firm-level data. *Industrial and Corporate Change*, 20(3), 941–963.
- Zu, X. (2009). Infrastructure and core quality management practices: How do they affect quality. *The International Journal of Quality & Reliability Management*, 26(2), 129–149.