

Full Length Research Paper

Working conditions under quality standards: The role of employee involvement

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Much of the management literature has demonstrated the impact of quality approaches on firm business performance. However, only a limited number of studies have made attempts to examine the relationship between quality standards and employee's outcomes. In order to fill this gap in the literature, we examine the impact of employee involvement as the most important dimension of quality approaches on working conditions. Using a two-stage instrumental variables approach (2SLS) on the sample of 198 employees from two ISO 9001 certified Montenegrin firms, the research results confirm that employee involvement positively influences working conditions. Accordingly, we conclude that quality standards may enhance working conditions if managers assure that such standards are implemented in line with employee involvement.

Key words: Employee involvement, working conditions, quality standards.

INTRODUCTION

Quality standards have been identified as important factors in modern business since their implementation assures the firm's survival and effective alignment of an organization's key business processes (Levine and Toffel, 2010; Pekovic, 2010). They could be defined as an organizational process involving changes in the fundamental behavior and applied routine of employees that ensures the quality of goods and services (Grolleau et al., 2012). The effect of quality standards on firm business performance has been examined for decades (Grolleau et al., 2012).

Nevertheless, the relevance of quality standards should not only focus on the attainment of favorable outcomes for firms, but also for employees. Actually, the idea that

there is a relationship between quality standards and employee's outcomes is supported by the fact that the adoption of quality approaches such as ISO 9000 standards, leads to re-organization of the workplace followed by job rotation, learning across tasks, teamwork, decentralization of responsibility, employee involvement, etc. (Delmas and Pekovic, 2012; Pekovic, 2012). However, a limited number of studies have made attempts to examine the relationship between quality standards and employee's outcomes. Thus, the objective of this paper is to fill the gap in the literature by examining the relationship between quality standards and employee satisfaction about their working conditions.

The originality of this contribution is threefold. Firstly,

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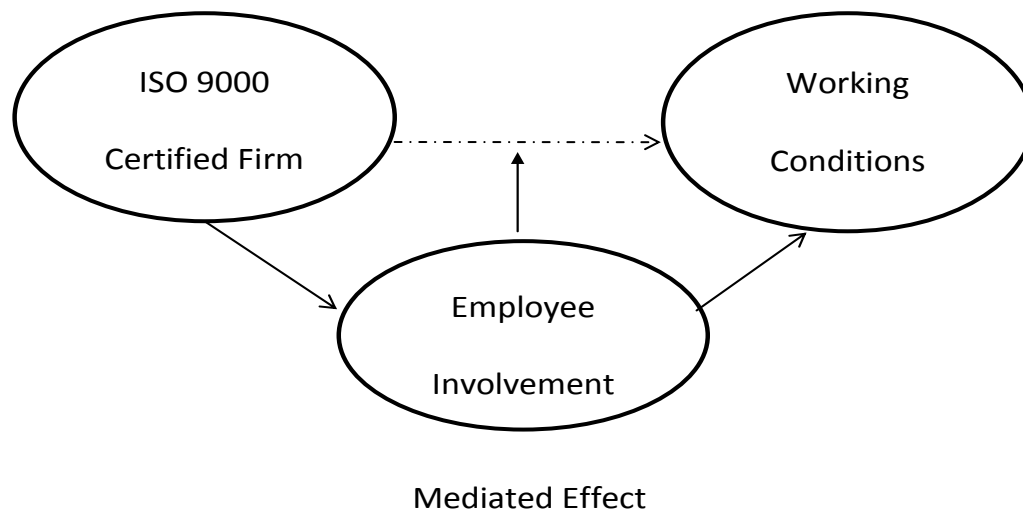


Figure 1. Mediated effect on working conditions.

we examine the relationship between quality standards and employee satisfaction with their working conditions, which has received, till now, less empirical attention. Secondly, although some empirical research (e.g. Rodriguez-Anton and Alonso-Almeida, 2011; Pekovic, 2012) analyzes the relationship between quality standards and employee's outcomes, the fundamental question as to how quality standards could influence employee's outcomes is still missing. Advances in the quality management field identified employee involvement (EI) as a crucial element of a successful quality standards implementation (Deming, 1982; Bowen et al., 1989; Brower, 1994; Lawler, 1994; Ugboro and Obeng, 2000; Welikala and Sohal, 2008; Tang et al., 2010) which points to employee involvement as a potential mediator of the relationship between quality standards and employee's outcomes. Hence, the purpose of our study is to empirically test whether employee involvement presents an antecedent of quality standards that could mediate the linkage between quality standards and working conditions (Figure 1). The third contribution comes from the utilization of Montenegrin database which permit us to control for a very detailed set of employee's and job characteristics.

The next section reviews the relevant literature on quality approaches and employees' involvement, and presents data and methods used in this research. Also, the next section is devoted to estimation results and finally, discussion and conclusion.

LITERATURE REVIEW

Quality standards and employee's outcomes

The success of quality approaches is based on managing

employees within firms (Hackman and Wageman, 1995). However, besides indicating that adoption of quality approaches changes employees' work environment and organization, the literature review presents only limited findings concerning the relationship between quality approaches and employee's outcomes. Furthermore, previous papers on the subject present mitigated conclusions. Several scholars confirm a positive link between quality approaches and different employee's outcomes (Elci et al., 2007; Levine and Toffel, 2010; Chang et al., 2010; Rodriguez-Anton and Alonso-Almeida, 2011). On the other hand, other researchers critique quality approaches indicating that its implementation is associated with high-pressure working environments (Garrahan and Stewart, 1992; Green, 2006; Fairris and Brenner, 2001; Brenner et al., 2004; Pekovic, 2012). Hence, the impact of quality approaches on employee's outcomes remains a research question. Accordingly, the purpose of this study is to examine whether employee involvement as an important antecedents of quality approaches influences employee's outcomes measured by employee satisfaction with his working conditions. Therefore, we examine the possibility that quality approaches enhance employee working conditions by allowing a firm to more thoroughly involves its workforce.

Employee involvement and employee's outcomes

Employee involvement could be defined as the degree to which the workplace contributes to one's self image (Lodahl and Kejner, 1965). Actually, employee involvement aims to create a sense of belonging towards the firm through a high degree of commitment and to enable employees to make changes in their working environment

by giving suggestions for improving performance (Welikala and Sohal, 2008). The interest in employee involvement was mainly driven by possible economic advantage. As argued by Gonzalez (2010), the investment in employee involvement would help a firm to respond quickly to market changes and to increase labor productivity which could be reflected by improved firm performance. Moreover, employee involvement is also considered to be an important factor in determining employee's outcomes (Diefendorff et al., 2002; Lawler, 1986). Nevertheless, little research has been conducted on the effects of employee involvement on working conditions.

However, even if we are not aware of any academic study of the link between employee involvement and working conditions, there are several predictors of working conditions such as job satisfaction, stress, mental health, absenteeism, wage, etc. that could help us to better understand the link between employee involvement and working conditions. For instance, the rationale for a positive relationship between employee involvement and job satisfaction is based on the fact that EI provides the employee with a sense of importance, pride, accomplishment, freedom and opportunity for sharing information, consultation and partnership in joint decision-making which consequently improves job satisfaction (Singh and Pestonjee, 1990; Ramsay et al., 2000; Macky and Boxall, 2008; Mohr and Zoghi, 2008). Furthermore, the literature indicates that a participative environment which encourages the development of problem-solving skills, provides opportunities to exercise those skills, fosters personal and co-worker beliefs in competence and encourages participation in decision-making are among key strategies to prevent stress in firm (Peterson, 1997; Mackie et al., 2001). Moreover, employee involvement is considered as a mechanism that reduces the probability of employee's absenteeism and turnover since it provides employees the opportunity to express their opinions about workplace decisions that directly affect them (Blau and Boal, 1987; Wilson and Peel, 1991; Batt et al., 2002). Finally, previous findings confirm a positive relationship between employee involvement and wages (for comprehensive review, see, Helper et al., 2002; Handel and Gittleman, 2004). The aforementioned reasoning leads us to propose the following hypothesis:

H1: The employee involvement increases the probability of working conditions improvement, ceteris paribus.

DATA AND MODEL SPECIFICATION

The database and variables

The research presented here is based on the MQS 2007 database. The creation of the database is financed by the French Ministry of Foreign Affairs under the ECO-NET project. Two of the best performing firms in Montenegro are selected, one is a port (service

firm) and the other is an agro-industry firm producing high quality alcohol beverages. Both firms implemented a system of quality management and they are ISO 9001 certified. They are leaders in terms of quality in Montenegro. With the help of the statisticians and sociologists of the Center for Labor Studies in France, a questionnaire was constructed, containing 46 questions. 251 and 111 employees from the service firm and from the agro-industry firm respectively have answered the questionnaire. The survey in both firms was conducted with the support of the top management. The survey started from mid July 2007 to the end of August 2007. The survey was simultaneously conducted in both firms using the same methodology: a researcher provides during 15 min necessary instructions to a group of 15 to 20 employees in a room, and then the employees fill the questionnaire. The time allocated to the employees to fill the questionnaire was not limited but on average this time was about 40 min. After collecting all the questionnaires, they were analyzed by the Centre for Quality of Montenegro and put into a database format. After deleting observations that do not provide all necessary information, we work with a sample of 198 employees. The database offers a promising opportunity to examine the role that employee involvement can play in improving satisfaction with working conditions.

Dependent variable

The dependent variable presents the degree of employee satisfaction about working conditions. The employees valued the working conditions in 2007 on a scale from 1 to 10.

Independent variable

To test the main hypothesis of the paper, which is that quality dimensions such as employee involvement in their job is positively associated with better working conditions, we use the variable denoted *Employee Involvement*. We construct an employee involvement indicator which consists of the following three components: (1) employee participates in meetings (2) employee makes propositions concerning quality improvement; (3) employee is consulted concerning the changes inside the firm.

Control variable

Our analysis includes several employee characteristics (gender, age, education, seniority), job characteristics (wage, working hours, supplementary work, additional pay, rapport, enough working time, co-workers group size, training, computer) and organizational features (changes due to new equipment implementation and restructuring) in order to control for employee - heterogeneity. The choice of variables is based on previous firm studies relating to employee involvement and employee's outcomes (Srivastava and Krishna, 1992; Ugboro and Obeng, 2000; Mohr and Zoghi, 2008).

The variables used in estimation, their definitions and sample statistics are presented in Table 1. No problem of multi-collinearity was detected (Appendix 1).

The empirical model

Noteworthy, the same observable factors (e.g. age, gender, education, organizational changes, etc.) may have an impact both on employee involvement and satisfaction about working conditions, which may cause a spurious relationship. Thus, using an ordinary least square (OLS) regression suffers from a major

Table 1. Definition of variables and sample statistics.

Variable	Description	Mean	SD	Min	Max
Dependent variables					
Working conditions	The degree of employee's satisfaction about working conditions. (Continuous variable)	5.23	3.56	0	37
Independent variables					
Employee involvement	The employee participates in meetings; employee makes propositions concerning quality improvement; employee is consulted concerning the changes inside the firm.	1.12	1.06	0	3
ISO 9000	The employee knows what is ISO 9000 standard Dummy variable (=1 if yes)	0.87	0.33	0	1
Supportive environment	The employee is helped by colleagues and superiors; the employee help his/her colleagues inside the department; and outside the department	2.48	0.61	0	3
Gender	The employee is a man Dummy variable (=1 if yes)	0.7	0.46	0	1
Age	Age (Continuous variable)	44.76	11.67	22	62
Education	The employee has:				
	Education1 (primary school degree)	0.11	0.31	0	1
	Education2 (technical or lower general secondary degree)	0.14	0.35		
	Education3 (High School degree)	0.36	0.48	0	1
	Education4 (two years of superior education)	0.12	0.33	0	1
	Education5 (University degree, PhD or Master degree)	0.27	0.42	0	1
Seniority	Seniority (Continuous variable)	20.69	9.76	0	38
Wage	The employee's wage is more than 400 Euros Dummy variable (=1 if yes)	0.31	0.46	0	1
Working hours	Number of working hours per day (Continuous variable)	7.21	1.54	1	15
Supplementary work	The employee sometimes works supplementary hours Dummy variable (=1 if yes)	0.67	0.47	0	1
Additional Pay	Additional pay1 (=1 if employee is always paid for additional work)	0.23	0.42	0	1
	Additional pay2 (=1 if employee is never paid for additional work)	0.5	0.5	0	1
	Additional pay3 (=1 if employee is sometimes paid for additional work)	0.22	0.45	0	1
Rapport	The employee prepares the rapports for his/her superior Dummy variable (=1 if yes)	0.44	0.5	0	1
Enough working time	The employee declares that has enough time to accomplish his/her working tasks. Dummy variable (=1 if yes)	0.91	0.28	0	1

Table 1. Contd.

Co-workers group size	The number of co-workers that the employee works with. Dummy variable (=1 if yes)	3.44	1.26	0	5
Quality training	The employee received training related to quality during ISO 9000 standard implementation Dummy variable (=1 if yes)	0.5	0.5	0	1
Equipment training	The employee received training related to equipment utilization Dummy variable (=1 if yes)	0.38	0.49	0	1
Computer	Computer1 (=1 if employee uses computer every day)	0.58	0.49	0	1
	Computer2 (=1 if employee never uses computer)	0.31	0.46	0	1
	Computer3 (=1 if employee uses sometimes computer)	0.09	0.29	0	1
Changes related to equipment	The changes that occurred are due the equipment changes Dummy variable (=1 if yes)	0.06	0.23	0	1
Firm restructuring	The changes that occurred are due the firm restructuring Dummy variable (=1 if yes)	0.42	0.49	0	1

problem since it considers employee involvement as an exogenous variable. Hence, in order to address the problem of endogeneity, we apply the two-stage instrumental variables approach (2SLS). The model relies on a simultaneous estimation approach (Pindyck and Rubinfeld, 1991) in which the factors influencing employee involvement are estimated simultaneously with the factors explaining satisfaction about working conditions. The two equations are jointly estimated for each explanatory variable using maximum likelihood¹.

Y_1^* and Y_2^* are latent variables influencing the probability of employee involvement improvement and better working conditions, respectively. We therefore consider the following 2SLS model:

$$\begin{cases} Y_1^* = \alpha_1 + \beta_1 X_1 + \delta_1 Z_1 + \mu_1 \\ Y_2^* = \alpha_3 + \beta_3 X_3 + \gamma_1 Y_1 + \mu_3 \end{cases}$$

X_1 and X_2 are the vectors of exogenous variables including employee's characteristics (gender, age, education, seniority), job characteristics (wage, working hours, supplementary work, additional pay, rapport, enough working time, co-workers group size, training, computer) and organizational features (changes due to new equipment implementation and restructuring).

The vector of variable Z_1 represents the vectors of instrumental variables that guarantee the identification of the model and help to estimate correlation coefficients (Maddala, 1983). A two-stage least square model circumvents the problem of interdependence by using instrument variables to obtain predicted values of the endogenous variables (in our case, employee involvement). Hence, in order to identify the two-stage least square model, we need additional variables that explain the probability of employee involvement improvement but are not correlated to the error term of

the working conditions equation. In our case, Z_1 indicates that the employee knows what the ISO 9000 standard is and that the employee works in a supportive environment. The rationale for using a variable that represents employee's knowledge about ISO 9000 standard is based on the fact that the main reasons for employees' resistance concerning quality standards are a lack of knowledge and information on the quality standards. Thus, providing information to employees regarding the quality standards can mitigate employee misperceptions about quality standards and also makes them more confident. What's more, knowledge and understanding about quality standards would encourage an employee to increase their involvement in their work (Wilkinson et al., 1992). The choice of a supportive environment as an important determinant of employee involvement is related to the fact that a supportive environment is positively associated with the implementation of quality approaches (Tang et al., 2010). Additionally, employee involvement is heightened by perceived work support (Cropanzano et al., 1997). The quality of instrumental variables is verified using the Stock-Yogo (2005) and Sargan statistics.

$\beta_1, \beta_2, \gamma_1, \gamma_2, \delta_1$ and δ_2 are slope coefficients to be estimated. Finally, $\alpha_1, \alpha_2, \mu_1$ and μ_2 are the intercepts and the disturbance terms for the two equations, respectively.

RESULTS

Estimation results are presented in Table 2. Our instruments are not found to be weak based on Stock-Yogo (2005) statistics since $F(21, 175) = 1.51$ and critical value with maximum bias of the IV estimator relative to OLS of 0.10 is 19.93. Sargan test fail to reject the null of validity of instruments (p values = 0.475). This gives us

Table 2. 2SLS estimates of the relation between of employee involvement and satisfaction about working conditions.

Variables	Working conditions
Employee Involvement	3.47** (1.685)
Gender	-2.60*** (0.877)
Age	-0.04 (0.044)
Education1	4.62* (2.628)
Education2	1.49 (2.054)
Education3	1.31 (1.416)
Education4	0.74 (1.413)
Seniority	0.04 (0.052)
Wage	-0.26 (0.942)
Working hours	-0.10 (0.233)
Supplementary work	0.39 (0.693)
Additional pay1	2.35*** (0.866)
Additional pay2	0.69 (0.764)
Rapport	-1.19 (0.969)
Enough working time	-1.93* (1.171)
Co-workers group size	-0.43 (0.274)
Quality training	-1.16 (0.765)
Equipment training	0.02 (0.608)
Computer1	1.34 (1.079)
Computer3	0.16 (1.293)
Changes related to equipment	-3.62** (1.599)
Firm restructuring	-0.36 (0.634)
Constant	6.29** (2.471)
Observations	198
R-squared	-0.208
Stock-Yogo statistics	
F(21, 175)	1.51
Critical value with maximum bias of the IV estimator relative to OLS of 0.10	19.93
Anderson canon. corr. LM statistic	7.636
Chi-sq(1) P-val	0.022
Sargan statistic	0.50
Chi-sq(2) P-val	0.475

(*), (**), (***) indicate parameter significance at the 10, 5 and 1% level, respectively.

confidence about the validity of our instruments.

The coefficient of employee involvement on working conditions is positive and statistically significant ($p < .001$) in Table 2. Hence, the main hypothesis of the paper which is that investment in employee involvement is associated with better working conditions - is confirmed by our results. Our findings are consistent with previous research that has suggested that employee involvement leads to a positive impact on employee work attitudes such as job satisfaction, stress, mental health, absenteeism, turnover and wage (Wilson and Peel, 1991; Ramsay et al., 2000; Mackie et al., 2001; Batt et al., 2002; Helper et al., 2002; Macky and Boxall, 2008; Mohr

and Zoghi, 2008). Therefore, the results induce that where employees' experience of knowledge, information, rewards and power increases (element of employee involvement), the employment relationship moves in a direction that employees find more satisfying. Consequently, we confirm that the concept of quality approaches highlights the importance of continuous improvement which requires the participation of every employee in the firm. Actually, our results uncover quality standards' antecedent that is positively associated to working conditions. Additionally, we may suggest that the quality standards and working conditions linkage is determined by employee involvement as an intermediate

factor that further explains this relationship as well as improving working conditions. Therefore, we can suggest that the utilization of employee involvement capabilities within quality approaches is positively associated with quality of work life what is previously supported by Welikala and Sohal (2008). Moreover, the findings indicate indirectly that the implementation of quality approaches creates challenging work, which improves employee control over his own work and leads to a highly motivating environment (Womack et al., 1990; Adler and Cole, 1993).

As we indicated previously, our model also provides determinants of working conditions. Based on obtained results, we may conclude that men are less satisfied with working conditions than women what confirms that women's attitudes toward their jobs are often more favorable than men's. Additionally, having enough time to complete certain tasks also impacts negatively on working conditions as well as changes related to equipment. On the other hand, employees with a lower educational level are more satisfied with working conditions. This could be explained by the fact that employees with lower education have less expectation about job rewards and promotions. Therefore, those employees are easier to satisfy at work. Finally, always being paid for additional working hours improves employee satisfaction concerning working conditions since employees would feel that they are treated fairly what is found to increase job satisfaction.

DISCUSSION AND CONCLUSION

In the last few decades, an increasing number of firms changed their work organization by implementing quality standards. The main premise of quality standards is that firms can improve their business performance while remaining cost competitive. It has been further discussed that quality standards do not matter only for employers but also for employees. Actually, the implementation of quality standards leads to important re-organization of the workplace (Pekovic, 2012). Therefore, all these changes in work organization are considered to be related to different employee's outcomes. In this sense, we assume that the direct effect of quality standards on employee's outcomes may be due to the existence of intermediate factors that are affected by quality standards adoption and that in turn influence employee's outcomes. Having in mind the importance of employee involvement in view of quality standards adoption (Tang et al., 2010), it is important to examine the role that EI plays when analyzing the relationship between quality standards and employee's outcomes.

Therefore, we offer a deeper analysis of how quality standards affect employee's outcomes such as working conditions. In particular, we demonstrate the relevance of

employee involvement when analyzing the relationship between quality standards and working conditions. According to our results, we may conclude that improved employee involvement improves working conditions. In this sense, the findings can be interpreted as meaning that quality standards implementation exerts a positive influence on working conditions if managers assure that its implementation is in line with employee involvement. Additionally, based on the fact that several previous studies find a negative impact of quality approaches on different employee's outcomes (Farris and Brenner, 2001; Brenner et al., 2004; Pekovic, 2012), we may suggest that employee involvement is one of the factors that contribute to better outcomes under quality approaches. Therefore, managers should pay attention to employee involvement in order to achieve maximum benefits from quality standards adoption. Thus, in line with Escrig-Tena et al. (2012), we may suggest that the effect of quality practices on employee's outcomes requires a holistic establishment in which both social and technical dimensions are jointly considered since in their isolation they even may influence negatively firm performance or employee's outcomes. Additionally, we may argue quality approaches contain a chain of human resources practices oriented to the development of employees and their work environment what influences their satisfaction about working conditions. Noteworthy, our results indirectly support the idea that without employee's involvement, it is difficult to overcome the resistance to changes imposed by quality practices implementation (Zelnik et al., 2012). Moreover, underlying the social context in quality practices contributes to a positive employee's attitude toward the quality practices (Turusbekova et al., 2007) what could be reflected on firm performance improvement.

Managerial implications

Our study has significant implications for managers. Our results indicate that employee involvement is a relevant factor when examining working conditions under quality approaches. The findings imply that managers should pay particular attention to employee involvement when adopting quality standards in order to avoid situations such as worsening working conditions after quality standards implementation. In this sense, during the quality standards adoption, managers are encouraged to establish appropriate human resource strategies which fit with the quality culture. Noteworthy, the effects quality practices on firm performance are higher when it is implemented through a human resource strategy that underlines the commitment and involvement of all individuals in the organization with quality objectives (Bou and Beltran, 2005). Additionally, since employee dissatisfaction about working conditions could reflect negatively

on their productivity and in turn on firm performance, investment in employee involvement under quality approaches could be considered as an important mechanism for a firm's performance improvement.

Limitations and directions for future research

This study has certain limitations that could be overcome in future research. Firstly, the effect of employee involvement on working conditions under quality approaches should be further examined taking into account different international settings since quality standards act differently in different countries, reflecting the varying international institutional conditions. Secondly, future studies should analyze the effect of other antecedents of quality standards such as team work, training, flexibility on different employee's outcomes (e.g. wages, job satisfaction, stress, etc.).

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Appendix 1. Pearson correlation coefficients.

	Working conditions	Employee involvement	ISO 9000	Supportive environment	Gender	Age	Edu1	Edu2	Edu3	Edu4	Edu5	Seniority	Wage	Working hours	Supplementary work	Additional pay1	Additional pay2	Additional pay3	Rapport	Enough working time	Co-workers group size	Quality training	Equipment Training	Computer1	Computer2	Computer3	Changes related to equipment	Firm restructuring
Working conditions	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Employee involvement	0.20	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ISO 9000	-0.04	0.13	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Supportive environment	0.07	0.30	0.08	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gender	-0.13	0.09	-0.10	0.07	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Age	-0.02	0.05	0.19	-0.07	-0.09	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Education1	0.07	-0.27	-0.50	-0.20	0.14	-0.10	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Education2	-0.18	-0.15	-0.02	0.03	0.12	0.06	-0.14	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Education3	-0.02	-0.10	0.19	-0.21	-0.09	0.20	-0.26	-0.30	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Education4	-0.09	-0.01	0.05	0.06	-0.01	-0.04	-0.13	-0.15	-0.28	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Education5	0.21	0.40	0.10	0.30	-0.14	-0.15	-0.19	-0.22	-0.41	-0.20	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Seniority	-0.05	0.09	0.21	-0.08	0.01	0.71	-0.05	0.13	0.28	-0.06	-0.32	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wage	0.14	0.39	0.22	0.20	0.16	0.11	-0.20	-0.08	-0.16	-0.01	-0.37	0.11	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Working hours	0.12	0.20	-0.01	0.14	-0.02	0.10	-0.14	-0.07	0.08	-0.05	0.13	0.08	0.18	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Supplementary work	-0.01	0.17	-0.08	0.10	0.24	-0.01	0.07	0.13	0.01	-0.16	-0.10	0.09	0.22	0.10	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional pay1	0.22	-0.04	0.11	-0.22	0.23	-0.03	0.30	-0.02	-0.04	-0.13	-0.16	0.09	0.05	-0.05	0.16	1.00	-	-	-	-	-	-	-	-	-	-	-	-
Additional pay2	-0.05	0.11	-0.02	0.31	-0.11	-0.11	-0.16	-0.09	-0.16	0.09	0.25	-0.19	-0.01	0.12	-0.13	-0.55	1.00	-	-	-	-	-	-	-	-	-	-	-
Additional pay3	-0.21	-0.07	-0.02	-0.09	-0.02	0.15	-0.07	0.17	0.08	0.02	-0.14	0.11	-0.01	0.06	0.15	-0.30	-0.53	1.00	-	-	-	-	-	-	-	-	-	-
Rapport	0.11	0.40	0.27	0.15	-0.04	0.06	-0.31	-0.21	0.09	0.11	0.37	0.04	0.47	0.19	0.06	-0.08	0.05	0.02	1.00	-	-	-	-	-	-	-	-	-
Enough working time	-0.16	-0.00	-0.01	0.10	0.02	0.07	0.05	0.12	-0.18	0.11	-0.00	0.04	-0.03	-0.12	-0.10	-0.09	0.16	-0.05	-0.16	1.00	-	-	-	-	-	-	-	-
Co-workers group size	-0.01	0.08	-0.02	0.06	-0.14	0.02	0.08	-0.19	0.07	-0.06	0.05	0.03	0.15	-0.08	0.08	0.01	0.21	-0.23	0.13	0.12	1.00	-	-	-	-	-	-	-
Quality training	0.01	0.27	0.26	0.02	-0.06	0.05	-0.19	-0.12	-0.01	0.06	0.16	-0.06	0.21	-0.13	0.06	-0.07	0.15	-0.10	0.29	-0.05	0.16	1.00	-	-	-	-	-	-
Equipment training	-0.01	-0.09	-0.02	0.03	0.01	0.05	0.15	0.10	0.05	-0.16	-0.17	0.08	-0.07	-0.10	0.07	0.04	0.01	-0.02	-0.12	0.02	0.03	-0.01	1.00	-	-	-	-	-
Computer1	0.13	0.25	0.26	0.14	0.21	-0.10	-0.42	-0.45	0.04	0.22	0.44	-0.16	0.19	0.10	-0.14	-0.19	0.23	-0.14	0.38	0.03	0.05	0.26	-0.20	1.00	-	-	-	-
Computer2	-0.04	-0.22	-0.27	-0.14	0.25	-0.06	0.50	0.39	-0.11	-0.21	-0.36	0.05	-0.11	-0.12	0.05	0.28	-0.27	0.06	-0.35	0.01	-0.13	-0.27	0.18	-0.79	1.00	-	-	-
Computer3	-0.15	-0.05	-0.04	0.04	-0.01	0.25	-0.06	0.07	0.09	-0.01	-0.13	0.16	0.10	0.02	-0.00	-0.13	0.07	0.08	-0.03	-0.03	0.10	0.07	0.08	-0.37	-0.21	1.00	-	-
Changes related to equipment	-0.07	0.08	-0.24	0.06	0.03	-0.06	0.05	-0.03	0.00	-0.02	0.03	-0.07	-0.11	-0.06	0.08	0.13	-0.11	-0.02	-0.13	0.07	-0.08	-0.07	-0.01	-0.02	0.08	-0.08	1.00	-
Firm restructuring	-0.11	-0.06	-0.11	-0.02	0.10	-0.04	0.12	0.07	-0.14	0.03	-0.02	0.01	-0.01	-0.10	0.12	-0.01	0.03	0.04	0.03	0.15	0.08	0.11	-0.08	-0.05	0.01	0.08	-0.21	1.00

ⁱ We estimate the model using the ivreg2 module in Stata developed by Baum et al. (2002).