



Working paper series
No 10 / May 2022

ORGANISATIONAL DETERMINANTS OF TRAINING

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Cedefop was originally established in 1975 by Council Regulation (EEC) No 337/75. This decision was repealed in 2019 by Regulation (EU) 2019/128 establishing Cedefop as a Union Agency with a renewed mandate.

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Please cite this publication as:
Russo, G. (2022). *Organisational determinants of training*. Luxembourg: Publications Office of the European Union. Cedefop working paper; No 10.
<http://data.europa.eu/doi/10.2801/442704>

Luxembourg: Publications Office of the European Union, 2022

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PDF ISBN 978-92-896-3417-5
ISSN 1831-2403
doi:10.2801/442704
TI-BA-22-003-EN-N

Acknowledgements

The author would like to acknowledge the excellent research assistance provided by Rossella Viggiano. The paper benefited from the comments by Milos Kankaras and participants of the DSL seminar.

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CHAPTER 1.

Introduction

Organisations accept the responsibility for training and other development activities linked to the attainment of organisational goals (OECD, 2021) ⁽¹⁾. To attain organisational goals through training, organisations must be able to activate the human resources they train (Teece, 2019). This observation establishes a relationship between the investment in human capital ⁽²⁾ and the organisational ability to activate its human resources; it hinges on managerial beliefs about the importance of human capital as a source of competitive advantage.

Training provision in organisations is predicated on the assumption that the benefits reaped by the organisation are larger than the costs incurred. Overall, there is sufficient evidence to suggesting that training brings substantial returns (Aguinis and Kraiger, 2009; Garavan et al., 2020; Haelermans and Borghans, 2012; Hanushek et al., 2015) and that training provision improves organisational performance (Garavan et al., 2020). The empirical evidence suggests that training contributes to the attainment of organisational goals and that organisations can

(1) In Europe, 72.6% of the companies participating to the 2015 Continuing vocational training survey (CVTS) reported having provided some form of training; among those who did not provide training, 13% had carried out a major training effort in the recent past. So, overall, 76% of companies either provided training or they did so in the previous year (on average involving 41% of the workforce). In the US, large corporations increasingly rely on corporate universities to maintain an adequate supply of skills, for themselves and their first and second tier suppliers in their supply chain (Lui-Abel, 2011).

(2) Organisations distinguish between two concepts of learning and development: personnel development (for example, career progression and the learning associated with transitions into new roles or occupations) and training and skill development to attain specific organisational goals (for example, to learn to operate machines or to use technologies, to attain or maintain compliance with certifications and industry standards, or to implement procedures). Organisations place responsibility for long-term development activities with employees (McDowall and Saunders, 2010; Oatey, 1970). A survey of reasons for training among personnel directors in Portuguese SMEs found that 'increasing knowledge' was the most important, while 'developing workers' was least important (Ferreira and Velinças, 2016). The shift in responsibility for personal development activities towards the individual is also found in organisational psychology. This is reflected in career orientations by the 'Protean career', in which the person, not the organisation, is in charge, and in which career decisions are driven by personal core values (Briscoe and Hall, 2006; Briscoe et al., 2012; Hall, 2004). The 'boundaryless career', capture an orientation to pursue a career beyond the boundaries of a single organisation, occupation, and industry (Briscoe and Hall, 2006; Briscoe et al., 2012; Hess; Jepsen and Dries, 2012; Tams and Arthur, 2010).

reap a large share of the returns (Konings and Vanormelingen, 2015) ⁽³⁾. Managers, however, may have difficulties in confidently stating the value of the human capital for their organisation (Smithey Fulmer and Ployhart, 2014). They may have only limited direct experience with the returns on training activities for the organisation in which they work, since HR managers use abstract concepts such as ‘commitment’ and ‘employee morale’ to illustrate how these activities contribute to the success of the organisation (Ulrich, 1997). Hard evidence on the returns on the investment in human capital may be scarce since organisations seldom assess the financial impact of training programmes (Aguinis and Kraiger, 2009; Haelermans and Borghans, 2012) ⁽⁴⁾.

Given the lack of objective information on the returns on training activities, managers’ perceptions of the value of training for the organisation are influenced by their beliefs about the degree of complementarity between human capital and other organisational assets for value creation in the product market (Adegbesan, 2009; Esho and Verhoef, 2020). These beliefs are linked managers’ abilities to lead people ⁽⁵⁾. Managers with good people skills understand how to manage human resources and have a good grasp of the potential to reach organisational goals through people (Hoffman and Tadelis, 2018; Oh et al., 2017).

Typically, managers in different organisations hold different beliefs about the importance of human resources in terms of being a source of competitive advantage ⁽⁶⁾. Individual managerial beliefs coalesce around a common alignment

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- ⁽³⁾ This implies that most of the training is firm-specific or the widespread presence of labour market frictions (Acemoglu and Pischke-Jorn, 1998; Acemoglu, Daron and Pischke-Jorn, Steffen 1999; Acemoglu, Daron and Pischke-Jorn, Steffen, 1999; Bassanini and Brunello, 2011; Becker, 1964; Brunello et al., 2007).
 - ⁽⁴⁾ For example, according to the 2015 CVTS, only 24% of EU companies which trained at least some employees perform an impact assessment of the training activities; in contrast, 34% of companies use satisfaction surveys among participants, which can provide only a rough idea of the effectiveness of training. Most companies do not perform any type of assessment. To illustrate the practical importance of this point, a Portuguese survey among SMEs found that the third most common reason for not providing training is ‘the lack of perception of the benefits from training from the organisation’ (Ferreira and Velinças, 2016).
 - ⁽⁵⁾ Beliefs can be expressed in the form of implicit theories, in respect of the role of the leader and of the followers (Epitropaki and Martin, 2004; Epitropaki et al., 2013; Hommelhoff, 2017; Kopelman; Prottas and Davis, 2008; Kopelman; Prottas and Falk, 2012; OECD, 2021; Offermann and Coats, 2018; Offermann; Kennedy and Wirtz, 1994; Russ Travis, 2011, 2013; Sager, 2008); Shen (2019); (Sy, 2010; van Gils; van Quaquebeke and van Knippenberg, 2010), of the nature people (Heslin; Latham and VandeWalle, 2005; Heslin and VandeWalle, 2008, 2011), and of the most effective ways to motivate employees (Dickson and Wendorf, 1999).
 - ⁽⁶⁾ The strategic factor market theory posits that organisations will be able to profit from resources, including human capital, when they have superior expectations about the future value of such resources (Barney, 1986).

of beliefs forming the core organisational culture (Chen et al., 2021; Cialdini et al., 2021; Khasro; Tomita and Wakabayashi, 2001; Kim, 2015; Ng and Sears, 2020; Oh et al., 2017; Van den Steen, 2010). Organisational culture shapes workplace organisation: it makes organisational goals visible and it clarifies the role and value of human resources in the attainment of these goals (Barney et al., 2012; Becker and Huselid, 2010; Schneider; Ehrhart and Macey, 2013; Steen, 2017; Van den Steen, 2005; Wright and Ulrich, 2017). For example, the integration of the HR function into strategy-making is more common in organisations which consider their employees as a strategic resource (Bennett; Ketchen Jr. and Schultz, 1998; Florkowski and Olivas-Luján, 2016; Ulrich and Dulebohn, 2015).

Through their impact on the organisational culture, beliefs on the importance of human resources colour other managerial decisions (Huczynski, 2006; Watson, 1986). Beliefs are reflected in skills requirements, in job design choices (the bundling of tasks into jobs, the degree of problem-solving and autonomy, the delegation of decision-making), in the expectations about how employees contribute to organisational success, and the degree of decentralisation and control (Arthur; Herdman and Yang, 2016; Barley and Kunda, 1992; Davis, 2010; Schneckenberg; Velamuri and Comberg, 2019; Viitala; Vesalainen and Uotila, 2020). In organisations in which managers believe that employees are a source of competitive advantage and act coherently, training provision will be linked to the attainment of multiple organisational goals and jobs will be designed in a way that foresees continuous training (Arthur; Herdman and Yang, 2016; Viitala; Vesalainen and Uotila, 2020). These workplaces would be characterised by a high demand for training (in the sense that the organisation would provide training to a large fraction of its workforce in relation to the attainment of many different organisational goals) and there would be managerial support for participation in training (Nikolova; Van Ruysseveldt; De Witte and Syroit, 2014; Nikolova; Van Ruysseveldt; De Witte and Van Dam, 2014; Polo; Cervai and Kantola, 2018; Simon, 1991; Tracey and Tews, 2005).

Organisations can be characterised by an implicit 'demand' for training which is embedded in their job design decisions. At the same time, in organisations investing in their human resources there will be attention to the proper utilisation of the human resources in which the organisation is investing. The link between investing in human resources and human resources utilisation is detailed in the next section, and empirically investigated using the latest wave of the European company survey.

The paper is structured as follows. Chapter 2 describes the empirical model. Chapter 3 introduces the data. Chapter 4 presents the empirical results and robustness analyses. Chapter 5 offers concluding remarks.

CHAPTER 2.

Skills and training in organisational settings

Organisations utilise their human resources when workers draw on their skills, utilise their skills, to deliver performance.

In general, performance has two facets: task performance and contextual performance. Task performance encompasses performance in the job, carrying out the tasks included in the job description. Contextual performance refers to activities and behaviours contributing to the smooth functioning of operations: improvements in the efficiency of the production process, cost saving solutions, improved client satisfaction, supporting colleagues, smooth functioning of the workplace, and reduction in machine downtime ⁽⁷⁾. Contextual performance takes place when employees are willing to go the extra mile. Examples of contextual performance include helping others, providing ideas on how to improve operations, suggesting improvements in product design or service delivery (Audenaert et al., 2018; Baker; Gibbons and Murphy, 2002; Baruch and Rousseau, 2018; Bird, 2005; Blader et al., 2015; Gibbons and Henderson, 2012; Halac, 2012; Helper and Henderson, 2014; Jensen; Opland and Ryan, 2010; Malcomson, 2015; Rousseau, 2001; Schalk and Rousseau, 2017; Shore et al., 2004; Tsui et al., 1997) ⁽⁸⁾. Contextual performance consists of voluntary behaviours that the organisation cannot mandate through a tight enforcement of the labour contract and that need to be incentivised. Organisations regarding human resources as a source of competitive advantage leverage contextual performance to reach organisational goals ⁽⁹⁾. For example, these organisations can adopt production processes, technologies or enter markets for products requiring workers continuously to update their skills.

⁽⁷⁾ Contextual performance follows from employees going above and beyond the requirements listed in their job descriptions (Borman and Motowildo, 1997; Demerouti et al., 2014; Stone-Romero; Alvarez and Thompson, 2009); it materialises when employees display extra role behaviour (Erdogan et al., 2020; Miles et al., 2002; Van Dyne; Cummings and Parks, 1995) or organisational citizenship behaviour (Dalal, 2005; Kizilos; Cummings and Cummings, 2013; Podsakoff et al., 2009).

⁽⁸⁾ The terms employee-organisation relationship, psychological contract, and relational contract, are used by different disciplines to stress different aspects of this phenomenon.

⁽⁹⁾ Contextual performance needs to be managed, otherwise it may lead to counterproductive work behaviours (Spector and Fox, 2010a, 2010b), sabotaging and withholding of information (Serenko, 2019; Serenko and Bontis, 2016), resistance (Brett et al., 2016; Lawrence and Robinson, 2007; Roscigno and Hodson, 2004), and withdrawal (Berry; Lechhook and Clark, 2012; Carmeli, 2005; Pajo; Coetzer and Guenole, 2010; Swider and Zimmerman, 2014).

The AMO – ability, motivation, opportunity – model is a general framework that can be used to understand employee performance, including contextual performance (Boon et al., 2018; Kellner; Cafferkey and Townsend, 2020). According to this model, performance materialises when employees have the skills (knowledge, skills and abilities), the opportunity to use them, and the motivation to do so. Organisations can support employees' performance by providing a work context which is conducive to performance: one that offers a motivating work environment, offering opportunities for contribution, and stimuli for skill utilisation and development. There is no sharp distinction between interventions aimed at supporting the three components of the model (A, M, and O) since workplace features creating opportunities for contributions also have a motivational component (Grant; Fried and Juillerat, 2011; Morrison et al., 2005; Oldham and Hackman, 2010).

The opportunities to contribute – the provision of channels through which contextual performance produces organisational outcomes – arise through two main channels: employee involvement (Kizilos; Cummings and Cummings, 2013; Pot, 2011; Riordan; Vandenberg and Richardson, 2005), and autonomy in decision-making. Delegation of decision-making – the autonomy in deciding how to do their jobs and when they have to find solutions to problems – gives employees the opportunity to use their knowledge and ability to produce superior task performance (Barrenechea-méndez; Ortín-Ángel and Rodes, 2016; Evans and Fischer, 1992; Ján Zábajník, 2002; Morgeson; Delaney-Klinger and Hemingway, 2005; Vidal, 2013; Wu; Griffin and Parker, 2015).

Managers in organisations providing opportunities to contribute need to support their subordinates in the exercise of their autonomy and initiative rather than control them.

Organisations will utilise their human resources when they design jobs in a way that places demands on workers' skills (Morrison et al., 2005). Skill requirements follow from job design; complex jobs, difficult jobs, have higher skills requirements than simple jobs (Pouliakas and Russo, 2015) and job complexity drives skills development (Russo, 2017; Wielenga-Meijer et al., 2012). Organisations can put pressure on workers skills by requiring that they regularly improve them.

Organisations can also support employees to match increased skills requirements. Jobs may be so designed to include elements of continuous training and managers can support employee participation in developmental activities.

Job design is central to the organisations' ability to leverage human capital as it affects all the elements of the AMO model. The right job design puts demand on employees' skills so that they need to draw on them; at the same time it offers the opportunities for skill development (through on-the-job learning but also through

the elements of continuous training included in the job design). In this sense job design is about task performance.

Job design also supports motivation through challenging and interesting jobs and the fulfilment of the sense of mastery (Hackman and Oldham, 1976; Oldham and Hackman, 2010). Job design features, such as autonomy and problem-solving, leverage autonomous forms of motivation (Gagné and Deci, 2005; Gagné et al., 2019). This motivation can sustain both tasks and contextual performance. Autonomy and problem-solving are the job design features providing employees with the opportunity to contribute.

However, just as a job description makes known to employees the demands on their skills, organisations need to make sure that their employees know that contextual performance is also expected from them. Organisations seeking to leverage contextual performance will need to motivate employees to perform these voluntary behaviours and to draw on their skills by providing a motivating working environment. These organisations could rely on a broad approach to motivation, using monetary as well as various non-monetary motivational levers, such as opportunities for development, interesting and challenging jobs, and relying on vision and mission messages (which could signal that contextual performance is expected and motivate workers to deliver it).

Skills deliver performance (task and contextual) when there is a collaborative climate in the workplace. A good (bad) relationship between management and employees fosters (hinders) workplace cooperation (Heyns and Rothmann, 2018; Hughes et al., 2018; Mayer and Gavin, 2005). A bad relationship between employees and management may result in work stoppage or behaviours which limit the human capital contribution to the firm's success. Therefore, poor quality employee–management relationships reduce the stream of benefits from the investment in human capital accruing to the organisation (Thau et al., 2007; Tzafirir, 2005). A good manager-employee relationship is instrumental if human capital is to contribute to the attainment of organisational goals.

Organisations in which human capital is regarded as a source of competitive advantage (i.e. managers see that organisational goals can be attained through the utilisation of their human resources) organise their workplace in a way that will induce workers to draw on their skills and to deliver both task and contextual performance. When employees draw on their skills, managers are in a better position to see positive returns on organisational investments in training and other skills development activities.

The working hypothesis is that organisational efforts aimed at incentivising skills utilisation (task and contextual performance) will also support skills development activities.

Beliefs about the importance of human resources as a source of competitive advantage can influence organisation's decision to make an effort to utilise its workers' skills. These efforts are then reflected in job design choices, requirements, and the use of motivational levers. These factors will compound to generate the organisational 'demand for training'. Therefore, the working hypothesis is that the workplace characteristics, put in place because of beliefs about the importance of human resources, will be more proximally associated with training provision, whereas the beliefs about the importance of human resources will be distally linked to training provision.

CHAPTER 3.

The data: the European company survey 2019

In the empirical analysis we use two measures of training. The first one records ‘the fraction of employees who participated in training sessions on the establishment premises or at other locations during paid working time’; the second records ‘the fraction of employees who received on-the-job training or other forms of direct instruction in the workplace from more experienced colleagues’. The first measure captures the extent of formal training activities while the second measure captures the extent of on-the-job training activities. The average incidence of the two forms of training is shown in Table 1.

In general, the content of on-the-job training tends to be more firm-specific (in the sense that is more valuable in the context of the particular firm offering the training than in other firms) than that of training courses. Consequently, establishments tend to involve a larger fraction of employees in on-the-job training activities than in training activities.

Table 1. **The incidence of training and on-the-job training in EU establishments, weighted.**

	Training	On-the-job training
Less than 20%	30.23	24.05
20% - 39%	19.12	21.62
40% - 59%	13.97	16.76
60% - 79%	11.61	13.09
80% or more	25.07	24.48
Total	100	100

Source: Author’s calculations.

The constructs included in the empirical model are illustrated hereafter.

The strategic importance of employees for the organisation is captured by a variable recording the answers to the question of whether ‘employee involvement is a source of competitive advantage’ (4-point likert scale, from 1 ‘not at all’ to 4 ‘a great extent’). This variable reflects managerial beliefs about the role of human resources in the organisation.

The pressure on workers to update their skills is captured by a variable recording the subjective frequency of change in skills requirements (4-point likert scale, from 1 ‘no change at all’ to 4 ‘very quickly’).

The significance of contextual performance is captured by three variables capturing the importance placed by management on helping colleagues, providing suggestions to improve how things are done in the establishment, and working long hours when required (4-point likert scale, from 1 'not important at all' to 4 'very important'). The last variable could also capture an element of presenteeism and possibly workplace control.

The presence of a cooperative climate is captured by a subjective evaluation of the quality of the relationship between management and employees (5-point likert scale, from 1 'very bad' to 5 'very good').

The opportunities to contribute are captured by a measure of employee involvement and job design features.

The degree of involvement of employees is determined by a variable capturing the extent to which employees influence (a 4-point likert scale, from 1 'no influence at all' to 4 'a great extent of influence') various organisational decisions ⁽¹⁰⁾.

The incidence of complex job design features is captured by an index subsuming the incidence of jobs (% of employees) in which employees have autonomy and need to find solutions to problems, which enhance skills utilisation and development in the workplace. The degree to which support to skills development is built into the job design is captured by the incidence of employees in jobs requiring continuous training.

Managerial support for participation in training is captured by a variable assessing whether participation in training is only possible when workload allows for it or work scheduled is adjusted to allow employees to participate in training. Managerial support for autonomy is captured by a variable assessing whether managers control if employees carry out the task assigned to them or if managers create an environment in which employees can autonomously carry out their tasks.

Finally, one variable captures the degree of motivation in the workforce (4-point likert scale, from 1 'not at all motivated' to 4 'very motivated', high values corresponding to high motivation). This variable reflects the overall level of 'morale' in the workforce (Bewley, 2002).

The dataset also contains various establishment characteristics: the industry group, the size, the number of years in operation, the number of establishments belonging to the company, and if the establishment is the headquarters or a subsidiary.

The means and standard deviations of the variables used in the empirical analysis is shown in Annex 1.

⁽¹⁰⁾ The organisational decisions included in the index are: training and skills development, improvement in the efficiency of the work process, flexibility, pay, and dismissal.

CHAPTER 4.

Empirical results

4.1. The empirical model and main results

Given the ordinal nature of the dependent variables, we used a bivariate ordered probit model to investigate the relationship between the fraction of employees involved in training and on-the-job training activities and the focal variables introduced in Chapter 2:

$$Y_{ij}^* = \beta_j X_i + \epsilon_{ij}$$

$$Y_{i1} = \begin{cases} 1 & \text{if } Y_{i1}^* \leq \alpha_1 \\ 2 & \text{if } \alpha_1 < Y_{i1}^* \leq \alpha_2 \\ 3 & \text{if } \alpha_2 < Y_{i1}^* \leq \alpha_3 \\ 4 & \text{if } \alpha_3 < Y_{i1}^* \leq \alpha_4 \\ 5 & \text{if } \alpha_4 < Y_{i1}^* \end{cases} \quad Y_{i2} = \begin{cases} 1 & \text{if } Y_{i2}^* \leq c_1 \\ 2 & \text{if } c_1 < Y_{i2}^* \leq c_2 \\ 3 & \text{if } c_2 < Y_{i2}^* \leq c_3 \\ 4 & \text{if } c_3 < Y_{i2}^* \leq c_4 \\ 5 & \text{if } c_4 < Y_{i2}^* \end{cases}$$

The subscript i denotes individual observations, the subscript j takes on 2 values, 1 and 2, denoting training and on-the-job training, respectively. X is a matrix of explanatory variables common to the two equations, β_j a vector of parameters to be estimated (one for each equation), α and c are vectors of ancillary parameters to be estimated, and ϵ are error terms distributed according to a bivariate normal distribution with correlation ρ , to be estimated.

The probability that $Y_{i1} = k$ and $Y_{i2} = m$ is:

$$\begin{aligned} P(Y_{i1} = k, Y_{i2} = m) &= P(\alpha_{k-1} < Y_{i1}^* \leq \alpha_k, c_{m-1} < Y_{i2}^* \leq c_m) \\ &= P(Y_{i1}^* \leq \alpha_k, Y_{i2}^* \leq c_m) \\ &- P(Y_{i1}^* \leq \alpha_k, Y_{i2}^* \leq c_{m-1}) - P(Y_{i1}^* \leq \alpha_{k-1}, Y_{i2}^* \leq c_m) + P(Y_{i1}^* \leq \alpha_{k-1}, Y_{i2}^* \leq c_{m-1}). \end{aligned}$$

Given that the errors follow a bivariate normal distribution (the bivariate cumulative distribution be denoted by Φ) the probability that $Y_{i1} = k$ and $Y_{i2} = m$ becomes:

$$\begin{aligned} P(Y_{i1} = k, Y_{i2} = m) &= \\ \Phi(\alpha_k - X' \beta_1, c_m - X' \beta_2, \rho) &- \Phi(\alpha_k - X' \beta_1, c_{m-1} - X' \beta_2, \rho) - \Phi(\alpha_{k-1} - X' \beta_1, c_m \\ &- X' \beta_2, \rho) + \Phi(\alpha_{k-1} - X' \beta_1, c_{m-1} - X' \beta_2, \rho). \end{aligned}$$

The corresponding log-likelihood is

$$\ln L_i = \sum_{k=1}^5 \sum_{m=1}^5 I(Y_{i1} = k, Y_{i2} = m) \ln[P(Y_{i1} = k, Y_{i2} = m)].$$

Since the coefficients in ordered probit models are difficult to compare across models (Greene, 2010; Norton and Dowd, 2018) we will use the more intuitive bivariate regression model to investigate the effect of different model specifications.

The estimates of the bivariate ordered probit model are presented in Table 2, column 1 and 2.

Table 2. **Participation in training and on the job training activities, standard errors in parenthesis**

	Bivariate ordered probit model: participation in		Bivariate regression model: participation in	
	Training	On-the-job training	Training	On-the-job training
Monetary rewards to motivate and retain employees	0.026 (0.013)	0.081** (0.018)	0.031 (0.016)	0.092** (0.021)
Providing interesting and stimulating work to motivate and retain employees	-0.020 (0.030)	0.062** (0.016)	-0.027 (0.037)	0.071** (0.021)
Communicating a strong mission and vision to motivate and retain employees	0.008 (0.014)	0.058** (0.012)	0.004 (0.016)	0.068** (0.014)
Training opportunities to motivate and retain employees	0.360** (0.030)	0.067** (0.011)	0.428** (0.034)	0.091** (0.019)
Workers in complex jobs (%)	0.046 (0.025)	0.090** (0.018)	0.054 (0.029)	0.111** (0.023)
Workers in jobs in which there is need for continuous training (%)	0.222** (0.016)	0.136** (0.015)	0.264** (0.018)	0.164** (0.013)
Teamwork				
Management-directed teams	0.105 (0.054)	0.117** (0.042)	0.125** (0.063)	0.144** (0.052)
Autonomous teams	0.084 (0.071)	0.070 (0.037)	0.109 (0.082)	0.094* (0.041)
Managerial support (work scheduled changed to allow participation in training)	0.289**	0.078*	0.336**	0.105**

	Bivariate ordered probit model: participation in		Bivariate regression model: participation in	
	Training	On-the-job training	Training	On-the-job training
	(0.043)	(0.029)	(0.057)	(0.038)
Managers create an environment in which employees can autonomously carry out their tasks	-0.003 (0.026)	-0.003 (0.022)	-0.009 (0.031)	-0.007 (0.028)
Frequency of skills requirements change	-0.007 (0.030)	0.005 (0.024)	-0.019 (0.037)	-0.002 (0.029)
Importance of helping colleagues without being asked	0.076* (0.029)	0.107** (0.026)	0.080** (0.031)	0.131** (0.032)
Importance of making suggestions for company improvement	-0.028 (0.025)	-0.018 (0.024)	-0.032 (0.032)	-0.024 (0.027)
Importance of staying longer when needed	-0.058** (0.018)	-0.045** (0.014)	-0.064** (0.019)	-0.056** (0.016)
Degree of direct influence exerted by employees	0.066** (0.020)	0.086** (0.021)	0.078** (0.023)	0.096** (0.031)
Employee involvement is a source of competitive advantage	0.004 (0.017)	0.036* (0.017)	0.004 (0.021)	0.042* (0.021)
Quality of the manager-employee relations	0.058 (0.042)	0.011 (0.048)	0.061 (0.049)	0.010 (0.054)
Correlation coefficient (ρ)	0.350** (0.025)		0.294** (0.021)	
Number of observations	17 994			

NB: The full set of estimates of the baseline model is shown in Annex 2. The reference group of the variables is in parenthesis: Teamwork (management led teams), Establishment size (small, 10-49 employees), managerial support (Participation in training and professional development activities is only possible if workload and work schedules allow for it), managers create an environment in which employees can autonomously carry out their tasks (Managers control if employees follow the task assigned to them), no innovation introduced (innovation introduced), Establishment age (10 years or less), Design and development of new product and services (carried out in house), Production of goods, assembly of parts, delivery of services (carried out in house), Product market strategy (price), Type of establishment (single establishment), Industry (mining and quarrying), and Country (Austria).

Source: Author's calculations.

The results suggest that the investment in human capital or skills development as proxied by the share of employees involved in training and on-the-job training is associated with all the indicators of employee involvement. The degree of direct employee influence in organisational matters and the importance of contextual performance, especially of helping colleagues, are associated with an increase in the fraction of employees exposed to both training and on-the-job training; the importance of providing suggestions to improve operations is not, while the

association between the importance of long hours and participation in training and on-the-job training is negative. Job design features are also an important determinant of exposure to training: the higher the percentage of complex jobs (jobs allowing for autonomy and involving problem-solving) ⁽¹¹⁾, the higher the fraction of workers undergoing on the job training activities. The incidence of jobs requiring at least some degree of continuous training is positively associated with the share of workers undergoing training and on-the-job training activities. Managerial support for participation in training activities displays a positive association with the fraction of employees undergoing training and on-the-job training activities ⁽¹²⁾. Among the motivational levers, the importance of training and development opportunities provision is linked to high participation in training

(¹¹) When the incidence of jobs allowing for autonomy and requiring problem-solving are entered separately in a linear probability model, the coefficients on autonomy and job complexity are not statistically significant from each other (the Wald test statistics is 0.540, with a p-value of 0.464 for the training equation and 2.190 with a p-value of 0.139 for the on-the-job training equation). Therefore, the two variables have been included in an index of job complexity.

(¹²) If explanatory variables are correlated with omitted variables there is an issue of endogeneity. The share of jobs including the need for continuous training and managerial support for participation in training are particularly at risk of endogeneity. The data set, however, does not contain variables that could be credibly used as instruments, that is being correlated with the likelihood of managerial support and with the incidence of the inclusion of continuous training in job design and that are not correlated with the error (for example, the presence of a learning culture). To probe the incidence of unmeasured confounders further, a special variable is derived that will act as an instrumental variable (Lewbel, 2012). First, the percentage of employees working in jobs which included continuous training and managerial support for participation in training are regressed on all other regressors (Z). From these two regressions the residuals are extracted, e_1 and e_2 . The instruments are then obtained by multiplying the demeaned Z by the residuals from the first step, $(Z-\bar{Z})e_1$ for the percentage of employees in jobs with continuous training and $(Z-\bar{Z})e_2$ for managerial support. In the last step the two instruments are used in the main regression.

Three main caveats are in order. First, the approach relies on very heavy modelling assumption, so ideally, it should be in conjunction with proper instruments. Second, we instrumented two variables contemporaneously; the conditions necessary for the estimator to be valid have been proven for one endogenous regressor but the conditions required for validity in the case of more than one endogenous regressors have not been derived (Baum and Lewbel, 2019). Third, the analysis relied on linear regression models as approximation of non-linear specifications.

With these caveats in mind, we now proceed to show the results. The coefficient on the instrument for the percentage of employees in jobs with continuous training is 0.256 (with a standard error of 0.020) and the one on managerial support is 0.294 (with a standard error of 0.060) in the equation on the participation in training and of 0.163 (with a standard error of 0.020) on the percentage of employees in jobs with continuous training and of 0.064 (with a standard error of 0.060) on managerial support for participation in training in the participation in on-the-job training equation. There is not much difference generally between the OLS and IV estimates.

activities. The importance of the various motivational levers is associated with participation in on-the-job training activities.

The quality of employee relations has a positive association with the share of employees undergoing training activities, the coefficient on this variable in the equation for the share of employees undergoing on-the-job training is not significantly different from zero.

There is a positive association between the fraction of employees undergoing on-the-job training (but not training) activities and the belief that employees are a source of competitive advantage.

Finally, there is a positive correlation between the error terms of the two equations, which means that unobserved factors that tend to increase the share of workers participating in training also increase the share of workers participating in on-the-job activities.

These results are robust to a different specification and can be replicated using a bivariate linear probability models, see Table 2, columns 3 and 4 ⁽¹³⁾.

Variables linked to the importance of human resources, i.e. beliefs about the importance of human resources as a source of competitive advantage, the quality of the manager-employee relationship and the pressure from changing skills requirements, interact with job design choice and the degree of autonomy and involvement. Estimation of a base model excluding these variables shows an increase in the strength of the association between the beliefs about the importance of human capital as a source of competitive advantage, the pressure from changing skills requirements and the quality of the manager-employee relationship and the incidence of training and on-the-job training activities.

In the base model, the coefficient on the importance of employee involvement becomes 0.102 (with a standard error of 0.018), and 0.136 (with a standard error of 0.024) in the equation for participation in training and on-the-job training, respectively. The coefficient on the frequency of skills requirements becomes 0.199 (with a standard error of 0.023) and 0.166 (with a standard error of 0.019) in the equation for participation in training and on-the-job training, respectively. Finally, the coefficient on the quality of the relationship between management and employees becomes 0.175 (with a standard error of 0.065) and 0.095 (with a standard error of 0.055) in the equation for the incidence of participation in training and on-the-job training, respectively.

Introducing the organisational features supporting performance (job design features, by having managers supporting participation in training and on-the-job

⁽¹³⁾ The range of the dependent variables is [1,5]. 1.88% of the predicted values falls outside the admissible range in the regression model for training and 0.11% of the predicted values falls outside the admissible range in the regression model for on the job training.

training activities, employee involvement) capture part of the effects of the beliefs about the importance of human resources as a source of competitive advantage, the quality of the management-employee relationship, and changing skills requirements.

4.2. Additional analyses

Organisations accept responsibility for the training that is linked to the attainment of organisational goal. This aspect was captured by a construct derived from four variables capturing the importance of training to sustain motivation, to support innovation, to provide workers with the skills needed for their job and to prepare workers for other roles (Cronbach $\alpha = 0.708$). A higher value on the construct characterises organisations in which training is understood to be instrumental to the attainment of multiple organisational goals. This construct has been added to the model in Table 2. The coefficient on the construct is 0.141 (with a standard error of 0.041) and 0.025 (with a standard error of 0.023) in the equation for participation in training and on-the-job training, respectively. Organisations that see the link between training provision to the attainment of organisation goals involve a larger fraction of their employees in training (but not in on-the-job training) activities than organisations in which the link between training and organisational goals is less clear to managers. The introduction of this construct does not change the coefficients on the remaining variables included in the model in Table 2⁽¹⁴⁾.

The regression framework allows explanatory variables to have a separate effect on the dependent variables. However, a subset of the explanatory variables may move together as a result of being linked by an underlying mechanism. For example, organisational efforts to leverage human capital are predicated on the quality of the exchange supporting the labour contract; this in turn is grounded in a balance between inducements and requirements (Blau, 1964; March and Simon, 1958; Rousseau, 1989; Schalk and Rousseau, 2017). Consequently, organisations making an effort to incentivise skills utilisation (incentivise their workers to draw on their skills to deliver tasks and contextual performance) need

⁽¹⁴⁾ The construct on the importance of training to attain organisational goals could be used to operationalise managerial beliefs about the importance of human capital. Up to this point, these beliefs have been measured using only one indicator: the importance of employee involvement as a source of competitive advantage. This means that the latent underlying concept could be measured with considerable error. However, the introduction of the construct tapping the importance of training in attaining organisational goals in the base model reduces the coefficient on the importance of employee involvement as a source of competitive advantage by 50% and 33%, in the training and on-the-job training equation; respectively. In other words, the two constructs do not measure the same underlying construct.

to use enough inducements to incentivise the desired workplace behaviours. This approach suggests that requirements (contextual performance), inducements (motivational levers and the ensuing outcome in terms of employee morale), beliefs about the importance of human capital, and the quality of the manager-employee relationship should not be looked at in isolation.

Latent class analysis (LCA) was used to group the establishments along the variables capturing the importance of contextual behaviour (helping colleagues, providing suggestions), the inducement offered (the use monetary and non-monetary motivational levers, the use of training for motivational purposes, and the use of training to support employees in providing suggestions to improve the production process), and the beliefs about the importance of human resources as a source of competitive advantage, the quality of employee-management relationships and the motivation in the workforce (Annex 3).

Four groups of establishments were identified on the basis of the intensity of the reliance on human resources for organisational success ⁽¹⁵⁾. These groups reflect the balance between inducements and requirements implied in the employee-organisation relationship (Hom et al., 2009; Tsui and Wu, 2005). The first group can be characterised as ‘balanced low inducements/low requirements’; establishments in this group are largely negative about the importance of human resources as a source of competitive advantage and have neither good nor bad management-employee relationships (this is the lowest quality of the relationship; few establishments acknowledge a worse level of management-employee relationship). There is a high incidence of establishments with relatively low motivation in the workforce.

⁽¹⁵⁾ The four groups, balanced low inducements/low requirements, balanced medium inducements/medium requirements, unbalanced high requirements/medium inducements, and balanced high requirements/high inducements, account for 14.93%, 34.63%, 24.87%, and 25.57% of the establishments, respectively. These represent the average probability that an establishment would belong to one of the four groups (*av_prob*). LCA returns a set of four probabilities for each observation, denoting the probability to belong to each of the four groups. Group membership was determined on the basis of the modal probability. The average modal probability of the establishments belonging to each of the four groups is 88%, 83%, 77%, and 87%; respectively. The (normalized) entropy measure associated with the classification is 0.701 (Celeux and Soromenho, 1996). The odds of correct classification ratio, based on the average modal probability (*av_modprob*), for group *k* is defined as

$$\frac{av_modprob_k/(1-av_modprob_k)}{av_prob_k/(1-av_prob_k)}$$

The odds of correct classification ratio for the four groups are: 41.39, 9.22, 10.11, and 19.48; respectively. Overall, these indicators point to a latent class model with good latent class separation and high assignment accuracy (Nagin, 2005).

The second group can be characterised as 'balanced moderate inducements/moderate requirements'; establishments in this group are lukewarm about the importance of human resources as a source of competitive advantage, place moderate importance on contextual performance and moderate importance on inducements, and have good management-employee relationships. The group is characterised by a relatively high incidence of establishments in which the workforce is fairly motivated.

The third group can be characterised as 'unbalanced moderate inducements/high requirements'. Establishments in this group place a lot of importance on contextual performance: helping others and making suggestions. However, they place moderate importance on the use of inducements, with the exception of the use of training for motivational purposes. Establishments in this group have good quality managerial-employee relations.

The fourth group can be characterised as 'balanced high inducements/high requirements'; establishments in this group recognise the importance of human resources as a source of competitive advantage and have very good management-employee relationships and attain high levels of motivation.

The four groups illustrate well how the increasing strength of the beliefs about the importance of human resources as a source of competitive advantage, accompanied by an increasing quality of the management/employee relationship, are followed by increasing demands on employees and increasing utilisation of a broad set of inducements. The incidence of establishments with the highest motivation in the workplace is highest among the four groups identified.

The groups show how beliefs about the importance of human capital move along with the quality of the manager-employee relationship, with the requirements and inducements, and with the overall level of motivation in the workforce.

Group membership is based on the modal probability. Including group membership in the regression model clearly shows that the higher the level of demands and inducements, the higher the incidence of training and on-the-job training provision, see Table 3.

Table 3. **Demands and inducements and participation in training and on- the-job training activities, OLS, standard errors in parenthesis (*: significant at 5%; **: significant at 1%), weighted**

	Bivariate regression model: participation in	
	Training	On-the-job training
Group 2: balanced moderate inducements - moderate requirements	0.274** (0.059)	0.260** (0.062)
Group 3: unbalanced moderated inducements - high requirements	0.289** (0.047)	0.319** (0.076)
Group 4: balanced high inducements - high requirements	0.490** (0.058)	0.461** (0.105)
Workers in complex jobs (%)	0.049 (0.036)	0.113** (0.026)
Workers in jobs in which there is need for continuous training (%)	0.298** (0.020)	0.176** (0.016)
Teamwork		
Management-directed teams	0.136** (0.066)	0.174** (0.055)
Autonomous teams	0.108 (0.082)	0.116** (0.047)
Managerial support	0.452** (0.051)	0.140** (0.040)
Managers create an environment in which employees can autonomously carry out their tasks	-0.001 (0.034)	0.010 (0.032)
Frequency of skills requirements change	0.012 (0.036)	0.023 (0.031)
Degree of direct influence exerted by employees	0.113** (0.022)	0.141** (0.035)
Correlation coefficient (ρ)		0.299** (0.020)
Number of observations	18 294	

NB: See Table 2. The reference group of the latent class grouping is: Group 1: low inducements – low requirements.

Source: Author's calculations.

Establishments with the simplest type of employment relationship, one offering few inducements but also with little demand in terms of contextual performance, tend to have the lowest incidence of employees involved in developmental activities. The group with a balanced high demands/high inducements combination is characterised by a significantly high incidence of training and on-the-job training compared to the group with a balanced moderate

demands/moderate inducements group (The Wald test statistics are 38.56 and 8.55, for training and on-the-job training, both significant at 5%) ⁽¹⁶⁾.

Given the size of the sample and good ability of the model to separate groups, the bias in the coefficient estimate induced by the measurement error in class membership (solely based on the modal class probability) is negligibly small (Bakk; Tekle and Vermunt, 2013).

⁽¹⁶⁾ These are cross-sectional results and they could be influenced by omitted variables correlated with both the dependent and one or more of the independent variables. For example, a learning culture would influence the incidence of participation in training and the likelihood that managers be supportive and the fraction of jobs involving a need for continuous training. The degree of bias that would be needed in order to make the OLS coefficient not significant (Frank et al., 2013), as a percentage of the coefficient, was calculated for the group membership dummies and for two selected variables in Table 2, the percentage of workers in jobs with continuous training and managerial support. The results are presented in the table below.

Bias needed to turn coefficient not significant		
	training (%)	on-the-job training (%)
Group 2	57.80	53.26
Group 3	68.12	53.30
Group 4	76.80	55.36
Workers in jobs with continuous training	86.85	82.18
Managerial Support	77.88	44.00

In all cases, a substantial amount of bias would be needed to render the coefficient not significant. For example, in the case of the % of workers in jobs requiring continuous training, the bias should amount to 87% of the value of the coefficient to render the coefficient on the variable not significant.

CHAPTER 5.

Conclusions

Managerial beliefs about the importance of human resources as a source of competitive advantage have very concrete consequences for employees, since they are connected to multiple organisational choices.

Our results show that variables linked to the importance of human resources for organisational success, beliefs about the importance of human capital as the source of competitive advantage, the frequency of change in skills requirements, and the quality of the management-employee relationship, have a distal relationship with the share of employees that have access to training and on-the-job training in their workplace. This result is not immediately visible because part of this association is channelled through variables linked to organisational efforts to stimulate employees' performance that are proximally related to training provision: particular examples are the provision of opportunities to contribute, managerial support for autonomy and participation in training, and job design features. The inclusion of continuous training elements in job design is associated with an increased participation in both training and on-the-job training activities. The adoption of complex job design is associated with increased participation in on-the-job training activities. The importance ascribed to the use of motivational levers is also linked to the amount of training provided. Managerial support for training is strongly associated with the incidence of participation in training and on-the-job training activities in the workforce.

Incentivising human resources to enact contextual performance requires a balance between requirements in terms of desired behaviours (requirements) and inducements offered (the utilisation of various motivational levers), a good work climate (lack of strife) and high motivation. Group membership based on the type of relationship between inducements and requirements is clearly linked to the incidence of training and on-the-job training. Membership in the low requirement/low inducement group is associated with the lowest participation in training and on-the-job training activities. Membership in the high requirements/high inducements group is associated with a significantly higher incidence of training and on-the-job training.

Managerial beliefs about the importance of human resources as a source of competitive advantage have a distal association with training provision, an indirect one through group membership. Strong beliefs about the importance of employee involvement as a source of competitive advantage are particularly common in the

high requirements/high inducements group and particularly rare in the low requirements/low inducements group.

The analyses show that what management believes about the importance of human resources and skills for the success of the organisation has concrete consequences for employees, as these beliefs are aligned in configurations that affect job design and also the balance between the requirements and the inducements, the quality of the employment relationship, and motivational outcomes. Skills utilisation and skills development are two sides of the same coin. Organisational efforts directed at improving employees' skills utilisation also support the investment in workers' skills, and skills development in general.

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Annexes

Annex 1. Descriptive statistics

Table A 1. **Descriptive statistics of the estimation sample: 17 994 observations have at least one non-missing value on each of the dependent variables (17 966 on the incidence of paid training and 17 943 on the incidence of on-the-job training), unweighted**

Variable	Mean	Std. Dev.	Min	Max
Workers who received paid training (%)	2.808	1.569	1	5
Workers who received on-the-job training (%)	2.898	1.481	1	5
Monetary rewards to motivate and retain employees	2.432	0.773	1	4
Providing interesting and stimulating work to motivate and retain employees	2.801	0.729	1	4
Communicating a strong mission and vision to motivate and retain employees	2.803	0.783	1	4
Training opportunities to motivate and retain employees	2.834	0.751	1	4
Workers in complex jobs (%)	2.328	1.243	1	5
Workers in jobs that require continuous training (%)	2.292	1.480	1	5
Teamwork				
No teams	0.250	0.433	0	1
Management-directed teams	0.597	0.490	0	1
Autonomous teams	0.153	0.360	0	1
Managerial support (work scheduled changed to allow participation in training)	0.677	0.468	0	1
Managers create an environment in which employees can autonomously carry out their tasks	0.713	0.452	0	1
Frequency of skills requirements change	2.381	0.630	1	4
Importance of helping colleagues without being asked	3.455	0.640	1	4
Importance of making suggestions for company improvement	3.341	0.681	1	4
Importance of staying longer when needed	2.914	0.813	1	4
Degree of direct influence exerted by employees	2.393	0.662	1	4
Employee involvement is a source of competitive advantage	2.893	0.885	1	4
Quality of the manager-employee relations	4.074	0.663	1	5
Employee involvement causes delay	2.844	0.855	1	4
Workers with permanent contract (%)	4.483	1.129	1	5
Workers with part-time contract (%)	1.491	1.054	1	5
Data analytics to improve production process	0.508	0.500	0	1
Data analytics to monitor workers' performance	0.326	0.469	0	1
No innovation introduced	0.453	0.498	0	1
It is difficult to find the required skills	2.951	0.736	1	4
Level of employee motivation in the establishment	2.982	0.607	1	4

Variable	Mean	Std. Dev.	Min	Max
Workers in jobs in which the pace of work is set by machines (%)	1.896	1.363	1	5
Workers in jobs in which there is no need to learn new skills (%)	1.947	1.273	1	5
Design and development of new products and services				
Yes, this is mainly carried out internally at this establishment	0.308	0.462	0	1
Yes, this is mainly carried out in collaboration with one or more other establishments within our company	0.038	0.192	0	1
Yes, this is mainly carried out in collaboration with one or more other companies	0.090	0.286	0	1
Yes, this is mainly contracted out	0.020	0.141	0	1
No	0.543	0.498	0	1
Production of goods, assembly of parts, delivery of services				
Yes, this is mainly carried out internally at this establishment	0.462	0.499	0	1
Yes, this is mainly carried out in collaboration with one or more other establishments within our company	0.053	0.223	0	1
Yes, this is mainly carried out in collaboration with one or more other companies	0.121	0.326	0	1
Yes, this is mainly contracted out	0.044	0.206	0	1
No	0.320	0.467	0	1
Establishment size (number of employees)				
Small (10-49)	0.619	0.486	0	1
Medium (50-249)	0.290	0.454	0	1
Large (250 and more)	0.091	0.287	0	1
Establishment type				
Single establishment	0.723	0.448	0	1
Headquarter	0.173	0.378	0	1
Subsidiary establishment	0.104	0.305	0	1
Industry (NACE)				
Mining and quarrying	0.004	0.064	0	1
Manufacturing	0.246	0.431	0	1
Electricity, gas, steam and air conditioning supply	0.008	0.092	0	1
Water supply, sewerage, waste management and remediation activities	0.015	0.122	0	1
Construction	0.103	0.304	0	1
Wholesale and retail trade, repair of motor vehicles	0.200	0.400	0	1
Transportation and storage	0.060	0.237	0	1
Accommodation and food services activities	0.058	0.234	0	1
Information and communication	0.040	0.197	0	1
Financial and insurance activities	0.021	0.142	0	1
Real estate activities	0.013	0.112	0	1

Variable	Mean	Std. Dev.	Min	Max
Professional, scientific, and technical activities	0.068	0.251	0	1
Administrative and support services activities	0.031	0.174	0	1
Arts, entertainment, and recreation	0.030	0.171	0	1
Other service activities	0.103	0.304	0	1
Establishment age				
10 years or less	0.139	0.346	0	1
11 to 20 years	0.235	0.424	0	1
21 to 30 years	0.257	0.437	0	1
More than 30 years	0.370	0.483	0	1
Employee representation body present				
No	0.615	0.487	0	1
Yes	0.385	0.487	0	1
Predictability of the demand for the main products or services				
Not at all predictable	0.032	0.175	0	1
Not very predictable	0.285	0.451	0	1
Fairly predictable	0.604	0.489	0	1
Very predictable	0.079	0.270	0	1
Market competition for the main products or services				
Not at all competitive	0.030	0.171	0	1
Not very competitive	0.105	0.306	0	1
Fairly competitive	0.504	0.500	0	1
Very competitive	0.361	0.480	0	1
Country				
Austria	0.047	0.212	0	1
Belgium	0.048	0.213	0	1
Bulgaria	0.043	0.203	0	1
Croatia	0.024	0.153	0	1
Cyprus	0.005	0.071	0	1
Czechia	0.040	0.196	0	1
Denmark	0.050	0.217	0	1
Estonia	0.024	0.152	0	1
Finland	0.052	0.223	0	1
France	0.061	0.239	0	1
Germany	0.032	0.176	0	1
Greece	0.022	0.146	0	1
Hungary	0.048	0.213	0	1
Ireland	0.013	0.115	0	1
Italy	0.068	0.252	0	1
Latvia	0.023	0.150	0	1
Lithuania	0.022	0.146	0	1

Variable	Mean	Std. Dev.	Min	Max
Luxembourg	0.011	0.102	0	1
Malta	0.007	0.081	0	1
Netherlands	0.051	0.220	0	1
Poland	0.036	0.187	0	1
Portugal	0.046	0.209	0	1
Romania	0.033	0.179	0	1

Source: Author's calculations.

Annex 2. Estimates of the full bivariate ordered probit and bivariate regression models of participation in developmental activities

Table A 2. **Maximum likelihood estimates of the bivariate ordered probit model of the incidence of participation in training and on-the-job training, weighted, ancillary parameters not shown**
(*: significant at 5%; **: significant at 1%)

	Workers who participated in	
	Training (%)	On-the-job training (%)
Monetary rewards to motivate and retain employees	0.026 (0.013)	0.081** (0.018)
Providing interesting and stimulating work to motivate and retain employees	-0.020 (0.030)	0.062** (0.016)
Communicating a strong mission and vision to motivate and retain employees	0.008 (0.014)	0.058** (0.012)
Training opportunities to motivate and retain employees	0.360** (0.030)	0.067** (0.011)
Workers in complex jobs (%)	0.046 (0.025)	0.090** (0.018)
Workers in jobs in which there is need for continuous training (%)	0.222** (0.016)	0.136** (0.015)
Teamwork		
Management-directed teams	0.105 (0.054)	0.117** (0.042)
Autonomous teams	0.084 (0.071)	0.070 (0.037)
Managerial support (work scheduled changed to allow participation in training)	0.289** (0.043)	0.078** (0.029)
Managers create an environment in which employees can autonomously carry out their tasks	-0.003 (0.026)	-0.003 (0.022)
Frequency of skills requirements change	-0.007 (0.030)	0.005 (0.024)
Importance of helping colleagues without being asked	0.076** (0.029)	0.107** (0.026)

	Workers who participated in	
	Training (%)	On-the-job training (%)
Importance of making suggestions for company improvement	-0.028 (0.025)	-0.018 (0.024)
Importance of staying longer when needed	-0.058** (0.018)	-0.045** (0.014)
Degree of direct influence exerted by employees	0.066** (0.020)	0.086** (0.021)
Employee involvement is a source of competitive advantage	0.004 (0.017)	0.036** (0.017)
Quality of the manager-employee relations	0.058 (0.042)	0.011 (0.048)
Employees involvement causes delay	0.035** (0.013)	0.018 (0.022)
Workers with permanent contract (%)	0.040** (0.018)	0.014 (0.015)
Workers with part-time contract (%)	0.024 (0.018)	0.061** (0.008)
Data analytics to improve production process	0.033 (0.036)	0.092** (0.040)
Data analytics to monitor workers' performance	0.126** (0.063)	0.111** (0.038)
No innovation introduced	-0.068** (0.020)	-0.093** (0.027)
It is difficult to find the required skills	0.021 (0.014)	0.007 (0.017)
Level of employee motivation in the establishment	-0.050** (0.026)	-0.028 (0.035)
Workers in jobs in which the pace of work is set by machines (%)	-0.001 (0.014)	0.005 (0.016)
Workers in jobs in which there is no need to learn new skills (%)	-0.003 (0.014)	0.011 (0.012)
Design and development of new products and services		
Carried out in cooperation with other establishments same company	0.058 (0.049)	0.070 (0.118)
In collaboration with other companies	0.168** (0.055)	0.152** (0.059)
Contracted out	0.017 (0.079)	0.009 (0.068)

	Workers who participated in	
	Training (%)	On-the-job training (%)
No	0.142** (0.028)	0.031 (0.032)
Production of goods, assembly of parts, delivery of services		
Carried out in cooperation with other establishments same company	-0.194** (0.075)	-0.100 (0.093)
In collaboration with other companies	-0.093 (0.067)	-0.024 (0.057)
Contracted out	-0.117 (0.077)	-0.023 (0.087)
No	-0.013 (0.033)	-0.009 (0.032)
Establishment size (number of employees)		
Medium (50-249)	-0.069** (0.027)	-0.035 (0.028)
Large (250 and more)	-0.074 (0.091)	-0.010 (0.062)
Type of establishment		
Headquarter	0.071** (0.033)	0.037 (0.040)
Subsidiary	0.280** (0.109)	0.173** (0.052)
Industry (NACE)		
Manufacturing	-0.010 (0.407)	0.454 (0.333)
Electricity, gas, steam and air conditioning supply	0.182 (0.623)	0.523 (0.322)
Water supply, sewerage, waste management and remediation activities	0.231 (0.429)	0.394 (0.310)
Construction	0.190 (0.474)	0.451 (0.354)
Wholesale and retail trade, repair of motor vehicles	0.038 (0.439)	0.396 (0.328)
Transportation and storage	0.126 (0.449)	0.251 (0.373)
Accommodation and food services activities	-0.075 (0.420)	0.742** (0.320)
Information and communication	-0.213 (0.440)	0.419 (0.289)

	Workers who participated in	
	Training (%)	On-the-job training (%)
Financial and insurance activities	0.301 (0.452)	0.513 (0.317)
Real estate activities	0.249 (0.421)	0.276 (0.345)
Professional, scientific, and technical activities	0.184 (0.436)	0.540 (0.295)
Administrative and support services activities	0.182 (0.429)	0.512 (0.360)
Arts, entertainment, and recreation	0.051 (0.390)	0.496 (0.329)
Other service activities	0.089 (0.400)	0.489 (0.334)
Establishment age		
11 to 20 years	0.100 (0.065)	-0.071 (0.047)
21 to 30 years	0.117 (0.086)	-0.163** (0.034)
More than 30 years	0.121 (0.087)	-0.209** (0.042)
Employee representation body present	0.099** (0.031)	0.025 (0.052)
Predictability of main products demand		
Not very predictable	0.060 (0.077)	-0.005 (0.071)
Fairly predictable	0.076 (0.074)	0.030 (0.091)
Very predictable	0.053 (0.064)	-0.036 (0.091)
Market competitiveness of main products		
Not very competitive	-0.050 (0.078)	0.121 (0.111)
Fairly competitive	-0.037 (0.064)	0.097 (0.104)
Very competitive	-0.042 (0.065)	0.132 (0.119)
Country		
Belgium	0.499** (0.024)	-0.090** (0.022)

	Workers who participated in	
	Training (%)	On-the-job training (%)
Bulgaria	-0.302** (0.022)	0.027 (0.021)
Croatia	0.051** (0.016)	-0.645** (0.018)
Cyprus	0.211** (0.025)	-0.056** (0.019)
Czechia	0.707** (0.038)	-0.414** (0.027)
Denmark	0.026 (0.024)	-0.188** (0.021)
Estonia	-0.026 (0.020)	-0.058 (0.031)
Finland	0.675** (0.024)	0.152** (0.030)
France	0.210** (0.037)	-0.451** (0.019)
Germany	-0.008 (0.021)	-0.067** (0.024)
Greece	-0.319** (0.022)	-0.470** (0.027)
Hungary	-0.288** (0.024)	-0.336** (0.021)
Ireland	0.741** (0.039)	0.307** (0.023)
Italy	0.492** (0.027)	-0.805** (0.017)
Latvia	0.241** (0.021)	-0.077** (0.028)
Lithuania	0.057 (0.035)	-0.247** (0.041)
Luxembourg	0.226** (0.030)	-0.324** (0.031)
Malta	0.317** (0.034)	-0.168** (0.023)
Netherlands	0.506** (0.024)	-0.456** (0.027)
Poland	0.443** (0.028)	-0.375** (0.026)
Portugal	0.895** (0.038)	-0.003 (0.025)

	Workers who participated in	
	Training (%)	On-the-job training (%)
Romania	-0.421** (0.032)	-0.687** (0.041)
Slovakia	0.611** (0.039)	-0.183** (0.035)
Correlation coefficient (ρ)	0.350*** (0.025)	
N	17 994	

Source: Author's calculations.

Table A 3. **Maximum likelihood estimates of the bivariate ordered regression model of the incidence of participation in training and on-the-job training, weighted (*: significant at 5%; **: significant at 1%)**

	Bivariate regression model: participation in	
	Training (%)	On-the-job training (%)
Monetary rewards to motivate and retain employees	0.031 (0.016)	0.092** (0.021)
Providing interesting and stimulating work to motivate and retain employees	-0.027 (0.037)	0.071** (0.021)
Communicating a strong mission and vision to motivate and retain employees	0.004 (0.016)	0.068** (0.014)
Training opportunities to motivate and retain employees	0.428** (0.034)	0.091** (0.019)
Workers in complex jobs (%)	0.054 (0.029)	0.111** (0.023)
Workers in jobs in which there is need for continuous training (%)	0.264** (0.018)	0.164** (0.013)
Teamwork		
Management-directed teams	0.125** (0.063)	0.144** (0.052)
Autonomous teams	0.109 (0.082)	0.094** (0.041)
Managerial support (work scheduled changed to allow participation in training)	0.336** (0.057)	0.105** (0.038)

	Bivariate regression model: participation in	
	Training (%)	On-the-job training (%)
Managers create an environment in which employees can autonomously carry out their tasks	-0.009 (0.031)	-0.007 (0.028)
Frequency of skills requirements change	-0.019 (0.037)	-0.002 (0.029)
Importance of helping colleagues without being asked	0.080** (0.031)	0.131** (0.032)
Importance of making suggestions for company improvement	-0.032 (0.032)	-0.024 (0.027)
Importance of staying longer when needed	-0.064** (0.019)	-0.056** (0.016)
Degree of direct influence exerted by employees	0.078** (0.023)	0.096** (0.031)
Employee involvement is a source of competitive advantage	0.004 (0.021)	0.042** (0.021)
Quality of the manager-employee relations	0.061 (0.049)	0.010 (0.054)
Employee involvement causes delay	0.037** (0.015)	0.018 (0.024)
Workers with permanent contract (%)	0.046** (0.020)	0.017 (0.017)
Workers with part-time contract (%)	0.031 (0.020)	0.071** (0.007)
Data analytics to improve production process	0.014 (0.045)	0.099** (0.048)
Data analytics to monitor workers' performance	0.160** (0.068)	0.136** (0.050)
No innovation introduced	-0.080** (0.027)	-0.124** (0.033)
It is difficult to find the required skills	0.019 (0.017)	0.002 (0.020)
Level of employee motivation in the establishment	-0.049 (0.027)	-0.035 (0.038)
Workers in jobs in which the pace of work is set by machines (%)	-0.010 (0.016)	0.006 (0.017)
Workers in jobs in which there is no need to learn new skills (%)	-0.001 (0.014)	0.012 (0.016)

	Bivariate regression model: participation in	
	Training (%)	On-the-job training (%)
Design and development of new products and services		
Carried out in cooperation with other establishments, same company	0.066 (0.064)	0.048 (0.146)
In collaboration with other companies	0.193** (0.064)	0.190** (0.074)
Contracted out	0.027 (0.079)	0.009 (0.082)
No	0.163** (0.036)	0.040 (0.039)
Production of goods, assembly of parts, delivery of services		
Carried out in cooperation with other establishments, same company	-0.217** (0.075)	-0.115 (0.121)
In collaboration with other companies	-0.106 (0.090)	-0.031 (0.074)
Contracted out	-0.112 (0.097)	-0.022 (0.100)
No	-0.019 (0.041)	-0.002 (0.045)
Establishment size (number of employees)		
Medium (50-249)	-0.065** (0.032)	-0.032 (0.036)
Large (250 and more)	-0.064 (0.096)	0.004 (0.068)
Type of establishment		
Headquarter	0.075** (0.029)	0.041 (0.043)
Subsidiary	0.342** (0.118)	0.197** (0.067)
Industry (NACE)		
Manufacturing	-0.109 (0.432)	0.542 (0.351)
Electricity, gas, steam and air conditioning supply	0.096 (0.664)	0.688 (0.366)
Water supply, sewerage, waste management and remediation activities	0.202 (0.451)	0.461 (0.322)
Construction	0.099 (0.496)	0.537 (0.367)

	Bivariate regression model: participation in	
	Training (%)	On-the-job training (%)
Wholesale and retail trade, repair of motor vehicles	-0.068 (0.454)	0.469 (0.348)
Transportation and storage	0.066 (0.469)	0.303 (0.394)
Accommodation and food services activities	-0.183 (0.435)	0.895** (0.335)
Information and communication	-0.338 (0.467)	0.509 (0.292)
Financial and insurance activities	0.227 (0.495)	0.578 (0.326)
Real estate activities	0.158 (0.431)	0.302 (0.352)
Professional, scientific, and technical activities	0.134 (0.460)	0.649** (0.299)
Administrative and support services activities	0.087 (0.434)	0.621 (0.375)
Arts, entertainment, and recreation	-0.066 (0.426)	0.602 (0.342)
Other service activities	0.001 (0.409)	0.585 (0.345)
Establishment age		
11 to 20 years	0.106 (0.065)	-0.097 (0.057)
21 to 30 years	0.127 (0.098)	-0.205** (0.041)
More than 30 years	0.142 (0.105)	-0.269** (0.051)
Employee representation body present	0.117** (0.040)	0.042 (0.065)
Predictability of main products demand		
Not very predictable	0.079 (0.092)	-0.004 (0.087)
Fairly predictable	0.087 (0.087)	0.021 (0.119)
Very predictable	0.049 (0.080)	-0.036 (0.100)
Market competitiveness of main products		
Not very competitive	-0.051 (0.100)	0.151 (0.141)

	Bivariate regression model: participation in	
	Training (%)	On-the-job training (%)
Fairly competitive	-0.050 (0.096)	0.114 (0.134)
Very competitive	-0.046 (0.084)	0.140 (0.153)
Country		
Belgium	0.617** (0.022)	-0.137** (0.022)
Bulgaria	-0.223** (0.024)	0.027 (0.025)
Croatia	0.073** (0.017)	-0.821** (0.027)
Cyprus	0.260** (0.031)	-0.092** (0.020)
Czechia	0.838** (0.044)	-0.516** (0.038)
Denmark	0.031 (0.031)	-0.270** (0.026)
Estonia	0.010 (0.026)	-0.088** (0.038)
Finland	0.809** (0.038)	0.168** (0.038)
France	0.233** (0.040)	-0.587** (0.022)
Germany	-0.002 (0.023)	-0.108** (0.029)
Greece	-0.303** (0.026)	-0.587** (0.031)
Hungary	-0.244** (0.023)	-0.444** (0.026)
Ireland	0.885** (0.031)	0.341** (0.028)
Italy	0.604** (0.023)	-1.011** (0.023)
Latvia	0.309** (0.029)	-0.121** (0.037)
Lithuania	0.068 (0.041)	-0.317** (0.048)
Luxembourg	0.255** (0.038)	-0.435** (0.036)

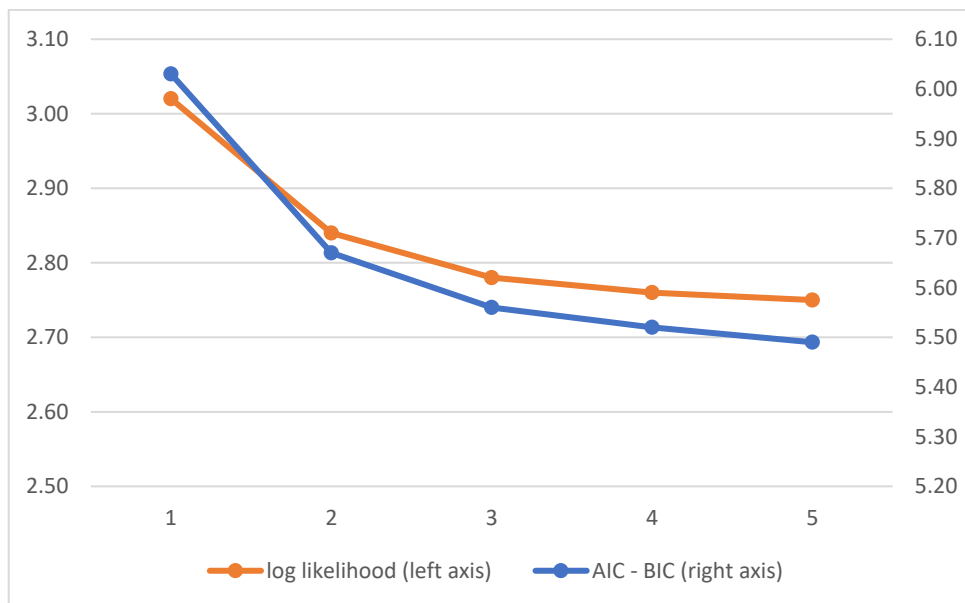
	Bivariate regression model: participation in	
	Training (%)	On-the-job training (%)
Malta	0.484** (0.042)	-0.246** (0.025)
Netherlands	0.602** (0.026)	-0.612** (0.034)
Poland	0.520** (0.027)	-0.482** (0.037)
Portugal	1.092** (0.026)	-0.018 (0.029)
Romania	-0.395** (0.037)	-0.846** (0.043)
Slovakia	0.753** (0.042)	-0.236** (0.040)
Correlation coefficient (ρ)		0.294** (0.021)
N	17 994	

Source: Author's calculations.

Annex 3. Latent class analysis

The four-group solution was chosen since the addition of a fifth group led only to a small reduction in likelihood and the AIC and BIC criteria see Figure A1.

Figure A 1. **The likelihood and the BIC and AIC criteria as a function of the number of groups**



Source: Author's calculations.

Table A 4. Incidence of the answering categories in the variables used for the latent class analysis and in the whole sample

	Group 1	Group 2	Group 3	Group 4	Sample
Importance of helping colleagues without being asked					
Not at all important	0.051	0.001	0.001	0.003	0.010
Not very important	0.229	0.042	0.000	0.012	0.058
Fairly important	0.509	0.637	0.165	0.143	0.413
Very important	0.211	0.320	0.834	0.842	0.520
Importance of staying longer when needed					
Not at all important	0.105	0.052	0.029	0.063	0.059
Not very important	0.272	0.245	0.146	0.156	0.207
Fairly important	0.435	0.576	0.464	0.392	0.500
Very important	0.189	0.127	0.362	0.389	0.235
Importance of making suggestions for company improvement					
Not at all important	0.068	0.004	0.000	0.007	0.013
Not very important	0.368	0.078	0.001	0.010	0.087
Fairly important	0.438	0.778	0.228	0.201	0.456
Very important	0.126	0.140	0.772	0.782	0.444
Utilisation of monetary incentives to motivate					
Never	0.264	0.081	0.093	0.111	0.101
Not very often	0.517	0.482	0.491	0.321	0.462
Fairly often	0.185	0.381	0.366	0.393	0.356
Very often	0.034	0.056	0.051	0.175	0.081
Utilisation of mission and vision statements to motivate					
Never	0.242	0.012	0.016	0.006	0.046
Not very often	0.612	0.372	0.274	0.034	0.308
Fairly often	0.136	0.558	0.609	0.354	0.463
Very often	0.010	0.058	0.101	0.606	0.184
Utilisation of challenging work to motivate					
Never	0.177	0.004	0.007	0.003	0.034
Not very often	0.656	0.301	0.266	0.029	0.308
Fairly often	0.158	0.641	0.660	0.428	0.504
Very often	0.010	0.055	0.067	0.540	0.154
Utilisation of developmental opportunities to motivate					
Never	0.145	0.008	0.016	0.006	0.029
Not very often	0.636	0.363	0.318	0.089	0.321
Fairly often	0.192	0.542	0.539	0.389	0.463
Very often	0.027	0.087	0.127	0.516	0.187

	Group 1	Group 2	Group 3	Group 4	Sample
Importance of training to sustain motivation					
Not at all important	0.113	0.010	0.001	0.005	0.019
Not very important	0.394	0.130	0.049	0.043	0.122
Fairly important	0.375	0.710	0.418	0.197	0.478
Very important	0.118	0.150	0.532	0.755	0.381
Importance of training to support innovation					
Not at all important	0.127	0.007	0.003	0.004	0.020
Not very important	0.474	0.214	0.037	0.047	0.167
Fairly important	0.331	0.712	0.568	0.334	0.528
Very important	0.068	0.068	0.391	0.615	0.285
Employee involvement is a source of competitive advantage					
Not at all	0.239	0.085	0.044	0.073	0.087
To a small extent	0.365	0.278	0.173	0.115	0.223
To some extent	0.274	0.504	0.493	0.369	0.428
To a great extent	0.122	0.133	0.289	0.443	0.263
Quality of the manager-employee relations					
Very bad	0.004	0.000	0.000	0.003	0.002
Bad	0.046	0.000	0.005	0.000	0.010
Neither good nor bad	0.403	0.117	0.143	0.022	0.148
Good	0.461	0.690	0.703	0.416	0.597
Very good	0.085	0.193	0.149	0.559	0.244
Level of employee motivation in the establishment					
Not at all motivated	0.049	0.001	0.004	0.005	0.012
Not very motivated	0.425	0.094	0.144	0.010	0.167
Fairly motivated	0.468	0.777	0.777	0.533	0.660
Very motivated	0.058	0.128	0.075	0.451	0.161

Source: Author's calculations.

ORGANISATIONAL DETERMINANTS OF TRAINING

6210 EN -TI-BA-22-003-EN-N - doi:10.2801/442704

Organisations centring their operations around human resources, in which skills are instrumental to the attainment of organisational goals, should create a climate to incentivise performance: the returns on any training depend on employee performance. To elicit such performance, organisations may challenge workers' skills (through complex job design, delegating decision-making, and employee involvement), stimulate motivation (utilising monetary and non-monetary incentives) and create opportunities for employees to make a contribution.

The importance of the role of human resources in training provision may not be immediately clear because organisational measures to support employee performance are proximally related to training provision. Variables linked to the importance of human resources are positively associated with the incidence of training and on-the-job training. Part of this association is channelled through job design and the use of incentives. Managerial beliefs about the importance of human resources influence group membership which is associated with the amount of training provision.



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Publications Office
of the European Union

ISBN 978-92-896-3417-5



9 789289 634175