Continuing Vocational Training of Human Resources: Results of a Longitudinal Survey

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Abstract

The paper focuses on company-provided management training and its determinants utilizing a longitudinal survey of Bulgarian firms conducted between 2020 and 2024. Data has been collected through a standardized interview with firm owners or managers. In addition to training participation, the questionnaire includes a wide range of aspects such as company characteristics, innovation activity, learning culture. Framed with the institutional paradigm, the study estimates the relationship between business investments in management training and three company attributes: size, measured by the number of employees, innovation activity and commitment to learning. To ensure robustness of empirical outputs and conclusions, two alternative estimation methods have been applied – binary logistic regressions as well as non-parametric tests. Stability of the relationships over time has also been assessed by a year term in the models. Empirical analyses indicate that learning orientation is the strongest and most significant predictor of management continuing training. Second, genuine innovations, rather than imitative changes, are correlated with continuing training. A stable positive association exists between industry-wide innovations and management training regardless of firm size while introducing products and services which are new or significantly improved for the company but not for its rivals, does not exhibit a statistically significant effect.

Keywords: *continuing vocational training, management training, firm provided training, innovation, learning culture*

1. Introduction

In today's dynamic world of technological changes and, in turn, new business models, continuing education and training is expected to play a key role for worker labor market competitiveness, company market success as well as national growth prospects. Although the benefits of training have been widely recognised, some countries still lag behind. According to Eurostat, the average percentage of employed people who have participated in continuing education and training across the EU is 43% on average but this number hides the wide differences between the member states ranging from 18.5% in Greece to 83.7% in the Czech Republic. Given these big differentials, it is important to explore to a greater extent the training patterns through country-by-country analyses. Therefore, the current study focuses on firm-provided vocational management training across Bulgarian companies. The research topic is chosen for two reasons. First, Bulgaria is one of the EU countries with lowest involvement of companies in lifelong learning. For example, in 2020, the share of enterprises providing continuing training was only 41.1% compared to 67.4% for the EU-28. Additionally, Bulgarian management is considered less professionally prepared than that in other European countries [1]. According to a study of Ruseva [2] only 53% of Bulgarian managers are aware of the problems and needs faced by their organisations. The present paper extends the scientific research in two directions. It examines a country with low participations in adult learning which might have important policy implications and focuses on determinants of management training particularly – an issue not well developed in the relevant literature. The study utilizes the results of a longitudinal survey comprising three waves – in 2020, 2022, and 2024 respectively. The structure is as follows. Section 2 makes an overview of the theory regarding firm investments in continuing education and training and, on this basis, formulates research questions and hypothesis. Section 3 describes the survey and makes a comparative descriptive analysis across the three rounds. Section 4 presents the empirical models and outputs. Concluding remarks are given in the last section.

2. Determinants of Firm-Provided Training: Theoretical Background in Brief

Firm investment in vocational education and training could be explained in the light of two main views – human capital theory and institutionalism. Training activities are widely regarded as investments in human capital that enhance productivity, efficiency, and competitiveness. From a rational perspective, firms invest in training only when the expected benefits—such as productivity gains—exceed the associated costs. In a perfectly competitive labor market, employees who receive training would earn higher wages reflecting their increased marginal productivity [3]. Employers are generally reluctant to finance general training, since the

acquired skills are transferable and may benefit firm rivals if the employee decides to change his or her job after training. Therefore, companies are willing to invest in firm-specific training, particularly, since the benefits would be retained within the company [4]. Nevertheless, when worker abilities differ and information about training outcomes is imperfect, employers may still finance general training. Firms may offer higher wages to retain high-ability people while encouraging the turnover of the less productive ones [5].

A significant body of research on work-based training is rooted in institutional theory [6]. From this perspective, continuing training is shaped by the inside and outside environment in which the company operate. It can be viewed as a response to formal regulations, industry norms, shared beliefs, and societal values at national, sectoral, or organizational levels. Factors such as trade union presence, organizational culture and ethics, market structures, and processes of institutional change influence firm training decisions [7,8]. Thus, training investments are not determined solely by economic rationality but are embedded in a broader institutional environment. The studies also underline the key importance of organizational factors such as involvement in R&D and innovations; existence of human resource development strategy and practices as well as focus on learning [9,10,11,12]. Sharing of work experiences, learning-oriented culture, appointment of staff responsible for training, private ownership, transparency and fairness in selection of trainees are conducive to lifelong learning in enterprises [13, 14, 15].

Regarding all said above, the current study explores the role of intra-company determinants of firm-provided management training by raising two research questions:

1. Are company attributes such as company size, innovation activity as well as focus on learning related to management training?
2. Are those relationships, if any, stable over time, particularly before and after CoVid-19 pandemics?

The research hypothesis is that firm size, propensity to innovate as well as learning orientation are positively associated with participation in management training.

3. Data and Estimation Method

To test the abovementioned hypothesis, the study uses data from a longitudinal survey of companies operating in the southeastern region of Bulgaria, conducted in three waves: 2020, 2022, and 2024. All samples are representative in terms of firm demographics thus enabling meaningful comparisons across the three rounds to be made. This, in turn, enhances the robustness and reliability of the research findings and strengthens the validity of the conclusions. The data was collected by direct standardized interviews with company manager or owner. The questionnaire comprised a wide range of questions on firm characteristics, policies and practices, including continuing training of managers. The survey was prepared and conducted by a specialized agency which assures its consistency and quality realization.

Table 1. Characteristics of the samples

Survey round	2020	2022	2024
Company's size (number of employees)			
Micro (0-9 employees)	34.7%	38.9%	38.9%
Small (10-49 employees)	33.3%	31.0%	31.0%
Medium and large (50+ employees)	32.0%	30.1%	30.1%
Sector of activity*			
Construction	24,0%	3,5%	4,7%
Trade, repair of motor vehicles and motorcycles	17,3%	14,2%	11,2%
Processing industry	14,7%	23,0%	19,6%
Hospitality industry	4%	20.4%	20.6%
Agriculture, forestry and fishing	13,3%	18,6%	15,0%
Firm-provided continuing training for managers**			
Never	60.0%	51.3%	25.2%
Yes, once	13.3%	18.6%	27.1%
Yes, several times	22.7%	26.5%	37.4%
Yes, by a long-term contract	4.0%	3.5%	10.3%
Training provider			
Individual training specialist	32.0%	18.6%	47.7%
A small company	21.3%	25.7%	19.6%
University/specialised training organisation	6.7%	16.8%	19.6%
NGO	8.0%	8.8%	6.5%
Government organisation	4.0%	7.1%	1.9%

*Only the first three are reported.

**The percentage of respondents answered by "I cannot say" has not been presented here.

Table 1 presents the sample characteristics. More than two-thirds of respondents were micro- or small enterprises with less than 50 employees. The sectoral distribution differs across the three rounds – whereas in 2020 the respondents predominantly operated in the field of Construction (23.8%), Trade, repair of motor vehicles and motorcycles (18.5%), and Processing Industry (16.6%), in 2022 and 2024 the biggest percentage came from Hospitality Industry - 20.4 % and 20.6%, respectively, followed by Processing Industry - 23% in 2022 and 19.6% in 2024, and Agriculture, forestry and fishing – 18.6% in 2022 and 15% in 2024. These differences reflect the change in the sectoral landscape of the Bulgarian economy over the investigated period, and, in turn, ensures representativeness. The number of companies being interviewed is 75, 113, and 107, respectively which accounts for approximately 0.2% of the total number of enterprises in the region per round.

The data shows a clearly expressed upward trend regarding investments in management training. In the first as well as the second round at least 70% of respondents admitted that they had not at all or have only once provided continuing training of managers. For the third round that percentage significantly fell to less than 53%. The percentage of respondents with no training was more than two times lower. Respectively, the share of companies providing management training on long-term contractual basis more than doubled from 4% to 10.3% between 2020 and 2024. The list of the most often used providers includes a training specialist, a small company specializing in training or a university/training organization. The role of the latter in providing management training has been continuously rising over the years from 6.7% during the first wave to nearly 20% in the last survey. Government organisations are rarely selected as trainers.

The main estimation method to test the hypothesis includes binary logistic regressions taking a general form as follows (eq .1):

$$L_i = \ln\left(\frac{P_i}{1-P_i}\right) = B_0 + \sum_{i=1}^{n} B_i\, x_i + \varepsilon_i \qquad (1)$$

The models are estimated on the basis of the results from the first (2020) and the third (2024) round, only. The data for the former was gathered in January 2020, just before the beginning of CoVid-19 crisis. Considering that the two time periods under investigation cover pre- and post-CoVid19 years, the study could, at least indirectly, give some insights into the role of pandemics for training. In all regressions, the dependent variable is a binary variable measuring the existence of firm-provided continuing management training. The variable takes the value of 1 if the company has not provided any management training at all or has participated in training only once. In case of more than one case of management training, the variable equals 2. The regression coefficients (*Bi*) show how the log of the odds ratio changes in case of a unit increase in the factor variable x_i [16]. Alternatively, *Exp(B)* indicates the increase of the odds ratio.

In addition to binary logistic regressions, nonparametric tests are used for assuring the robustness of the results and conclusions – Chi-square test and Mann-Whitney U test. The next section highlights the empirical outcomes.

4. Research Outputs and Analyses

A separate regression was run for each factor of training being tested. The models are of the form (eq. 2):

$$\text{Logit(CTM)}=\beta 0+\beta 1*\text{Xi}+\beta 2*(\text{Xi}*\text{Year})+\beta 3*(\text{Year}) \qquad (2)$$

CTM is the binary dependent variable for continuing management training presented above. Constructed in this way, the specification allows for the stability of the impact of a given factor on training over time to be estimated. The variable *year* takes 0 for the first survey wave (2020), and 1 for the third one (2024). The size of the enterprise denoted by *firm size* (see, table 1) is measured by a categorical variable which equals 1 for the micro-companies (up to 9 employees), 2 in case of a small or a medium-size company (between 10 and 49 people), and 3 for larger players (50+ employees).

The second training determinant – innovation activity - is defined as an introduction of a product, service, method or process which is new or significantly improved either for the industry or the company. The paper differentiates between its quantity and quality by using two proxies. The binary categorical variable denoted *innovation* (see, table 1) reflects the answers to the question “Did your organization introduced an innovation in the year…” referring to the year preceding the survey. The variable takes 1 in case of a confirmatory answer or 2, otherwise. Alternatively, *innovation scope* is used as a measure of innovation quality. It is a binary categorical variable equal to 1 if the respondent claims that over the two years prior to the survey an industry-level innovation not only for the firm but also for its competitors has happened in products or

services being supplied. The variable is coded by 2 if the product/service being introduced was new for the company but not for the market and customers. In case of no innovations, the variable equals 3.
The third training determinant is *learning commitment*. It is a scale variable calculated as an average of three items, each one representing one of the following statements:

1. The ability of employees to learn is a key competitive advantage.
2. Employee training is considered an investment rather than cost.
3. Employee training is a main priority.

Each of the above is measured by a 5-point Likert scale varying from 1 for “Definitely, no” to 5 for “Definitely, yes”.

Table 2. Binary logistic regression output

Independent variables	Estimate	St. error	Wald	Sig.	Exp(B)	Goodness of Fit	
						Nagelkerke R^2 p-value	Hosmer–Lemeshow Test p-value
Model 1						0.153	0.911
firm size			6.496	0.039**			
firm size (micro companies)	-1.768	0.747	5.598	0.018**	0.171		
firm size (small companies)	-0.439	0.461	0.906	0.341	0.645		
year	1.636	1.037	2.489	0.115	5.136		
firm size * year	-0.302	0.450	0.449	0.503	0.740		
Model 2						0.091	1.000
innovation	1.030	0.558	3.404	0.065*	0.958		
innovation * year	0.703	0.680	1.067	0.302	2.019		
year	-0.43	1.019	0.002	0.966	0.958		
Model 3						0.206	0.903
innovation scope			6.896	0.032**			
product/service new for the industry	1.191	0.610	3.808	0.051*	3.289		
product/service new for the company only	-0.126	0.483	0.068	0.795	0.082		
innovation scope * year	-0.329	0.394	0.698	0.403	0.720		
year	1.544	0.908	2.889	0.089*	4.683		
Model 4						0.206	0.426
learning commitment	0.631	0.240	6.916	0.009***	1.879		
learning commitment * year	0.147	0.333	0.195	0.659	1.158		
year	0.319	1.321	0.058	0.809	1.376		

***,**,* Statistical significance at 0.01, 0.05 and 0.10 level, respectively

The model goodness of fit is estimated by Hosmer-Lemeshow (HL) test [17] which is widely applied as a standard tool in logistic regressions. A p-value higher than 0.5 implies a failure to reject the null that the model is appropriate in the context of the empirical data. Nagelkerke estimate [18] is a pseudo R-square for generalized linear models ranging from 0 to 1. A value above 0.2 implies a moderate relationship and is considered good fit in the field of social sciences [19].

The regression outputs are presented in table 2. According to the first model, company size is a significant predictor of training, in general (p-value = 0.039). Not unexpected, the negative regression coefficients imply that both micro- and small firms are less likely to provide management training than larger firms. The odds are much lower and statistically significant at 5% level (p-value = 0.018) for micro-firms, particularly. For small companies, the association is weaker and not significant (p-value = 0.341). The positive association is stable over time since the coefficients for *year* as well as the interaction term are not significant. The Hosmer–Lemeshow test has a very high p-value (0.911) indicating that the model performs well. However, Nagelkerke R^2 of 0.153 shows that, although statistically significant, firm size exerts only a weak effect on participation in management training and the model explains hardly 15% of the variance.

Model 2 evaluates the effect of innovation culture on training. It demonstrates a good fit to the data (HL = 1) but its explanatory power is very limited, as indicated by the low value of Nagelkerke R^2 (< 0.10). The regression coefficient for *innovation* is above zero (1.030). This means that companies with innovation in their products, services, methods or processes have higher odds of providing management training in comparison with the competitors which have not recorded any innovation activity. Nonetheless, the higher than 0.05 p-value (0.065) implies marginal statistical significance which suggests a lack of conclusive evidence on the link between innovation quantity and firm investments in management training. Covid-19 crisis has not changed the relationship.

Table 3. Test outputs

Factor	Test	p-value[1]
firm size		
firm's size total effect	Chi-square[2]	0.003***
firm's size (round 1)		0.025**
firm's size (round 2)		0.053*
Cramer's V (round 1) value/p-value		0.313 (0.025**)
Cramer's V (round 2) value/p-value		0.234 (0.053*)
innovation		
innovation total effect	Chi-square	0.108
innovation (round 1)		0.060*
innovation (round 2)		0.400
Breslow-Day test		0.300
Mantel–Haenszel statistics		0.103
innovation scope		
innovation scope total effect	Fisher–Freeman–Halton	0.033**
innovation scope (round 1)		0.000***
innovation scope (round 2)		0.000***
Cramer's V (round 1) value/p-value		0.312 (0.027**)
Cramer's V (round 2) value/p-value		0.378 (0.000***)
learning commitment		
learning commitment total effect	Mann-Whitney U test	
learning commitment (round 1)		0.005***
learning commitment (round 2)		0.001***
Kolmogorov-Smirnov Z (round 1) value/p-value		1.393 (0.041)**
Kolmogorov-Smirnov Z (round 2) value/p-value		1.735 (0.005)***

[1]Group 1 includes enterprises which have never participated in management education and training or those participating only once while group 2 the firms with more management training activity.
[2]Pearson's Chi-square p-value
***,**,*Statistical significance at 0.01, 0.05 or 0.10 level, respectively.

The introduction of a separate variable measuring innovation quality changes the outcome. Wald statistics for model 3 shows that not innovation per se but its scope is a statistically significant determinant of management training (p-value = 0.032). In table 2, the coefficient for the variable titled *product/service new*

for the industry is above zero. Moreover, according to *Exp (B),* companies with market-wide innovations have 3.3 times higher odds of training involvement compared to non-innovators. The statistical significance is high given the slightly above the accepted 5% margin p-value (0.051). On the other hand, the impact of firm-level innovations denoted by *product/service new for the company only* is negative and statistically non-significant. The coefficient for *year* is marginally significant at 0.10 but the high p-value (0.403) for the interaction term *innovation scope*year* indicates a lack of evidence that the association has changed during the post-CoVid-19 years. In general, the output reveals that innovations rather than imitations matter for management training. The model exhibits good fit to data with HL near 1 and shows a moderate association between the scope of firm innovations and training incidences.

Since there is a likelihood that due to lower financial and non-financial constraints, higher R&D spending, scale economies as well as market power, larger firms have higher innovative outputs [20], we check if the outcomes of model 2 and 3 result from the positive link between company size and continuing training as model 1 implies. According to the correlation analysis between training participation and each of the two innovation proxies included in model 2 or model 3, both the zero order correlations and partial correlation coefficients with company size used as control are statistically significant. Moreover, the lack of significant correlation between size and innovation indicators used here is in compliance with the non-linear relationship found by some studies. For example, there is evidence that smaller firms have significant potential in product innovations, and in cases of rapid innovation changes [21,22]. So, in this study, the results for the role of innovation performance cannot be explained by firm size.

The third factor – *learning commitment* – is positively linked to firm-provided training (model 4). This is the only coefficient with p-value less than 0.01. Additionally, *year* and the interaction term are not significant (p-value > 0.10) which denotes a stable effect of learning culture on training. Model 4 has moderate explanatory power (p-value = 0.206) and demonstrates a good fit to the data as shown by HL test statistics (p-value = 0.426).

For checking the robustness of the regression outputs discussed above, non-parametric testing has been performed additionally. The results are described in table 3. Chi-square test is employed to the cases of a categorical type factor variable such as firm size, innovation activity or innovation scope. The test results confirm the positive association between larger size and training. However, some slight differences over time have been observed due to the marginal significance for the second round since p-value is slightly above 0.05. Cramer's V statistics is higher than 0.2 denoting a moderate correlation which is a bit lower for the second round.

Regarding the role of innovations, the same as logistic model, the test has not found an overall statistically significant correlation at the 5% level. Chi-square p-value is 0.103. However, during pre-CoVid-19 period, there were some indications for a positive relationship since the p-value is (0.06) is significant at 10% level. A stratified analysis controlling for year was conducted using the Mantel–Haenszel (MH) procedure. The Breslow–Day test indicates that the odds ratios did not significantly differ across years (p = 0.30). The MH shows no significant association between innovation and training after adjusting for year (p-value > 0.10). Overall, no conclusive evidence has been found that the companies declaring some innovation activity are active also in training which is in compliance with the regression outcome above. Contrary to the latter, the statistical analysis once again proves the existence of a robust stable correlation between the scope of innovations and training involvement. The Fisher–Freeman–Halton exact test is more appropriate in this case because of the small cell counts for the first wave (2020). The total effect is significant at the 0.01 threshold (p-value = 0.033). Cramer's V demonstrates a moderate link between innovation quality and training for the first round (0.312) and moderate to strong effect for the second round (0.378).

To explore the effect of learning culture, Mann-Whitney U test is employed due to the non-normal distribution of *learning commitment* variable and the dichotomous grouping structure. It enforces the outcome of the logistic regression (table 2) by confirming that the organizational focus on human resource development differs significantly between firms with no or very weak management training involvement and those with more intensive participation. The relationship is robust over time as p-value is less than 0.01 for both rounds. The effect size is 0.32 denoting a clearly expressed medium effect. Comparing the four determinants of training being tested, the analysis shows the underlining role of human resource management and the emphasis placed on learning.

5. Concluding Remarks

The aim of this study is to explore the link between selected firm-level attributes and management training. In line with the institutional paradigm, several factors have been included in the econometric specifications: firm size, existence of innovations, innovation scope, and focus on learning. The data comes from two rounds of a field survey conducted with Bulgarian companies. This allows for estimating the stability of the training

determinants over time, specifically before and after CoVid-19 pandemics. The outputs suggest a positive significant association between company size and training incidences. Micro-companies are much less likely to provide training to their managers than the large players. Bulgarian firms employing up to 9 people account for nearly 94% of the total number of non-financial enterprises which is a plausible explanation of the low country involvement in firm-sponsored adult learning.

Regarding the second training determinant, the results differ according to the innovation indicator being applied. Introduction of an innovation, though positively related to training, lacks statistical significance at the 0.05 level. While not entirely foreseen, this outcome is explainable considering the broad definition of innovation used here. The latter encompasses any introduction of new or significantly improved products, services, methods, or processes in an organization. Once the quality of innovation is estimated, the effect becomes statistically significant. A stable positive link emerges between the scope of innovations and management training with innovation leadership acting as a catalyst of business investments in training. This outcome is consistent with the resource-based view [23] which sees learning as a key strategic organizational asset. On the other hand, there is no conclusive evidence regarding the effect of firm-only innovations. The study suggests that regular management training is offered by companies with genuine innovations, rather than imitative ones, regardless of firm size. The final factor being tested is learning orientation. Here, it is approximated by respondent perception of learning as a main source of competitive advantage and a key priority for the company. Both the binary logistic regression and the non-parametric test provide evidence of the essential role of learning commitment.

Overall, the current study fully confirms the hypothesized relations regarding firm size as well as learning orientation, while partially justifying the role of innovation performance. Moreover, it underlines the primary importance of learning culture and market-wide innovations of product or services produced by the firm. Thus, the research findings are in line with resource-based view and institutional theory.

The paper has some practical implications for public policy in adult learning. The government should direct its efforts to create incentives for micro-firms to invest in staff training given the financial constraints which such organisations likely face. According to a field study on continuing vocational education and training across Bulgarian companies conducted in 2024 [24], the three most effective measures of government support include direct subsidies from government budget covering all the associated expenses for 34% of respondents, national or European projects (23%), direct subsidies covering part of training spending (15%). Such measures might lead not only to human capital accumulation but also to higher firm potential to innovate. The reverse effect of training on innovation capacity needs to be further examined.

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