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ABSTRACT

Small Enterprises' Digital Competencies and Financial Performance

In the contemporary business landscape, digital competencies have become a crucial factor for small enterprises to remain competitive and thrive. The present study examines how a business applications training, aiming to boost small enterprises' digital competencies, affects their financial performance. The business applications training took place in Greece, Cyprus, and the United Kingdom. Longitudinal data were collected between 2021 and 2023. The study revealed a positive association between digital competencies and the revenue growth rate of enterprises. Moreover, it was observed that following business applications training, the impact of digital competencies on the revenue growth rate strengthened compared to before the training. This pattern persisted across all three regions, underscoring the robustness of the estimated outcome. The study indicates that training that boosts enterprises' digital competencies could facilitate their ability to adapt to changing market conditions and stay competitive, contributing to increased financial performance. Small enterprises that develop and leverage digital competencies could be better positioned to seize growth opportunities, enhance efficiency, and adapt to the evolving business landscape.

JEL Classification: D25, O14, M53

Keywords: digital competencies, small enterprises, business applications, financial performance, revenue growth, immigrant entrepreneurship

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1. Introduction

Digital transformation is not merely a technological shift but a strategic enabler that influences various aspects of business operations, customer engagement, and overall competitiveness in the market (Drydakis, 2022a). Enterprises that successfully leverage digital competencies are better positioned to adapt to the dynamic business landscape and capitalize on growth opportunities (Drydakis, 2022a). Digital competencies refer to the enterprise's ability to effectively leverage digital technologies to achieve its business objectives (Oberländer et al., 2020). These competencies enable enterprises to innovate and adapt quickly to changing market conditions (Drydakis, 2022a). This agility allows enterprises to introduce new products or services faster, respond to customer needs, and stay ahead of competitors (Drydakis, 2022a).

The present study indicates that there might be a positive association between digital competencies and the financial condition of small enterprises. Indeed, small enterprises possessing digital competencies are more effective in collecting, analyzing, and interpreting data related to customer behaviour, market trends, and financial performance (Drydakis, 2022a; b). This data-driven approach to decision-making can lead to more informed choices that positively impact on enterprises' revenue. Moreover, small enterprises with digital competencies can streamline their operations by implementing digital tools for various tasks such as inventory management, customer relationship management, accounting, and supply chain management (Drydakis, 2022a;b). These increased efficiencies can lead to cost savings and improved resource allocation, contributing to better financial performance. The aforementioned considerations align with the broader trend of digital transformation as a key driver for business adaptability and competitiveness (North et al., 2020).

Business applications training plays a crucial role in boosting an enterprise's digital competencies, ultimately contributing to better performance (Drydakis, 2025; 2022b; Azevedo and Almeida, 2021; OECD, 2021; Giotopoulos et al., 2017) which might also impact on financial

indicators (North et al., 2020). Business applications training helps enterprises understand how to use applications that automate and optimize business processes, ensuring that they develop the necessary skills to use digital tools effectively (Drydakís, 2025; 2022b). These advancements can lead to more efficient operations, reducing manual errors and delays, and increasing productivity as enterprises become proficient in leveraging technology to streamline tasks and workflows.

Moreover, business applications training can teach enterprises how to interpret and use digital data for informed decision-making (Drydakís, 2025; 2022b). This shift towards data-driven decision-making can positively impact profitability strategies and, consequently, revenue. Simultaneously, business applications training focusing on customer relationship management can enhance enterprises' ability to engage with customers effectively (Drydakís, 2025; 2022b). This can lead to improved customer satisfaction, loyalty, and increased revenue from repeat business and positive word-of-mouth. Furthermore, with the rise of remote work, business applications training can help enterprises effectively use applications in a virtual or hybrid work environment (Drydakís, 2025; 2022b). This adaptability contributes to business continuity and ensures that operations can continue seamlessly, irrespective of the physical location of staff and customers.

The current study assesses the impact of training programs on business applications in improving the digital competencies and financial performance of small enterprises. This study is grounded in the theoretical framework of Human Capital, which posits a positive correlation between the adoption of information and communication technology, and the operational effectiveness and outcomes of enterprises (Giotopoulos et al., 2017). Additionally, the study employs the conceptual perspective of the Business Applications Training Intervention framework (Drydakís, 2025; 2022b). This framework suggests that entrepreneurs, through interventions focused on business applications training, can enhance their internet and digital skills, leading to increased digital competencies for their enterprises.

The study concentrates on small enterprises operated by immigrant entrepreneurs in Greece (Attika), Cyprus (Limassol, Larnaca, Nicosia, Paphos), and the United Kingdom (East of England).

In 2021, the research team from the Faculty of Business and Law at Anglia Ruskin University conducted a three-month online training on business applications for immigrant entrepreneurs who expressed interest in participating. The data gathered both prior to and following the training on business applications allowed for an evaluation of whether enterprises underwent positive improvements after the intervention.

This research makes a contribution to existing literature in several ways. Firstly, there is a noticeable gap in research regarding the association between training in business applications and the financial progress of small enterprises (Drydak, 2025; 2022b; Azevedo, and Almeida, 2021). If training in business applications proves to enhance a company's digital competencies, resulting in improved financial performance, it should be considered as an additional strategy for boosting profitability.

Secondly, given the significant contribution of small enterprises to a country's overall growth, fostering an interest in enhancing digital competencies could serve as a proactive intervention (Chan et al., 2020). Small and medium enterprises jeopardize their performance, profitability, and sustainability if they fail to embrace digital transformation (Ulas, 2019). The primary obstacle to these enterprises facing a digital divide is not a lack of access to digital technology but rather a deficiency in relevant knowledge (Horváth and Szabó, 2019). Simultaneously, immigrant entrepreneurship has emerged as a driving force in both national and regional economies (Krol, 2021). In Greece, Cyprus, and the United Kingdom, the growing number of immigrant enterprises underscores a business reality that calls for policies supporting immigrant entrepreneurship (Cyprus Labour Institute, 2018; Hatziprokopiou and Frangopoulos, 2016; Jones et al., 2015).

Thirdly, this study presents outcomes based on a longitudinal dataset designed to capture unobserved heterogeneity and provide more well-informed evaluations (Andreß et al., 2013). By utilizing data from three European countries, the research assesses the posed questions within the

context of each country, offering a robust evaluation that facilitates the generalization of the study's findings.

The study outcomes will unveil a positive association between digital competencies and the revenue growth rate of enterprises. Moreover, the study will indicate that, following business applications training, the impact of digital competencies on the revenue growth rate of enterprises strengthened compared to the period before the training. This pattern will be observed consistently across all three regions, highlighting the robustness of the estimated outcome.

2. Variables

Details about the nature of the business applications training and data gathering can be found in Drydakis (2025; 2022b). In the present study, the so-called 'business applications training' variable, captures two time periods: before the business applications training, and after the business applications training. The revenue growth rate captures enterprises' annual growth by comparing the previous year's revenue with the current year's revenue. Revenue refers to the money an enterprise earns from all sources, including sales, investments, interest, royalties, and more, before any expenses are deducted. Revenue growth is a key performance indicator, representing how able an enterprise is to grow its revenue over a period (Keiningham et al., 2007). Moreover, the Digital Competencies scale (Drydakis, 2022b) measures entrepreneurs' reflection on the level of their firm's digital competency related to: (i) communication, (ii) networking operations, (iii) social media engagement, (iv) customer relationship management, (v) payment services, (vi) accounting and finance services, (vii) inventory operations, (viii) team and time management services, and (ix) project management services.

3. Descriptive statistics

Table 1 presents the descriptive statistics of the sample. In 2021, a total of 129 entrepreneurs completed the e-survey (i.e. before the business applications training), and in 2023 the same

entrepreneurs provided follow-up information (i.e. after the business applications training). It is presented that the majority of the enterprises were from the United Kingdom (58.1%), followed by Greece (30.2%) and Cyprus (11.6%). Regarding the sector of operation, most were involved in services (38.7%), following by hospitality (31.0%), and trade (30.2%). It is found that the mean figure, in terms of the enterprises' years of operation, was 6.2 years. The average number of employees in the enterprises was of 5.8, and 8.5% of the entrepreneurs owned the enterprise's premises. Regarding the entrepreneurs' profile, it is found that 79.8% were male. The mean age was 35.6 years, and 11.2% of the entrepreneurs had a higher education degree. In the sample, 55.0% were from Africa, and the rest were from Asia. The immigrants resided in the host countries for a mean of 12.6 years.

[Table 1]

Table 2 presents a tabulation analysis. In Panel I, it is observed that after the business applications training, the level of enterprises' digital competencies is higher than before the business applications training (2.5 vs 2.1; $t=7.2$, $p<0.01$). Moreover, in Panel II, it is found that after the business applications training, the level of enterprises' revenue growth rate is higher than before the business applications training (5.4 vs 2.7; $t=11.0$ $p<0.01$).

[Table 2]

Table 3 presents a correlation analysis. In Panel I, it is evident that business applications training is positively associated with enterprises' digital competencies ($r=0.41$; $p<0.01$), and revenue growth rate ($r=0.56$; $p<0.01$).

In Panel II, it is found that enterprises' digital competencies are positively associated with enterprises' revenue growth rate ($r=0.70$; $p<0.01$), years of operation ($r=0.35$; $p<0.01$), number of employees ($r=0.28$; $p<0.01$), and ownership of the premise ($r=0.15$; $p<0.05$). Moreover, it is found that enterprises' digital competencies are stronger in the United Kingdom ($r=0.47$; $p<0.01$) as compared to Greece ($r=-0.38$; $p<0.01$) and Cyprus ($r=-0.18$; $p<0.01$). In addition, it is found that

enterprises' digital competencies are positively associated with entrepreneurs' age ($r=0.28$; $p<0.01$), male gender ($r=0.31$; $p<0.01$), higher education ($r=0.14$; $p<0.05$), and years of immigration in the host country ($r=0.32$; $p<0.01$).

In Panel III, it is found that enterprises' revenue growth rate is positively associated with enterprises' years of operation ($r=0.34$; $p<0.01$), number of employees ($r=0.19$; $p<0.01$), and ownership of the premise ($r=0.16$; $p<0.01$). It appears that enterprises' revenue growth rate is stronger in the United Kingdom ($r=0.33$; $p<0.01$), as compared to Greece ($r=-0.24$; $p<0.01$) and Cyprus ($r=-0.16$; $p<0.01$). In addition, it is found that enterprises' revenue growth rate is stronger in the services sector ($r=0.12$; $p<0.05$), and weaker in the hospitality sector ($r=-0.13$; $p<0.05$). It is observed that enterprises' revenue growth rate is positively associated with entrepreneurs' age ($r=0.18$; $p<0.01$), male gender ($r=0.28$; $p<0.01$), and years of immigration in the host country ($r=0.25$; $p<0.01$).

[Table 3]

4. Estimates

4.1 Digital competencies

Table 4 presents estimates of digital competencies. Model I provides random effects estimates and controls for business applications training, indicating whether enterprises operated before or after the intervention. Additionally, Model I controls for enterprises' revenue growth rate, region of operation, sector, years of operation, number of employees, ownership of the enterprise's premises, entrepreneurs' age, gender, higher education, years of immigration in the host country, and continent of origin. The inclusion of these variables aims to create more informed specifications by reducing omitted variable bias (Clarke, 2005). The study reports marginal effects (m.e.) at the mean of each continuous covariate. The marginal effects of the dichotomous variables are

calculated as the discrete change in the prediction equation when the covariate changes from zero to one (Wooldridge, 2010).

In Model I, it is found that enterprises' digital competencies are positively associated with business applications training ($b=0.182$, $p<0.01$; $m.e.=0.039$) and enterprises' revenue growth rate ($b=0.077$, $p<0.01$; $m.e.=0.137$). Additional outcomes indicate that Greece ($b=-0.325$, $p<0.01$; $m.e.=-0.042$) and Cyprus ($b=-0.264$, $p<0.01$; $m.e.=-0.013$) experience a lower level of digital competencies compared to the United Kingdom's level of digital competencies. Moreover, enterprises' digital competencies are positively associated with the enterprise's number of employees ($b=0.015$, $p<0.05$; $m.e.=0.040$) and entrepreneurs' higher education ($b=0.114$, $p<0.10$; $m.e.=0.005$) and male gender ($b=0.172$, $p<0.01$; $m.e.=0.059$).

Model II provides fixed effects estimates. Model II controls for business applications training and enterprises' revenue growth rate. Time-invariant information could not be included in the fixed effects model (Andreß et al., 2013). Furthermore, collinearity prevents the empirical specification from controlling for the time-variant information, which was included in Model I. Model II estimates that enterprises' digital competencies are positively associated with business applications training ($b=0.393$, $p<0.01$; $m.e.=0.084$).

Hausmann tests were employed to examine whether random effects or fixed effects models better fit the data (Andreß et al., 2013). It is indicated that omitted factors may be correlated with key predictors in random effects models, and that fixed effects models could remove omitted variable bias (Vaisey and Miles, 2017). Fixed effects models were found to better fit the data ($h=41.2$; $p<0.00$).

[Table 4]

4.2 Revenue growth rate

Table 5 presents estimates of revenue growth rate. Model I offers random effects estimates. It controls for enterprises' level of digital competencies and business applications training. Additionally, it incorporates an interaction effect between digital competencies and business applications training, indicating whether, after the business applications training, enterprises' digital competencies have a stronger impact on the revenue growth rate than before the business applications training. Moreover, Model I controls for regions' gross domestic product and inflation rate in 2021 and 2023, as well as for enterprises' region of operation, sector, years of operation, number of employees, ownership of the enterprise's premises, entrepreneurs' age, gender, higher education, years of immigration in the host country, and continent of origin.

In Model I, it is found that the enterprises' revenue growth rate is positively associated with digital competencies ($b=1.409$, $p<0.01$; $m.e.=0.794$) and business applications training ($b=7.094$, $p<0.01$; $m.e.=0.860$). The interaction effect between digital competencies and business applications training is positive ($b=1.788$, $p<0.01$; $m.e.=0.547$), indicating that after business applications training, the enterprises' digital competencies have a stronger impact on the revenue growth rate than before the business applications training. Moreover, it is found that the enterprises' revenue growth rate is positively associated with ownership of the enterprises' premises ($b=0.768$, $p<0.10$; $m.e.=0.015$) and male entrepreneurs ($b=0.905$, $p<0.01$; $m.e.=0.175$).

Model II provides fixed effects estimates. The analysis reveals a positive association between the enterprises' revenue growth rate and business applications training ($b=7.085$, $p<0.01$; $m.e.=0.858$). Additionally, the interaction effect between digital competencies and business applications training remains positive ($b=2.206$, $p<0.01$; $m.e.=0.675$). Hausmann tests indicated that fixed effects models better fit the data than random effects models ($h=178.19$; $p<0.01$).

[Table 5]

Table 6 offers a robustness evaluation by replicating Table 5's fixed effects estimations for each region. Model I provides the interaction effect analysis for Greece ($b=3.222$, $p<0.01$;

m.e.=1.106). Model II presents the interaction effect analysis for Cyprus ($b=2.886$, $p<0.10$; m.e.=1.106), and Model III provides the interaction effect analysis for the United Kingdom ($b=1.984$, $p<0.01$; m.e.=0.562). In all regions, the interaction effects indicate that after business applications training, the enterprises' digital competencies have a stronger impact on the revenue growth rate than before the business applications training.

[Table 6]

5. Discussion

The study highlighted the effectiveness of a business applications training intervention in improving the digital competencies of small enterprises. Business applications training can be seen as a strategic investment that provides business environments with the skills and knowledge needed to maximize the use of digital tools (Drydakís, 2025; 2022b).

Moreover, the study revealed that following the business applications training, the impact of digital competencies on enterprises' revenue growth rate increased. This positive association remained consistent across three distinct regions—Greece, Cyprus, and the United Kingdom. This consistency enhances the robustness of the findings, suggesting that the observed relationship is not confined to a specific region but holds true across diverse business environments.

In the current study, the business applications training aimed to acquaint entrepreneurs with applications that enable them to adapt systems to enhance performance. It also encouraged them to explore new opportunities by adopting technology-enabled tools to monitor changes in core technology and environments, identify industry patterns, develop processes and products, and monitor market changes (Drydakís, 2025; 2022b).

European policymakers should acknowledge the significant asset that entrepreneurship and immigrant entrepreneurs represent for Europe. Finding ways to better support immigrant

entrepreneurs is crucial. Training entrepreneurs to utilize technology for automating and optimizing business processes, interpreting and utilizing data for informed decision-making, and enhancing customer relationship management could lead to growth (Drydakis, 2024; 2025).

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Table 1. Descriptive statistics. Mean and standard deviation

	Total sample
Enterprises' region: Greece (%)	30.2 (0.4)
Enterprises' region: Cyprus (%)	11.6 (0.3)
Enterprises' region: United Kingdom (%)	58.1 (0.4)
Enterprises' sector: Hospitality (%)	31.0 (0.4)
Enterprises' sector: Services (%)	38.7 (0.4)
Enterprises' sector: Trade (%)	30.2 (0.4)
Enterprises' years of operation (c.)	6.2 (2.6)
Enterprises' number of employees (c.)	5.8 (3.1)
Ownership of the enterprises' premise (%)	8.5 (0.2)
Digital competencies (c.)	2.3 (0.4)
Revenue growth rate (c.)	4.1 (2.3)
Entrepreneurs' age (c.)	35.6 (7.8)
Entrepreneurs' gender: Male (%)	79.8 (0.4)
Entrepreneurs' higher education (%)	11.2 (0.3)
Entrepreneurs' years of immigration in the host country (c.)	12.6 (5.2)
Entrepreneurs' continent of origin: Asia (%)	44.9 (0.4)
Entrepreneurs' continent of origin: Africa (%)	55.0 (0.4)

Notes: N=129 firms. The data set covers the periods 2021 and 2023, in Greece, Cyprus and the United Kingdom. (c.) Continuous variable. Standard deviations are given in parentheses.

Table 2. Descriptive statistics. Mean and standard deviation. Tabulation analysis		
	Panel I Digital Competencies	Panel II Revenue Growth Rate
Before the business applications training	2.1 (0.4)	2.7 (1.6)
After the business applications training	2.5 (0.3)	5.4 (2.1)
t-test	t=-7.2; p<0.00	t=-11.0; p<0.00

Notes. N=258. The data set covers the periods 2021 and 2023, in Greece, Cyprus and the United Kingdom. Standard deviations are in parentheses.

Table 3. Correlation analysis

	Panel I Business applications training	Panel II Digital competencies	Panel III Revenue growth rate
Business applications training	1		
Digital Competencies	0.41***	1	
Revenue Growth Rate	0.56***	0.70***	1
Enterprises' region of operation: Greece	0.00	-0.38***	-0.24***
Enterprises' region of operation: Cyprus	0.00	-0.18**	-0.16***
Enterprises' region of operation: United Kingdom	0.00	0.47***	0.33***
Enterprises' sector: Hospitality	0.00	-0.11*	-0.13**
Enterprise's sector: Services	0.00	0.05	0.12**
Enterprises' sector: Trade	0.00	0.06	0.01
Enterprises' years of operation	0.37***	0.35***	0.34***
Enterprises' number of employees	0.09	0.28***	0.19***
Ownership of the enterprises' premise	0.00	0.15**	0.16***
Entrepreneurs' age	0.12**	0.28***	0.18***
Entrepreneurs' gender: Male	0.00	0.31***	0.28***
Entrepreneurs' higher education	0.06	0.14**	0.10
Entrepreneurs' years of immigration in the host country	0.19***	0.32***	0.25***
Entrepreneurs' continent of origin: Asia	0.00	-0.00	0.00
Entrepreneurs' continent of origin: Africa	0.00	0.00	-0.00

*Notes: N=258 observations. The data set covers the periods 2021 and 2023, in Greece, Cyprus and the United Kingdom. (***) Statistically significant at the 1%. (**) Statistically significant at the 5%. (*) Statistically significant at the 10%.*

Table 4. Random and fixed effects estimates. Digital competencies. Total sample.

	Model I Random effects	Model II Fixed effects
Business applications training	0.182 (0.051)***	0.393 (0.055)***
Revenue growth rate	0.077 (0.012)***	0.002 (0.016)
Enterprises' region of operation: Greece [^]	-0.325 (0.056)***	-
Enterprises' region of operation: Cyprus [^]	-0.264 (0.076)***	-
Enterprises' sector: Hospitality ^{^^}	-0.036 (0.056)	-
Enterprises' sector: Services ^{^^}	-0.045 (0.053)	-
Enterprises' years of operation	-0.009 (0.013)	-
Enterprises' number of employees	0.015 (0.007)**	-
Ownership of the enterprises' premise	0.087 (0.089)	-
Entrepreneurs' age	0.008 (0.003)**	-
Entrepreneurs' gender: Male	0.172 (0.060)***	-
Entrepreneurs' higher education	0.114 (0.067)*	-
Entrepreneurs' years of immigration in the host country	-0.002 (0.006)	-
Entrepreneurs' continent of origin: Asia ^{^^^}	-0.047 (0.044)	-
Wald	364.59	-
Prob>x ²	0.000	-
R-squared	0.620	-
F	-	78.82
Prob>F	-	0.000
R-squared	-	0.184
Hausman test	h=41.24; p<0.00	
Observations	258	258

*Notes: The data set covers the periods 2021 and 2023, in Greece, Cyprus and the United Kingdom. (^) The reference category is the United Kingdom. (^^) The reference category is trade. (^^^) The reference category is Africa (***) Statistically significant at the 1%. (**) Statistically significant at the 5%. (*) Statistically significant at the 10%.*

Table 5. Random and fixed effects estimates. Revenue growth rate. Total sample.

	Model I Random effects	Model II Fixed effects
Digital competencies	1.409 (0.330)***	-0.332 (0.452)
Business applications training	7.094 (2.332)***	7.085 (2.216)***
Digital competencies × Business applications training	1.788 (0.484)***	2.206 (0.500)***
Gross domestic product	2.739 (0.799)***	2.773 (0.760)***
Inflation rate	2.256 (0.723)***	2.205 (0.683)***
Enterprises' region of operation: Greece [^]	0.948 (0.760)	-
Enterprises' region of operation: Cyprus [^]	2.435 (1.170)**	-
Enterprises' sector: Hospitality ^{^^}	-0.225 (0.253)	-
Enterprises' sector: Services ^{^^}	0.233 (0.240)	-
Enterprises' years of operation	-0.006 (0.060)	-
Enterprises' number of employees	-0.030 (0.033)	-
Ownership of the enterprises' premise	0.768 (0.397)*	-
Entrepreneurs' age	-0.015 (0.017)	-
Entrepreneurs' gender: Male	0.905 (0.272)***	-
Entrepreneurs' higher education	-0.113 (0.308)	-
Entrepreneurs' years of immigration in the host country	-0.012 (0.028)	-
Entrepreneurs' continent of origin: Asia ^{^^^}	-0.085 (0.199)	-
Wald	453.72	-
Prob>x ²	0.000	-
R-squared	0.650	-
F	-	62.99
Prob>F	-	0.000
R-squared	-	0.468
Hausman test	h=178.19; p<0.00	
Observations	258	258

*Notes: The data set covers the periods 2021 and 2023, in Greece, Cyprus and the United Kingdom. (^) The reference category is the United Kingdom. (^^) The reference category is trade. (^^^) The reference category is Africa (***) Statistically significant at the 1%. (**) Statistically significant at the 5%. (*) Statistically significant at the 10%.*

Table 6. Fixed effects estimates. Revenue growth rate.

	Model I Greece	Model II Cyprus	Model III United Kingdom
Digital competencies × Business applications training	3.222 (1.039)***	2.886 (1.547)*	1.984 (0.593)***
F	47.34	9.80	57.18
Prob>F	0.000	0.001	0.000
R-squared	0.701	0.336	0.291
Observations	78	30	150

*Notes: The data set covers the periods 2021 and 2023. Each model controls for digital competencies and business applications training. (***) Statistically significant at the 1%. (*) Statistically significant at the 10%.*