

KRYSTIAN BIGOS

Krakow University of Economics, Krakow, Poland

BOŻENA PERA

Krakow University of Economics, Krakow, Poland

Human capital and its role in start-ups' early internationalisation. An example of Polish new ventures

Abstract: The article considers the relations of education and prior international experience as elements of human capital with new ventures' early internationalisation. The aim of the study is to investigate the role of human capital as a factor that can influence early internationalisation. The paper presents partial results based on a sample of 220 Polish start-ups operating in the information and communications technology sector, founded between 2017 and 2021. Quantitative methods were used to analyse the data collected in March and April 2022 by applying the CATI method. In addition, binomial logistic regression, assuming a dichotomous dependent variable, was used to verify the formulated research hypotheses. The study finds that prior international experience and education could significantly determine the likelihood of early internationalisation. The research also showed that human capital is positively related to start-up internationalisation. The results presented in the article have practical implications. They are just a starting point for further analysis regarding focusing not only on human capital but also on considerations on intellectual capital and identifying the other factors influencing the start-ups' early internationalisation in the information and communications technology sector, recognised as one of the most innovative industries in the Polish economy.

Keywords: early internationalisation; human capital; international business; international entrepreneurship; international new ventures; start-ups

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INTRODUCTION

Early internationalisation is a phenomenon that is currently on the spectrum of interest of many researchers around the world (Kahiya, Warwood, 2022). The issue has been relevant as the research object within the framework of international entrepreneurship since the mid-1990s. (Wach, 2012). International entrepreneurship grew up in the literature

through the research of Oviatt and McDougall (1994), who were the first to define the so-called international new ventures, also known as international start-ups, i.e., business entities that internationalise shortly after their inception. Unlike traditional enterprises, whose development is based on slow and organic growth (Johanson, Vahlne, 1974; Johanson, Wiedersheim-Paul, 1975), international new ventures characterise proactivity while they operate. They also employ unconventional internationalisation strategies (Wach, 2018). The concept of early internationalised start-ups arose due to the overall development of technology, which revolutionised the new approach to sales. Today, overseas business costs are much lower than a dozen years ago (Deng, Zhu, Johanson, Hilmersson, 2022). Due to their small size and young age, the start-ups' survival on the market depends on exploring intangible resources, such as knowledge in their portfolio and management (Wach, Głodowska, 2021).

Although early internationalisation is well-known in the literature, many of its threads have yet to be explored (Jiang et al., 2020). We need to learn more about how start-ups manage intangible resources. In the context of the resource-competence approach, many research gaps can be filled by presenting a comprehensive picture of this phenomenon. The difficulties involved stem from the fact that early internationalized start-ups are difficult to grasp in a classification context. Thus, researchers have not yet proposed a clear and comprehensive definition of this type of venture (Jiang et al., 2020).

The article aims to investigate the role of human capital in stimulating the process of early internationalisation. Our research can serve as a prelude to further research in this area. We base our conclusions on our research conducted among 220 Polish start-ups contributing to the resource-competence approach within the internationalisation theory. Since a high level of innovation usually characterises such ventures, we selected mainly start-ups operating in the information and communication technology industry. Consequently, we try to prove that human capital plays a vital role in the international development of the analysed firms.

The article consists of two main parts. The first is a theoretical one, including a review of the literature on the relationship between human capital and early internalisation. We derived research hypotheses based on the literature review in this part of the paper. The second, empirical part of our paper presents the results of conducted research obtained by applying binomial logistic regression and enables verification of the probability of early internationalisation.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Human capital is essential in firms' development – especially in young and small start-ups. This concept refers to the knowledge, talent, or experience of the employees of an organisation (Calza, Dezi, Schiavone, Simoni, 2014). Human capital also includes scope, among other things, the level of creativity and ability to develop ideas found in and utilised by a business unit (Prajogo, Oke, 2016). The concept of human capital generally refers to all the human resources involved in the business process of an enterprise (Ienciu, Matis, 2011). Other researchers equate this concept as the accumulation of personal attributes, i.e. knowledge, skills, abilities, education, and personality, that enable a person to function (Nigam, Mbarek, Boughanmi, 2021; Singh, Mittal, Sengupta, Pradhan, 2019). According to Seetharaman, Lock Teng Low, and Saravanan (2004), on the other hand, human capital is related to employee competence, that is, the ability to act in different situations

to create both tangible and intangible value. The entrepreneurship literature notes that human capital is the portion of knowledge that a company loses when its employees leave. Empirical studies by many researchers confirm that it positively impacts the venture's performance (Scafarto, Ricci, Scafarto, 2016; Stucki, 2016). The founder's human capital in start-ups is crucial for the company's survival and growth. Start-ups do not employ professional managers, so founders are responsible for making strategic decisions based on their human capital, such as education, knowledge, skills, and experience (Yi, Xu, 2019).

Knight and Liesch (2016) observed that human capital also plays a critical role in the internationalisation of start-up ventures, as it influences both the identification and exploitation of international opportunities (Buzavaite, Korsakiene, 2019). Start-ups pursuing an early internationalisation path need to develop a high absorptive capacity to process and internalise market information more quickly (Sapienza, Autio, George, Zahra, 2006). On the other hand, Onkelinx, Manolova, and Edelman (2016) hypothesize that the level of human capital will vary depending on a company's internationalisation strategy. Moreover, it will be necessary for early internationalised ventures. Founders' human capital is directly related to a company's ability to identify and exploit foreign market opportunities and manage business operations beyond national borders. It can therefore stimulate the propensity of start-ups to export (Stucki, 2016).

Dar and Mishra (2021) observed that start-ups whose managers have international experience are significantly more likely to internationalise than those managers without such experience. Thus, the knowledge, usually experiential, accumulated by an entrepreneur due to his or her previous international work experience plays an essential role in early internationalisation (Cannone, Pisoni, Onetti, 2014; Cannone, Ughetto, 2014). Such managers and entrepreneurs quickly recognise an internationalisation opportunity for the company (Isidor, Schwens, Kabst, 2011; Baronchelli, Cassia, 2014). Knight and Liesch (2016) also confirm that the early internationalisation of start-ups may be due to the founders' unique entrepreneurial skills, who have the knowledge and prior experience in managing markets. Chandra, Styles, and Wilkinson (2009) argue that the more prior experience and knowledge a venture has, the more likely the start-up will consciously seek out and identify new international opportunities. Previous international experience is a specific human capital factor relevant to internationalisation operations in a particular type of venture-backed start-up (Manigart, Collewaert, Wright, Pruthi, Lockett, Bruining, Hommel, Landstrom, 2007). They pointed out that managers and venture capital executives better understand foreign markets and legal and institutional environments if they have previous international experience (Manigart et al., 2007). Rialp et al. (2005) emphasize the significance of knowledge-related drivers in the international expansion of start-ups in comparison with the gradual internationalisation path. Moreover, in literature, new ventures are considered to develop entrepreneurs' knowledge, among other factors that give rise to start-up internationalisation (Thorpe, Holt, Macpherson, Pittaway, 2005; Grichnik, Brinckmann, Singh, Manigart, 2014). The owners' knowledge determines the selection of national and international opportunities and successfully evaluates and exploits them (Debrulle, Maes, 2015). In the literature, management experience helps to face the complex problems inherent to internationalisation and other entrepreneurial activities (Ucbasaran, Westhead, Wright, 2008), broadens knowledge and improves problem solving skills (Chandler, Lyon, 2009) and individual communication skills (Ucbasaran et al., 2008). The following hypothesis can therefore be advanced:

H1: Start-ups whose founders or managers have prior international experience have a higher propensity for early internationalisation than other ventures.

Considering human capital alongside previous experience, some studies also find that education influences the start-up's early internationalisation. A high level of education, previous work experience, and knowledge of foreign languages are strongly related to an international orientation (Ibeh, 2003; Zucchella, Palamara, Denicolai, 2007). Chandra, Styles, and Wilkinson (2009) argue that the more knowledge a start-up's founder has, the more likely the start-up is to seek out and identify new international opportunities consciously.

H2: Start-ups whose founders have higher education manifest a higher propensity for early internationalisation than other businesses.

The research regarding the role of human capital in the early internationalisation of new ventures should be continued, although publications addressing similar issues can be found in the literature. However, they need to consider the start-ups operating in different countries and regions of Poland. Furthermore, they often cover the internationalisation process of all companies, or a separate SME sector, without focusing on specific entities such as start-ups.

METHODS

Sample and data collection

The verification of research hypotheses was based on quantitative methods. Therefore, Polish start-ups were surveyed in two stages: (1) the preliminary survey conducted between March and April 2022 and (2) the primary survey. The preliminary survey was conducted using the Computer Aided Web-based Interview method. In this way, we received a total of 45 responses. On the other hand, we conducted the primary survey applying Computer Aided Telephone-based Interview method among 200 randomly selected Polish start-ups. In both surveys, we generated 245 responses; nevertheless, after removing outlier or invalid observations, 220 start-ups founded between 2017 and 2021 were included in the analysis.

Due to the lack of a formalised definition of a start-up, we assumed it is a young, micro or small enterprise. Additionally, considering that start-ups are highly innovative companies, we assumed that they are entities that operate in the information and communication technology (IT/ICT) industry.

Selection of the list of potential projects for surveying was made with the help of the ORBIS database, in which the following eligibility criteria were entered:

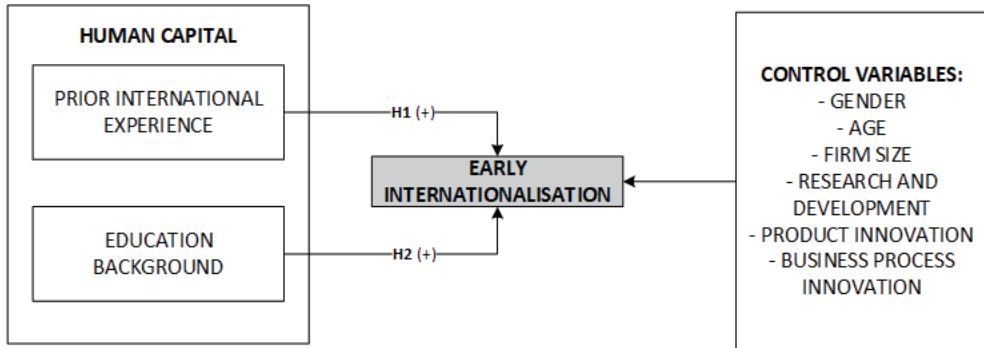
- Start-ups established between 2017 and 2021,
- IT/ICT industry (NACE rev. 2.: 26.1, 26.2, 26.3, 26.4, 26.8; 58.2, 61-62, 63.11),
- Poland-based start-ups,
- Micro and small enterprises based on the criterion proposed by the European Commission.

In the research sample, 60 start-ups were founded in 2017 (27.3% of the total surveyed firms), 63 start-ups were founded in 2018 (28.6% of the total surveyed firms), 46 companies were founded in 2019 (20.9% of the total surveyed firms), 35 companies were established in 2020 (15.9% of total surveyed firms), and 16 companies were established in 2021 (7.3% of the total surveyed firms). In the research sample, 57.3% of the analysed start-ups were domestic-oriented, while the rest were early internationalised firms.

Research model

Our proposed research model (see Figure 1) postulates the existence of a positive relationship between human capital operationalised by variables describing prior international experience and education level and the start-ups propensity to internationalise early.

Figure 1. The theoretical model of start-ups' early internationalisation



Source: Authors' own elaboration

We verified hypotheses based on binomial logistic regression as in the research dependent variable is dichotomous (Hosmer, Lemeshow, Sturdivant, 2013). The logistic regression model is recommended in those research where the assumption of normality of the distribution of variables cannot be met (Hair, Anderson, Tatham, Black, 1998). In the case of independent variables, the econometric model allows using quantitative, ordinal, and nominal variables.

Measures

Dependent variable. Our study's dependent variable is EARLY_INTERNATIONALISATION, measured on a nominal scale. If the surveyed start-up answered positively that it realised the first foreign sales within four 4 years from inception, then we assign number 1, otherwise number 0.

Independent variable. Regarding the independent variables, we included two of them in the analysis: (1) PREVIOUS_EXPERIENCE and (2) EDUCATION. The first independent variable is dichotomous, meaning that if a given respondent answered affirmatively to the question relating to the founder or management team prior international experience before the start-up's establishment, then we assigned number 1; otherwise, we assigned number 0. A similar scale was used concerning the EDUCATION variable, where the respondent was asked whether he or she had at least a bachelor's degree. If the responders' answer was affirmative, we assigned number 1, otherwise number 0.

Table 1. Variables used in the analysis

Measure	Definition	Possible value
<i>Dependent variable</i>		
Early internationalisation (EARLY_INTERNATIONALISATION)	Does the start-up realise any foreign sales within 4 years?	Dummy variable: 1 – yes 0 – no
<i>Independent variable</i>		
International experience (PREVIOUS_EXPERIENCE)	Does the start-up founder have prior international experience?	Dummy variable: 1 – yes 0 – no
Education background (EDUCATION)	Founder's level of education. (at least bachelor's degree)	Dummy variable: 1 – yes 0 – no
<i>Control variable</i>		
Gender (GENDER)	Main founder's gender	Dummy variable: 1 – man 0 – woman
Age (AGE)	Founder(s) average age	Continuous variable
Research and development (RESEARCH_DEV)	Does the start-up conduct research and development activities?	Dummy variable: 1 – yes 0 – no
Firm size (SIZE)	The number of employees coming from abroad or foreign workers.	Continuous variable

Source: own elaboration based on the survey (n=220)

Control variables. The paper includes four control variables that could affect the dependent variable (i.e. early internationalisation). The first control variable is GENDER, which may be necessary for early internationalisation. Unlike women, men tend to be much more willing to undertake risky ventures, and internationalisation is such a phenomenon (e.g. Ivanova Yordanova, Ivanova Alexandrova-Boshnakova, 2011; Zhang, Duysters, Cloodt, 2014). We also control AGE as older founders generally have more professional experience translating into a relatively higher propensity to undertake risky business ventures. SIZE is another control variable, as the presence of foreign employees in the start-up's structures is conducive to identifying opportunities in foreign markets. The case is similar in the context of R&D activity (R_D), which can be a predictor of early internationalisation (see Table 1).

RESULTS AND DISCUSSION

We verified the econometric models' reliability using two statistical tests (see Table 2): (1) the likelihood ratio test and (2) the Hosmer-Lemeshow test. The expected result of the first test is statistically significant, while for the second test, its non-significant. Based on the data in table 2, it could be observed that in the three binomial logistic regression models, the likelihood ratio test was statistically significant (model 1: chi-square=63.021, $p < 0.001$; model 2: chi-square=56.472, $p < 0.001$; model 3: chi-square=46.263, $p < 0.001$). In contrast, based on the Hosmer-Lemeshow test, all models indicate a lack of statistical significance, which is an expected result (model 1: chi-square=3.049, $p = 0.931$; model 2: chi-square=6.699, $p = 0.570$; model 3: chi-square=9.645, $p = 0.291$).

Table 2. Statistical test

Statistical test	Model 1		Model 2		Model 3	
	chi-square	sign.	chi-square	sign.	chi-square	sign.
Likelihood ratio test	63.021	p<0.001	56.472	p<0.001	46.263	p<0.001
Hosmer-Lemeshow test	3.049	p=0.931	6.699	p=0.570	9.645	0.291

Source: own calculations in PQSTAT

In addition, the Pseudo R-square coefficient of determination was verified (see Table 3). In the case of models based on logistic regression, the Pseudo R-square measured by the Nagelkerke and Cox-Snell methods is usually used (Blomstermo, Deo Sharma, Sallis, 2006; Smith, McKenna, 2013). As for Nagelkerke's Pseudo R-square, its value ranged from 0.255 (model 3) to 0.335 (model 1). Slightly lower values were observed in terms of Pseudo R-square measured by the Cox-Snell method. In model 1, the value of this coefficient was 0.249, while in model 2, the value was already lower at 0.226. Moreover, in model 3, Cox-Snell's Pseudo R-square was 0.190.

Table 3. Pseudo R-square

Coefficient of determination	Model 1	Model 2	Model 3
Pseudo R-square (Nagelkerke)	0.335	0.304	0.255
Pseudo R-square (Cox-Snell)	0.249	0.226	0.190

Source: own calculations in PQSTAT

Before verifying the hypotheses, we evaluated the correlation of the variables used in the study. Referring to the correlation coefficients in Table 4, we can observe that both PREVIOUS_EXPERIENCE and the dependent variable EARLY_INTERNATIONALISATION are correlated to a relatively highest degree ($r=0.329$, $p<0.001$). An equally higher correlation value was observed between the dependent variable and the independent variable EDUCATION ($r=0.209$, $p<0.01$) and the dependent variable and the control variable SIZE ($r=0.295$, $p<0.001$). Excluding the dependent variable, the relatively highest correlated variables are AGE and GENDER ($r=-0.199$, $p<0.01$) and R_D and SIZE ($r=0.165$, $p<0.01$) and EDUCATION and PREVIOUS_EXPERIENCE ($r=0.151$, $p<0.05$).

Table 4. Correlation matrix

	N	1	2	3	4	5	6	7
1. EARLY_INT~	220	1						
2. GENDER	220	0.024	1					
3. AGE	220	-0.125 †	-0.199**	1				
4. RESEARCH_DEV	220	0.184**	0.067	0.018	1			
5. SIZE	220	0.295***	0.077	-0.053	0.165**	1		
6. EDUCATION_BAC~	220	0.209**	0.051	0.028	-0.052	0.112 †	1	
7. PREVIOUS_EXPER~	220	0.329***	-0.010	0.114 †	0.149*	0.133*	0.151*	1

† $p<0.1$, * $p<0.05$, ** $p<0.01$, *** $p<0.001$

Source: own calculations in SPSS

Based on the estimated values of the logistic regression parameters in Table 5, we can observe that the control variables GENDER and AGE are negatively related to the dependent variable. The AGE variable, which refers to the average age of the start-up founder, is statistically significant, which should be interpreted that the younger start-ups' founders demonstrate a higher propensity to early internationalisation. The following control variable, that is, the variables related to R&D activities (RESEARCH_DEV) and the number of foreign-origin employees (SIZE), are statistically significant and positively related to the dependent variable (EARLY INTERNATIONALISATION). R&D start-ups manifest a 2-times higher propensity for early internationalisation; in the context of the SIZE variable, their propensity is even higher.

Table 5. Estimated models (dependent variable = early internationalisation)

Variable / Measure	Model 1		Model 2		Model 3	
	Coeff.	Odd ratio	Coeff.	Odd ratio	Coeff.	Odd ratio
GENDER	-0.268 (0.393)	0.765	-0.190 (0.384)	0.827	-0.242 (0.378)	0.785
AGE	-0.049* (0.022)	0.952	-0.043* (0.022)	0.958	-0.033 (0.021)	0.968
RESEARCH_DEV	0.615 † (0.323)	1.850	0.507 † (0.314)	1.660	0.719* (0.308)	2.052
SIZE	0.745** (0.235)	2.106	0.799*** (0.235)	2.223	0.845*** (0.239)	2.328
PREVIOUS_EXPER~ (H1)	1.316*** (0.331)	3.728	1.357*** (0.325)	3.885		
EDUCATION (H2)	1.336* (0.564)	3.804			1.411** (0.535)	4.100
Const	-0.855 (0.975)	0.425	0.072 (0.866)	1.075	-0.861 (0.950)	0.423

† $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Standard error in parentheses.

Source: own calculations in PQSTAT

We also could observe that both PREVIOUS_EXPERIENCE and EDUCATION are statistically significant. Based on the results of the estimated values of the logistic regression parameter in model 1, we can observe that among the ventures, the probability of early internationalisation is slightly more than 3.7-times higher among those start-ups whose founders had prior international experience. The case is similar in model 2 ($b=1.316$, $Wald= 15.774$, $p < 0.001$), where this propensity is relatively higher than in model 1 ($b=1.357$, $Wald= 17.491$, $p < 0.001$). Based on the above, it is possible to **accept hypothesis 1**, start-ups whose founders have prior international experience show a significantly higher propensity for early internationalisation than other ventures. Our results align with Zucchella, Palmera and Denicolai (2007). Their findings underline that the relevance of previous specific experiences, especially internationalisation, was a significant factor in early internationalisation, as Debrulle's and Maes's study shows (Debrulle, Maes, 2015). The results of our study are partially in line with Manigart et al. (2007). They noticed that European start-ups with more executives with previous international experience resulted in a higher probability of investing internationally. The case is similar in the

context of the higher education the founders of start-ups possessed. The econometric model shows that the start-ups' propensity to early internationalisation is, on average, 4-times higher among those whose founders have at least a bachelor's degree (model 1: $b=1.336$, $Wald=5.604$, $p<0.05$; model 3: $b=1.411$, $Wald=6.944$, $p<0.01$). Based on the statistically significant estimated values of the parameters in both analyzed models, **hypothesis 2 can be accepted**. Our results seem to align with Onkelinx, Manolova, and Edelman (2016), who observed that the firms which follow an accelerated internationalisation path have no time for gradually developing organisational capabilities and consequently need to strengthen organisational capabilities through acquired knowledge and individual employee experience. The researchers found that added human capital (measured by an index that includes, among other things, the weighted average education level of employees) translates into the higher export intensity of ventures. The findings obtained by Wach and Głodowska (2021) also confirm our results, indicating the relationship between the entrepreneur's education level and the speed of the internationalisation process. However, the findings of Zucchela, Palmera and Denicolai (2007) are not in line with our study in the education background variable, considering the knowledge of a foreign language as a critical start-up driver only in the case of Italian new ventures. Formal education does not seem to be an essential factor for the start-ups localised on the Belgian market (Debrulle, Maes, 2015). Thus, it can be concluded that the study of the significant factors associated with the rapid internationalisation of start-ups may vary depending on the origin of the firms and their founders. However, the entrepreneur and management's previous experience with the foreign market, as recorded, are significant to our findings. Nevertheless, the economic and financial situation and the business environment may prove the results to be contrary to ours (Baronchelli, Cassia, 2014). Collecting the data at the beginning of 2010, when the business environment was still affected by a financial crisis, early internationalisation decisions were burdened by high market uncertainty (Baronchelli and Cassia, 2014).

CONCLUSIONS

As our research shows, human capital plays a vital role in the early internationalisation process of start-ups. We noted that prior international experience and education could be critical in determining the likelihood of early internationalisation. Our research showed that human capital positively relates to the phenomenon under study. Our research has practical implications for managers and policymakers. First and foremost, practitioners should continuously develop their international knowledge and experience by attending various qualification courses. Due to dynamically changing economic conditions caused, among other things, by the development of technology and changing perceptions of societies around the world, founders of start-ups should constantly be open to development and improvement. In this context, a unique role is played by decision-makers who, at the institutional level, should create better conditions for networking to share their insights.

Like any study, ours has several limitations. First, we analysed human capital based on only two independent variables. In the context of future research, it is worth considering many other variables to comprehensively confirm the positive relationship between human capital and early internationalisation. Second, we based our inference on a sample of 220 Polish start-ups. Therefore, the next step should be to research a much larger sample. It would be worthwhile to verify the studied relationship in a much broader

cultural context on a comparative basis to contrast the results of our research with others. Furthermore, thirdly, the research was conducted in a single year, so in future research, it is worth observing the situation of start-ups over the years to look at the progressive changes in this type of enterprise in a dynamic way.

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Krystian Bigos, MSc, research assistant at Krakow University of Economics, Department of International Trade at the College of Economics, Finance and Law. His research interests include early and rapid internationalisation, international start-ups, and international entrepreneurship.

ORCID: <https://orcid.org/0000-0001-6030-4119>

Bożena Pera, PhD, is an assistant professor in the College of Economics, Finance and Law, Krakow University of Economic, Department of International Trade. Her research interests focus on international trade, economic integration, the disintegration process, regional trade agreements, international trade policy, and international business.

ORCID: <https://orcid.org/0000-0003-3274-8788>

Address:

Krakow University of Economics
College of Economics, Finance and Law
Department of International Trade
Rakowicka 27
31–510 Krakow, Poland
e-mail: perab@uek.krakow.pl