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Entrepreneurial Business and Economics Review

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The Role of Self-Efficacy and Entrepreneurial Self-Efficacy on the Entrepreneurial Intentions of Graduate Students: A Study among Omani Graduates

Pappusamy Udayanan

ABSTRACT

Objective: The objective of this research is to study the entrepreneurial intention of Omani graduate students by introducing self-efficacy as a mediating variable in Social Cognitive Career Theory (SCCT).

Research Design & Methods: Two hundred and sixty-three Omani graduate students were surveyed using a self-administered questionnaire. An entrepreneurial intention model was developed and tested using AMOS.

Findings: The results revealed that the effect of self-efficacy on the entrepreneurial intention of graduate students was fully mediated by entrepreneurial self-efficacy. At the same time, the direct effect of self-efficacy on entrepreneurial intention was not established.

Implications & Recommendations: The research informs policymakers and academicians in Oman to develop sustainable entrepreneurship courses to nurture entrepreneurship based on the measures of self-efficacy and entrepreneurial self-efficacy.

Contribution & Value Added: This research contributes to the Social Cognitive Career Theory by including entrepreneurial self-efficacy as a mediating variable, thus providing a new scope with the study of entrepreneurial intention among Omani graduate students.

Article type: research article

Keywords: entrepreneurial intention; entrepreneurial self-efficacy; self-efficacy; Omani graduates

JEL codes: L26

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INTRODUCTION

Entrepreneurship helps in the socio-economic development of countries (BarNir, Watson, & Hutchins, 2011; Hafer, 2013; Thurik & Wennekers, 2004), and entrepreneurial attitude stimulates the GDP of a country (Doran, McCarthy, & Marie O'Connor, 2018). Entrepreneurship is a viable alternative for employment generation (Van Gelderen, Brand, van Praag, Bodewes, Poutsma, & Van Gils, 2008) while neglecting entrepreneurship as a strategic component for growth from a five-year development plan of a country would eventually lead to unemployment issues (Kayed & Kabir, 2011). Developing young graduates as entrepreneurs augments employment measures adopted by a country through the creation of self-employment opportunities. Students from developing economies are more likely to pursue entrepreneurship as their career in comparison to students from developed economies (Plewa & Struwig, 2011). However, motivating graduate students to pursue entrepreneurship as their career is the most challenging task for both governments and universities. Many studies have identified self-efficacy as a major determinant of entrepreneurship and entrepreneurial intention. Self-efficacy means one's own belief to complete tasks successfully. General self-efficacy is useful when an individual faces challenging situations, and when one wants to establish a firm (Locke & Baum, 2007). Practitioners and academicians coordinate efforts to develop entrepreneurial culture by focusing on graduate entrepreneurship and entrepreneurial intention (Krueger, Reilly, & Carsrud, 2000; Nabi & Holden, 2008). Strong entrepreneurial intention (EI) is likely to eventually result in attempts to start a new venture. The Social Cognitive Career Theory is a widely accepted framework to study entrepreneurial intention (EI), which is a underresearched in the Gulf region.

The objective of this research is to study Omani graduates' entrepreneurial intention by introducing entrepreneurial self-efficacy as a mediating variable in the Social Cognitive Career Theory (SCCT) framework developed by Lent, Brown, and Hackett (2002). The study was conducted by surveying 263 graduate students with a self-reporting instrument. The article follows in four major sections. The first section focuses on the review of literature with hypotheses and model development. The second section discusses the materials and methods used in this study. The third section focuses on the model testing, and the fourth section discusses the results, followed by a conclusion and future research directions.

LITERATURE REVIEW

This research focuses on individual cognition related factors of the Social Cognitive Career Theory (SCCT), that is, the self-efficacy, outcome expectations, and personal goals based on the work of Lent, Brown, and Hackett (2002). The SCCT framework focuses on career interests and their relation to career choices. Self-efficacy (SE), outcome expectations, and personal goals control one's own career (Lent, Brown, & Hackett, 2000). "Self-efficacy is one's own beliefs on the capabilities to complete a task successfully" (Boyd & Vozikis, 1994). SCCT asserts that SE influences personal goals, which determines the individual's action based on the expected outcomes. Outcome expectation is the "belief about the consequences of performing a behaviour" (Lent *et al.*, 2002, p.262). The level of SE influences the outcome ex-

pectations and their success and failures; people are discouraged by failures when they experience easy success. However, effort and perseverance can overcome obstacles and lead to a stable sense of SE (Wood & Bandura, 1989). Perseverance means achieving goals in challenging times. Thus, an individual with high SE will persevere in challenging times (Bandura, 2002). Self-efficacy and outcome expectations influence the career choice, goals, and ambitions. Hence, a goal is the conviction to perform an activity that affects an outcome (Bandura, 1986, quoted in Boyd & Vozikis, 1994). That is, individuals with a high level of SE and the wish to achieve their expected outcomes will help them in achieving their goals. Lent, Brown, and Hackett (1994) claim that one's choice of career depends on the person's SE and outcome expectations. Therefore, I propose the following hypotheses:

H1: Self-efficacy positively influences one's outcome expectations.

H2: Self-efficacy positively influences one's conviction to perform an activity.

Achieving desired goals creates a positive change, and it positively influences entrepreneurial commitment (Jansen, 2004), entrepreneurial intention (do Paço, Ferreira, Raposo, Rodrigues, & Dinis, 2011), the need for achievement, and persistence (Wu, Matthews, & Dagher, 2007). Wu and Li (2011) focus on different constructs – namely perceived benefits and sacrifices – to study entrepreneurial intention, which is synonymous with expected outcomes. They find that the perceived benefits of entrepreneurship explain the formation of entrepreneurial intention. Outcome expectations and entrepreneurial intention vary according to an individual's psychological and socio-economic conditions. What further determines entrepreneurial intention is financial security (Van Gelderen *et al*., 2008), the need for achievement (Dinis, do Paco, Ferreira, Raposo, & Gouveia Rodrigues, 2013), and perceived sacrifices (Wu & Li, 2011).

Various research perspectives argue that SCCT is a valid framework to study the relationship between SE and entrepreneurial intention (Austin & Nauta, 2016; Liguori, Bendickson, & McDowell, 2018). Intentions influence the choice of actions and predict future behaviours. Many researches on entrepreneurial intention use Ajzen's (1991) and Ajzen's and Fishbein's (2000) theory of planned behaviour (Aloulou, 2015; Krueger *at al.*, 2000; Van Gelderen *et al*., 2008; Zhang, Wang, & Owen, 2014). Another group reveals a relationship between SE and entrepreneurial intention (Bayrón, 2013; Bar Nir *et al*., 2011; Kristiansen & Indarti, 2004; Segal, Borgia, & Schoenfeld, 2002). I derive the following hypotheses from extant literature:

H3: One's perception of consequences for performing a behaviour influences the conviction to perform an activity.

H4: Self-efficacy positively influences entrepreneurial intention.

H5: One's conviction to perform an activity influences entrepreneurial intention.

The Mediating Role of Entrepreneurial Self-Efficacy

SE influences a person's behaviour to start a business and the level of "task persistence" in challenging times (Bandura, 1986, quoted in Boyd & Vozikis, 1994). Individuals with higher SE in their early stages of career will possess high entrepreneurial intentions and will be involved in entrepreneurial tasks (Boyd & Vozikis, 1994). SE can be general or domain-specific. General SE is an individual's ability to perform a broad range of tasks (Luszczynska, Scholz, & Schwarzer, 2005), whereas domain-specific SE is

a person's ability to effectively perform various entrepreneurial tasks (Chen, Greene, & Crick, 1998). Research proves that SE influences a person's career choice (Lent *et al*., 1994) and determines entrepreneurial intentions and behaviour (Fietze & Boyd, 2017; Laguna, 2013; Naktiyok, Karabey, & Gulluce, 2010; Newman, Obschonka, Schwarz, Cohen, & Nielsen, 2019; Pihie & Bagheri 2013; Ren, Ping, & Li, 2018; Sequeira, Mueller, & Mcgee, 2007; Sušanj, Jackopec, & Miljković, 2015; Wilson, Kickul, & Marlino, 2007; Zhao, Seibert, & Hills, 2005). While many researchers find direct influence of entrepreneurial self-efficacy (ESE) on entrepreneurial intentions (EI) the role of ESE as a mediating variable between SE and EI of graduate students is less researched in Oman. McGee *et al*. (2009) assert that scholarship should include ESE in the EI model. ESE is one's ability to start and successfully manage a venture with required entrepreneurial skills in marketing, human resources, and finance (Chen *et al.,* 1998). Hence, I propose the following hypotheses:

H6: Entrepreneurial self-efficacy positively influences entrepreneurial intention.

H7: Entrepreneurial self-efficacy mediates the relationship between self-efficacy and entrepreneurial intention.

MATERIAL AND METHODS

This study is descriptive and quantitative in nature. The sample included graduate students enrolled in a business program at a private college in Muscat. A non-probability method of sampling was used. Using judgemental sampling, three hundred questionnaires were distributed to the final year undergraduate students, out of which 274 students responded. Among the received responses, 263 responses were usable. The final sample constituted 137 male and 126 female students. The data was collected through self-administered questionnaire. The questionnaire consisted of eight items measuring general SE adapted from Chen, Gully, and Eden (2001), and six statements measuring entrepreneurial intention adapted from Liñán and Chen (2009). One global statement measured ESE and entrepreneurial goals, and four independent items measured outcome expectations were adapted from Segal *et al.*(2002). Outcome expectations were measured by assessing respondents' perception of the ability of self-employment in "making money," "providing financial security," "achieving independence," and "satisfying the need for achievement." The questionnaire was pilot tested on 25 students for reliability. Based on the measure of reliability, the eight-items scale measuring general SE was reduced to six items and the six-items scale measuring entrepreneurial intention was reduced to three items. The final reliability measures of the 15-item scale (excluding demographic variables) was 0.958. Table 1 details the reliability measures. Data was analysed with AMOS 23 and SPSS.

Table 1. Reliability measures

Mean	Minimum	Maximum	Variance	N of Items	Cronbach's Alpha
3.712	2.970	4.916	0.244	15	0.958

Source: own calculation in SPSS.

RESULTS AND DISCUSSION

The hypotheses were tested by applying multiple regression in SPSS. The aggregated scores of general SE items and EI items were used to run the regression.

Outcome expectations were assessed based on four individual measures that focused on earning money, financial security, independence, and the achievement of needs. The following statements were used to measure outcome expectations: "What do you think is the probability of making money by being self-employed?"; "What do you think is the probability of having financial security by being self-employed?"; "What do you think is the probability of being independent if you are self-employed?"; "What do you think is the probability of satisfying your need for achievement if you are self-employed?" Aggregated scores of SE statements were considered when running the regression path. Table 2 shows the standardised regression weights with R- Squared measures for OE and GSE.

Table 2. Standardised regression weights

Variables with path			Estimate	S.E.	C.R.	p
Making Money (MM)	<---	General Self- Efficacy (GSE)	0.908	0.041	35.127	***
Financial security (FS)	<---		0.713	0.058	16.473	***
Independence (IND)	<---		0.639	0.016	13.431	***
Need for Achievement (NACH)	<---		0.947	0.028	47.913	***

Significant codes: *** 0.001. R-squared = 0.72.
Source: own calculation in SPSS.

Referring to the statistics in Table 2, we may infer that general self-efficacy (GSE) influences the outcome expectation variables (MM, FS, IND, NACH) with a good R-squared value of more than 70%, except for the variable independence, which is less than 70%.

Entrepreneurship goal was measured through a global statement that elicited response from students by asking "How likely are you to become an entrepreneur?" Table 3 shows standardised regression weights with R- Squared measure for EG and GSE.

Table 3. Standardised regression weights

Variables with path			Estimate	S.E.	C.R.	p
Entrepreneurship Goals (EG)	<---	General Self-Efficacy (GSE)	0.99	0.044	33.248	***

Significant codes: *** 0.001. R-squared = 0.72.
Source: own calculation in SPSS.

Referring to the statistics in Table 3, we may infer that GSE determines student entrepreneurship goals with 72% of explained variance.

Table 4 shows the standardised regression weights with R-squared measures for OE and EG.

The statistics from Table 4 reveal that all four variables account for 86% of the total explained variance. Two variables, namely "financial security" and "independence" have a negative influence on entrepreneurship goals. Hence the above two variables fail to positively influence entrepreneurship goals.

Table 4. Standardised regression weights

Variables with path			Estimate	S.E.	C.R.	p
Entrepre-neurship Goals (EG)	<---	Making Money (MM)	0.835	0.020	36.431	***
	<---	Financial security (FS)	-0.082	0.024	-3.558	ns
	<---	Independence (IND)	-0.067	0.097	-2.904	ns
	<---	Need for Achievement (NACH)	0.393	0.022	17.141	***

Significant codes: *** 0.001; * 0.05 'ns' not significant. R-squared = 0.862.
Source: own calculation in SPSS.

EI was measured by eliciting responses from the students through such statements as, "I am ready to do anything to be an entrepreneur," "I will make every effort to start and run my own firm," "I think seriously of starting a firm." The aggregated scores of the three items were used as a single measure. Table 5 shows the standardised regression weights with R-squared measure for EI and GSE.

Table 5. Standardised regression weights

Variables with path			Estimate	S.E.	C.R.	p
Entrepreneurial intention (EI)	<---	General Self-Efficacy (GSE)	0.895	0.037	32.445	***

Significant codes: *** 0.001. R-squared = 0.80.
Source: own calculation in SPSS.

The statistics from Table 5 reveal that SE influences EI of the students. GSE explains entrepreneurial intention of the students to the extent of 80%.

Table 6 shows the standardised regression weights with the R-Squared measure for EI and EG.

Table 6. Standardised regression weights

Variables with path			Estimate	S.E.	C.R.	p
Entrepreneurial intention (EI)	<---	Entrepreneur-ship Goals (EG)	0.933	0.019	41.843	***

Significant codes: *** 0.001. R-squared = 0.87.
Source: own calculation in SPSS.

The statistics from Table 6 reveal that the students' entrepreneurship goals positively influence their EI. The goals explain their EI to an extent of 87%.

The students' ESE was measured by eliciting response from them about the global statement, "How confident are you that you have all the necessary knowledge, skills, and abilities to perform the tasks and activities necessary to become an entrepreneur?" Table 7 shows the standardised regression weights with the R- Squared measure for EI and ESE.

The statistics from Table 7 reveal that the students' ESE positively influences the entrepreneurial intention of the students with an explained variance of 81%.

To test the hypothesis 7 (H7), the study measured the direct and indirect effect of SE on EI with bootstrapping. Path analysis with bootstrapping was performed with the variables of

SE, EI, and ESE. The Tables 8 and 9 show standardised regression weights with the R-squared measure, along with the direct and indirect effect of SE on EI of the graduate students.

Table 7. Standardised regression weights

Variables with path			Estimate	S.E.	C.R.	p
Entrepreneurial intention (EI)	<---	Entrepreneurial Self-Efficacy (ESE)	0.901	0.021	33.588	***

Significant codes: *** 0.001. R-squared = 0.87.
Source: own calculation in SPSS.

Table 8. Standardised regression weights

Variables with path			Estimate	S.E.	C.R.	p
Entrepreneurial Self-Efficacy (ESE)	<---	General Self- Efficacy (GS)	0.889	0.050	31.479	***
Entrepreneurial intention (EI)	<---	Entrepreneurial Self-Efficacy (ESE)	0.502	0.040	9.716	***
	<---	General Self- Efficacy (GS)	0.448	0.070	8.663	***

Significant codes: *** 0.001. ESE R-squared = 0.79; EI R-squared =0.79.
Source: own calculation in SPSS.

Table 9. Direct and indirect effects

Hypothesis	Direct effect	Indirect effect	Result
GS→ESE→EI	0.607* (GS→EI)	0.605* (GS→ESE→EI)	Partial mediation

Significant code: * 0.05.
Source: own calculation in SPSS.

The result reveals that SE has a significant direct effect on EI and significant indirect effect on EI through ESE.

Based on empirical studies (Table 2 – Table 9) we conclude that hypotheses (H1-H7) are confirmed.

Model Development

A model was developed with all the variables (hypotheses) and tested for its path relationship in a single run. Figure 1 shows the model with the path co-efficient.

Figure 1 reveals that the outcome expectation measures "financial security" and "independence" did not significantly influence EG of the students. However, the outcome expectation "probability of making money" significantly influenced the EG of the students. We may also observe that the effect of individual SE on EG and EI was significantly reduced. The prominent change may be observed in the mediating effects of ESE, in which partial mediation changed to full mediation. Full mediation implies that the role of SE in determining EI of the students is significant when it is mediated through ESE of the students. The direct relationship between the individual SE and EI is insignificant. Table 10 shows the mediating effect achieved in the model.

Based on the results of the model (Figure 1), a revised model was developed (see Figure 2). The revised model eliminated 1) the financial security and independence path on

entrepreneurship goals; 2) the path established between self-efficacy and entrepreneurial in-tention; and 3) the path established between self-efficacy and entrepreneurship goals. Figure 2 shows the revised path model with the standardised regression weights.

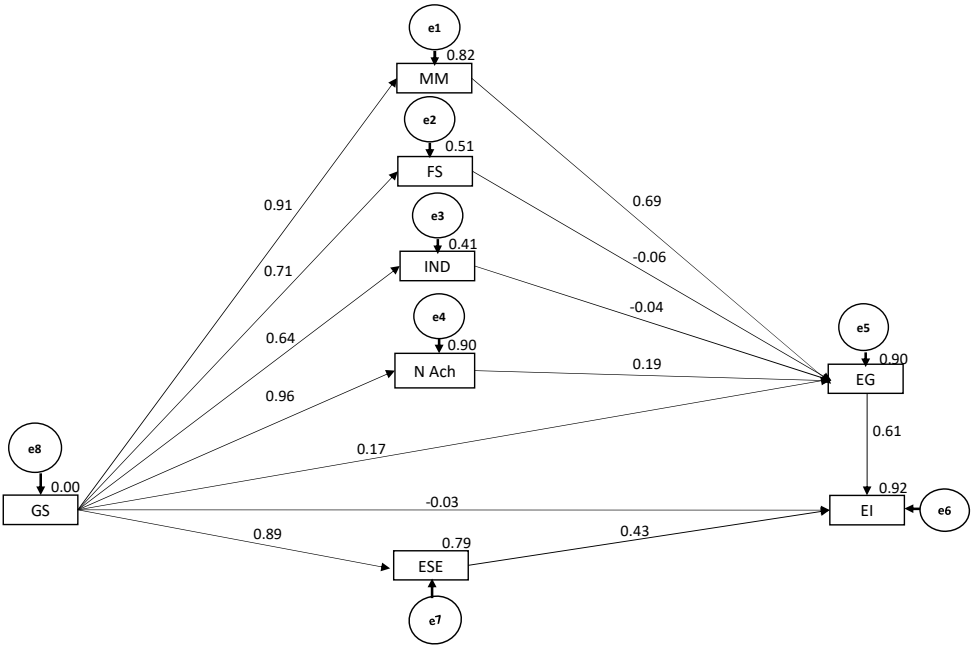

Figure 1. Path diagram of the model with standardised regression weights
Source: own calculation in AMOS.

Table 10. Direct and Indirect effects

Hypothesis	Direct effect	Indirect effect	Result
GS→ESE→EI	0.889*** (GS→EI)	0.934*** (GS→ESE→EI)	Full mediation

Significant code: *** 0.001.
Source: own calculation in SPSS.

The revised path model shows a good R-squared measure and significant path-coefficient. An improvisation of the revised path model was attempted by changing the path relationship, but a valid model could not be developed. Hence, the revised model (Figure 2) is the final outcome of this research.

This research studied the entrepreneurial intention of graduate students in Oman by focusing on the roles of SE and ESE in the SCCT framework. The results of the revised model (see Figure 2) differ from the work of Lent *at al.* (2002). When SE was tested independently (excluding other variables) for its relationship with EI, the results established a positive relationship, which is similar to the findings in other research studies (Laguna, 2013; Pihie & Bagheri, 2013; Sušan *et al*., 2015; Wilson *et al*., 2007; Zhao *et al*., 2005). The students with high SE showed higher interest in achieving EG, which implies their motivation to start own business. The research established a positive relationship between the students' SE

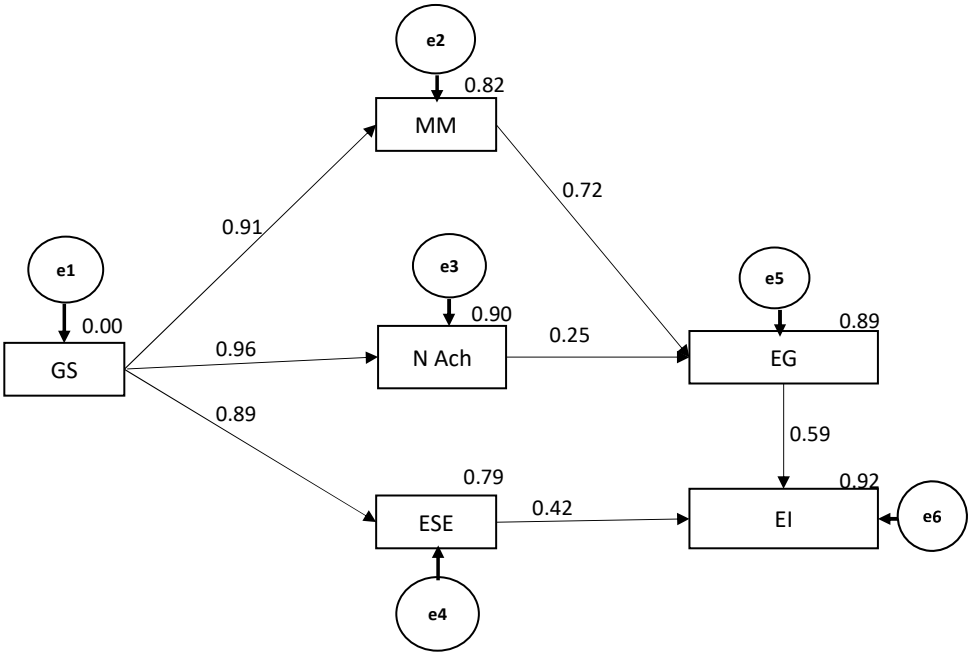

Figure 2. The revised path diagram of the model
Source: own calculation in AMOS.

and all the variables of outcome expectations. The above finding confirms the role of SE in determining the outcome expectations of the students. Interestingly, not all variables of outcome expectations determined the students' EG. The study revealed that students who expected to make more money through their own ventures had stronger EG, which in turn positively determined the EI of the students. The students prefer to be financially secured by being employed in a firm, thus being risk-aversive.

Omani students do not choose entrepreneurship as their career due to the fear of failure (Belwal, Al Balushi, & Belwal, 2015). Both the government of Oman and Omani educational institutions should play a significant role in nurturing graduate students' attitude in assuming entrepreneurial risks. This can be done at universities and colleges by emphasizing entrepreneurship courses through building an entrepreneurship curriculum based on the industry-academic partnership to nurture students' business acumen. Oman lacks systematic policies that govern the relationship between colleges and industries (Issa, 2016). Hence there is an imperative to develop strategic policies that develop entrepreneurship education. The study's results are similar to the findings of Chen *et al.* (1998) that graduate students' entrepreneurial SE determines their EI. Graduate students' SE influences their EI both directly and indirectly through their ESE. A significant partial mediation was obtained. However, the above discussion becomes worthwhile when each of the above hypotheses is treated independently, excluding other variables. When all the hypotheses were considered in a single run (Figure 1), the outcomes varied. The explanatory power of SE for EI and EG was not significant, which implies that SE predicts EI better when it is treated alone as the choice of determinant. SE failed to establish relationship with EI in a multivariate ap-

proach. However, the role of SE in determining EI can be ruled out completely, as it has a considerable indirect explanatory power. Given the above scenario, a revised model was developed (Figure 2) with ESE as the mediating variable. We should mention that many studies establish a direct relationship between ESE and EI (Bar Nir *et al*., 2011; Krueger *et al*., 2000; Pihie & Badheri, 2013; Wilson *et al*., 2007; Zhao *et al*., 2005), but do not establish a mediating relationship. This study differs from other studies, as it claims that SE explains EI in the presence of ESE. Besides ESE, EI are determined by the graduate students' EG, which in turn influenced the outcome expectation variables such as "making money" and "need achievement." Noteworthy, the "need achievement" had less explanatory power in the first model (Figure 1) but gained in the revised model (Figure 2).

CONCLUSIONS

Based on the results, we suggest that universities and colleges should focus on developing Omani graduate students' mastery experience as recommended by Wood and Bandura (1989). Overall, the current article established the roles of SE and ESE in determining EI. The results of the study suggest ESE as a critical mediating factor that determines EI of undergraduate students. ESE also mediates the influence of belief and motivation on EI. (Odoardi, Galletta, Battistelli, & Cangialosi, 2019). Educational institutions in Oman should develop courses that nurture ESE of the students. Entrepreneurship clubs will stimulate entrepreneurial learning (Pittaway, Rodriguez-Falcon, Aiyegbayo, & King2011), which helps developing students' SE. Exploring the exact requirements of an entrepreneurship course that develops the ESE of graduate students is beyond the scope of this study. However, we may recommend that institutions reinforce Omani students' confidence by training them in technical aspects, such as market research, product development, and commercialisation, which will help to increase their ESE. Moreover, the ESE of graduate students can be developed by training them with the transferrable skills in areas related to business, such as marketing, finance, procurement, and human resources management, which will develop domain-specific skills.

The role of the Ministry of Higher Education is also imperative in developing the SE and ESE of graduate students by building effective educational policies. Hence, nurturing ESE will lead to the development of entrepreneurship, which is much required in Oman, as the economy faces trying times due to the decline in the economic contribution from the hydrocarbon sector. The Ministry of Higher Education in Oman has mandated all the colleges to include entrepreneurship as a course in undergraduate programs, but this course is dealt as one of the subjects for graduation. In such circumstances, this research informs practitioners and researchers about the need to nourish domain-specific ESE skills to develop holistic academic programs, which can inculcate the spirit of entrepreneurialism and nurture EI among graduate students. After all, the government has a substantial role in nurturing the relationship between entrepreneurship and economic growth (Saberi & Hamdan, 2019). Oman's government has invested in promoting Small and Medium Enterprises as the country's economic engine, as this would facilitate diversification, promote entrepreneurship, and increase employment opportunities. Government's initiatives can be supported by academicians imparting the skills through practical learning rather than focusing on theoretical courses, as asserted by Piperopoulos and Dimov (2015).

The associative relationship between SE and ESE in determining the EI should help educational policymakers, entrepreneurship educators, and universities to develop and implement multiple pedagogies so as to impart SE and ESE among graduate students.

The limitation of the study is the use of self-reported questionnaire to assess SE and ESE of students. As multiple studies suggest, ESE is a multi-dimensional construct, although there is no agreement among the researchers on the measurement construct, while ESE measuring instrument has ample room for refinement. There is also room to broaden the scope of samples by including undergraduate students from across the country. However, these limitations do not influence the study's outcome quality. As a future research direction, in light of the developed alternative model, using cognitive individual related factors of the SCCT, including ESE as a mediating variable, and incorporating the role of situational factors like environment, education, infrastructural support, resource capabilities, and socio-cultural factors, will definitely contribute to the existing body of knowledge in entrepreneurship research. Moreover, the role of psychological constructs should be thoroughly investigated for their greater understanding. Lastly, in the future, an expanded model of the above measures should be developed to empirically test and validate a comprehensive framework and research graduate student's EI; thus developing appropriate intervention strategies for both academic and practical purposes.

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EU vs Local Market Orientation: Western Balkan Entrepreneurs' Challenge

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ABSTRACT

Objective: The main objective of the article is to analyse the relationship between entrepreneurs' profiles and their market orientation, i.e. to compare two groups of entrepreneurs – opportunity entrepreneurs and necessity entrepreneurs – to identify which group is international-export oriented.

Research Design & Methods: Supported by questionnaires, the probit model is the method used to analyse 200 enterprises that operate in Kosovo as both export and non-export firms.

Findings: The main findings confirm that there is a relationship between the type of entrepreneur and market orientation; necessity entrepreneurs are less oriented towards international markets, while opportunity entrepreneurs are more focused on international markets.

Implications & Recommendations: Among the main implications is one that shows entrepreneur type matters for market orientation. Therefore, the condition of trade liberalisation only is insufficient for the EU and international market orientation of entrepreneurs. In consideration of this fact, the main recommendation is to internally improve entrepreneurs' capability to exploit the EU and international markets in the future.

Contribution & Value Added: The main contribution of this study is the demonstration of a link between the characteristics of entrepreneurs with entrepreneurs' market orientation; especially in the Western Balkans, a region characterised by long transitions, political tensions along with economic and institutional challenges. The added value of this research is the comparison of entrepreneurs on local markets with entrepreneurs on international markets based on their characteristics.

Article type: research article

Keywords: entrepreneurs; local market; necessity; opportunity; EU integration

JEL codes: D21, F23, L26, P45

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INTRODUCTION

According to the World Bank Report (2008), we may attribute poor industrial performance in the Western Balkans to previous conflicts but also delayed transition, in some countries, poor economic management, and informal economy. The loss of markets in these countries seriously disrupted commercial and economic links among several neighbours and their main industrial partners, not to mention international production.

According to the Global Entrepreneurship Monitor report (GEM; 2018), most of Western Balkan countries are factor-driven economies. In such economies, research and development (R&D) transfer, entrepreneurship education, government entrepreneurship programs, taxes, and bureaucracy are highlighted as areas that constrain entrepreneurship. Like other Western Balkan countries within the EU framework, Kosovo strives to enter the European Union and capitalize on the opportunities of the EU market. Therefore, in addition to the local market, it is crucial for local firms to penetrate the international markets, considering the opportunities of the EU market. There are many reasons why local entrepreneurs are less oriented towards international markets.

Different authors tackled the many theories regarding entrepreneurs' approach to the orientation towards the EU market. Pehrsson (2016) addresses the importance of international firms' in foreign markets; Dimitratos, Lioukas, and Carter (2004) discuss the uncertainty of domestic environment; Pissarides (2003) covers the limited technical expertise and growth issues; Acs and Audretsch (1993) scrutinize the role of small firms in Central Europe; while the informal sector and corruption are analysed by Shleifer and Vishney (1993). Wach, Głodowska, and Maciejewski (2018; 2019) analyse the impact of entrepreneurial orientation on the internationalisation of companies. Furthermore, Marcouiller and Young (1995), Scase and Goffee (1982) and McIntyre (2003) analyse necessity-type entrepreneurs, who will be one of the subjects of this paper.

This research is crucial, as Western Balkan countries seek European integration. Hence, the correlation between the type of entrepreneur and their market orientation is key for the future of exporting trends of these countries. This research fills a knowledge gap by making a scientific contribution to the fields of entrepreneurship, market orientation, trade, and export. Apart from the type of entrepreneur and their capability to penetrate the international market, the additional contribution or value added of the research is the measuring of the level of experience, economic sectors, and the role of institutional support on export orientation. Supported by surveys, we employed the probit model along with descriptive statistics to analyse export and non-export enterprises. The main research questions are 1) whether opportunity entrepreneurs have a higher probability of participating in international markets, 2) whether the level of experience matters for export orientation, and, finally, 3) what is the role of institutional support and economic sectors on market orientation. The main objective of this study is to empirically analyse the relationship between the type of entrepreneur and their market orientation. The paper is structured as follows: following the introduction there is a review of the literature and the theory development. Then there is a discussion of the material and methods employed, followed by a presentation of the results. The main findings of the study are detailed and final conclusions are presented.

LITERATURE REVIEW

The subject of market orientation is crucial for the development of entrepreneurship in the Western Balkans, considering that region has signed the regional free trade agreements known as CFETA 2006; not to mention that there are other market opportunities available from free trade with the European Union. While there are positive expectations for the Western Balkan countries with respect to free trade with the European Union, there is a low level of export on GDP creation – around 30% – which is quite low compared to new EU member states. Furthermore, according to the World Bank Group (2017), the current economic growth in the EU creates opportunities for Western Balkan countries. Therefore, growth in the EU through exports affects growth among its trading partners, including the Western Balkans: a one % point increase in GDP growth in EU-28 leads to an additional growth of 0.6% point of GDP in Albania and 0.27% points in Montenegro, with the impact falling in-between for FYR Macedonia, Serbia, Bosnia and Herzegovina, and Kosovo. Through regional ties, these countries also affect each other: a 1% point increase in GDP growth in Serbia motivates growth in Montenegro by 0.26% point. Regional integration is important for small countries because it facilitates entry into production chains – the main vehicle of growth in productivity, exports, and output.

To that end, Zhang and Zhou (2016) measure the relationship between market orientation, innovation, and export performance of Chinese manufacturers only to confirm that the relationship is positive. Furthermore, in a study of Saudi Arabia, Alotaibi and Zhang (2017) conclude that export market orientation has a significant impact on export performance. Pascucci, Bartoloni, and Gregori (2016) analyse a sample of 300 Italian small and medium enterprises (SMEs) to find that the number of foreign markets and the presence of an export department is significantly and positively related to market orientation. According to Mac and Evangelista (2016), a significant component of export performance is a commitment to learning. Moreover, they found that market orientation may enhance export satisfaction while, conversely, negatively impacting firm profit.

Further evidence suggests that entrepreneurs in post-conflict countries often face economic, institutional, and legal obstacles, including limited access to working capital along with limited managerial and technical expertise (Pissarides *et. al*., 2003). Consequently, in many transition economies, especially in the Western Balkans, the small-firm sector has not grown rapidly enough to prevent the rise of unemployment, nor has it fulfilled its potential as an engine of growth (Acs & Audretsch, 1993). Additional challenge for transition countries is the informal sector. In Kosovo, this phenomenon was mainly due to the predatory behaviour of government officials who expected bribes from anyone with officially registered economic activity (Shleifer & Vishney, 1993). According to Marcouiller and Young (1995), bribery and corruption may result from inadequate institutional environment. Moreover, this informal environment provides incentives to devote resources to influencing regulators and encouraging unproductive entrepreneurship (Baumol, 1990). Such uncertainty may reduce productive investment and slow growth but also encourage the growth of bribery and corruption (Shleifer & Vishney, 1993).

Furthermore, Wach, Głodowska, and Maciejewski (2018; 2019) confirm that entrepreneurial orientation can stimulate internationalisation much earlier than it is assumed in previous theoretical concepts, by combining entrepreneurial orientation, knowledge,

and internationalisation. This research analyses necessity and opportunity entrepreneurs and their behaviour towards the EU market in order to measure their potential for international orientation and development; considering that an additional obstacle for local Kosovo entrepreneurs is their dominant necessity-type characteristic. In the 1990s, as Kosovo's employees lost their positions in public companies, they were forced to undertake their own economic activities to survive economically. In comparison to the rest of the region, an additional challenge for Kosovo firms is the restriction on the free movement of business people, insofar as Kosovo still faces barriers on migration to EU countries due to visa restriction. Consequently, the restricted movement has a negative impact on networking and partnership with EU firms, thereby increasing the transaction costs of local firms (Qorraj & Jusufi, 2018).

The differences between necessity entrepreneurs and opportunity entrepreneurs were introduced in 2001 to clarify the distinction between entrepreneurship borne out of voluntary pursuit versus the need to engage in entrepreneurship due to the lack of employment opportunities. While necessity entrepreneurs are mainly present among the developing countries, where the lack of other alternatives pushes individuals to engage in entrepreneurial activities, opportunity entrepreneurs are individuals who are pulled into entrepreneurship activities due to their desire to apply their ideas or skills to entrepreneurial ventures. Scase and Goffee (1982) along McIntyre (2003) suggest that the majority of entrepreneurs in transition countries are necessity-based entrepreneurs rather than opportunity-based entrepreneurs. According to these authors, entrepreneurship is characterised by the reinvestment of business profits for the purpose of business growth and expansion.

The differentiation between the two above groups focuses on the motivation of entrepreneurs to initiate their own ventures (Reynolds, *et al.,* 2005). Reynolds *et al.* explore the distinction between necessity entrepreneurs and opportunity entrepreneurs. Furthermore, Reynolds *et al.* find that necessity and opportunity entrepreneurs differ in their aspirations for growth. In GEM 2001, 14% of opportunity entrepreneurs expected to create more than 20 jobs, whereas only 2% of necessity entrepreneurs had such expectations. A study by Block and Wagner (2006) in Germany finds that these two groups differ with respect to age, gender, region, and risk of becoming unemployed.

Opportunity entrepreneurs have been found to earn more, thereby having a stronger impact on economic growth. According to these results for Germany, it seems that necessity and opportunity entrepreneurship is not only significant for venture startups. Moreover, Bartlett, and Prasnikar (1995) confirm that most entrepreneurs in Slovenia have not been pushed into setting up a business by pressures of unemployment. The most important objective for most entrepreneurs was personal independence (57.6%). In the case of Slovenia, entrepreneurs appear to be growth-oriented. According to the last report of the Global Entrepreneurship Monitor (GEM 2017-2018), most entrepreneurs around the world are opportunity-motivated. On average, three-quarters of respondents in the 2017 survey, just as in the 2016 survey, state that they chose to pursue opportunity as the basis of their entrepreneurial motivations.

In contrast, factor-driven economies report the lowest average opportunity motivation. Kosovo is identified as a factor-driven economy, based on the GEM Report (2017-2018) and confirmed by the study by Prasnikar, Koman, and Qorraj (2010). Analysed on a regional basis, North America has the most opportunity-driven entrepreneurs (around

83%), followed by Europe (75.4%), Asia and Oceania (74.4%), Latin America and the Caribbean (71.7%), and Africa (70.9%).

While other studies analyse the main factors that influence the export orientation of enterprises or barriers to trade, this research extends the analysis to consideration of the type of entrepreneur and market orientation in the Western Balkans. Moreover, this study answers the following questions. Does the type of entrepreneurs have an impact on export orientation? Does entrepreneurship experience matter for export capabilities? Does a branch or economic sector impact export performance? What is the role of institutional support on export orientation? Furthermore, this paper contributes to researchers, students, and policy-makers by providing a better understanding of the relationship between entrepreneurs and their potential to exploit international market opportunities, thus filling a knowledge gap in entrepreneurship and market-orientation, especially for the Western Balkans.

MATERIAL AND METHODS

This section presents the empirical results of the probit model analysis. We analysed around 200 firms in Kosovo by differentiating exporting firms or firms that currently operate in the international markets from non-exporting firms or firms that operate in the local markets. The aim of dividing the firms into two groups was to evaluate and compare the capacity and the challenges faced by entrepreneurs in local and international markets, but also to note the correlation between the type of entrepreneur and market orientation. The data and sample were collected by open surveys conducted at the end of 2018 and early 2019. We included two hundred local firms: 100 firms that currently operate in international markets and 100 firms that operate only in the local markets. We selected data for these firms from the National Customs Agency.

The survey was designed to provide representative data and avoid complexities, such as personal questions in order to address the main issues under consideration and obtain accurate data for the purpose of the study. The survey was conducted by an experienced researcher, followed by audio recordings and transcriptions. The researcher mainly interviewed owners and experienced managers of the enterprises. As Kosovo has a limited number of firms that operate in international markets, the sample of exporting firms is limited. By employing the following statistics, we will be able to understand the core challenges with regard to strategic orientations of Kosovo firms, both those in the international and the local market. We surveyed firms in the main regions of Kosovo.
Firms were randomly selected in order to perform the regional inclusiveness approach.

In this paper, we test the following hypotheses:

H1: Opportunity-based entrepreneurs are more likely to access the EU market.

H2: The level of experience increases the export capabilities of entrepreneurs.

H3: The economic sector, i.e. industry branch, affects export orientation.

H4: Firms that possess more institutional support (funds or technical support from the government) are more likely to access the EU market.

The econometric model used in this study is as follows:

$$P(Y_i = 1) = \Phi(\beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \beta_3 x_{i3} + \beta_4 x_{i4} + \varepsilon) \quad (1)$$

in which y = export orientation; β_0=regression coefficient; X1 = characteristics of entrepreneurs (whether they are necessity or opportunity entrepreneurs); X2 = business experience (years in business; does the current exporter work with international firms in local markets?); X3 = economic sectors (in which sectors are concentrated into exporting vs local firms); X4 = institutional support (funds and technical support from the local government); and ɥ = error term. The model explores the relationship between the type of entrepreneur and market orientation. The main variables will be the type of entrepreneur, business experience, sector concentration, and the financial and technical support from the local government.

Variables Descriptions and Measurement

The levels of variables in the table below appear nominal. Only business experience is scale variable. Scale variable is a measurement variable and has a numeric value. The nominal variable is the most basic level of measurement. The nominal level measurement uses symbols to classify observations into mutually exclusive and exhaustive categories. Mutually exclusive means that categories must be distinct so that no observation falls into more than one category. Exhaustive means that there must exist sufficient categories so that each observation falls into at least one category. Over the years, only business experience variable has been expressed as ordinal or scale.

Table 1. Variables description

Dependent variable	**Variables descriptions and measurement**
Export orientation	1 – EU Market Orientation, 0 – Local Market Orientation
Independent variables	**Variables descriptions and measurement**
Characteristics of entrepreneurs	1 – Opportunity entrepreneurs, 0 – Necessity entrepreneurs
Business experience	Years since starting with exports
Economic sectors	The most widespread manufacturing sectors in Kosovo: Production of plastic doors and windows (Reference category), 1-Furniture, 2-Food industry, 3-Beverage industry, 4-Processing of metals
Institutional support	1-Institutional support from local government, 0-otherwise

Source: own study.

The choice of proper statistical technique very much depends on the dependent variable under testing. Probit and logit models are types of generalised linear models. Both can be used for modelling the relationship between one or more numerical or categorical predictor variables and a categorical outcome. In both logit and probit models, a binary outcome must be coded as 1 or 0. In our model, the dependent variable Export Orientation is coded as 1 – EU Market Orientation and 0 – Local Market Orientation. The real difference is theoretical. They use different link functions. Logistic regression uses a logit link function, while a probit regression uses an inverse normal link function. Economists like the probit model because it can be given a latent normal interpretation; the distribution of the response is relayed onto a continuous normal variable. In conclusion, choosing the right model depends on the individual preferences of researchers.

RESULTS AND DISCUSSION

The following is an explanation and discussion of the performed analysis. Table 2 represents the total number of firms that export to the EU and other international markets.

Table 2. The total number of Kosovo enterprises that export to the EU and other countries

Years	Total number of enterprises	Type of firms	
		The number of enterprises that export to the EU	The number of enterprises that export to other countries
2014	9404	244	386
2015	9833	229	421
2016	10424	210	456
2017	9223	257	443

Source: Kosovo Agency of Statistics (2018).

The entrepreneurs who operate with the EU and other international markets represent approximately 63% and are opportunity entrepreneurs. In contrast, entrepreneurs who operate on the local market seem to be relatively frequent, around 83%. This is an indication that firms which operate in the international markets have a growth-oriented approach and, therefore, increase their competitive capabilities as a strategy. Conversely, local firms mostly have a local approach; their lack of information and technical expertise prevents them from benefitting from opportunities that come from foreign markets. Moreover, we compared the receipt of technical or financial support from local institutions and international donors by firms that operate on the international market and those that do not operate on the international market. Only 9% of the firms that operate on the international market received funds and technical support from local institutions and donors, while only 4% of firms that operate on local markets absorbed funds and technical support from local institutions. This financial support improves the corporate governance of the firms. Furthermore, about 53% of enterprises that export to the EU market were established after 1989 and in 2000-2010, while around 80% of enterprises that operate in local markets were established after 2010. Most of the enterprises that export to the EU market (around 21%) are involved in production-related activities such as plastic doors and windows, while enterprises that operate in local markets are mostly involved in the furniture sector (around 23%).

In our model, the *pseudo R2* is 0.29. Changes in independent variables also because the change in the value of this test. LR chi2 is the likelihood ratio (LR) chi-square test. The value of this test is 31.02. *The Prob>chi2* shows that the coefficients jointly are highly significant. The value of this test is 0.03. Moreover, the Wald test – a test for exclusion restrictions – is 27.04.

In Table 3, we present results estimated from the binary probit model or probit coefficients for both groups of entrepreneurs. The variables include the characteristics of an entrepreneur's business experience, economic sector, and institutional support. Below, please find an explanation of the variables estimated in the model, used to analyse their impact on entrepreneurs' export orientation (supported by the results of Table 3).

Table 3. Enterprises that export to the EU markets vs enterprises on local marketsProbit Model Estimation Results

Parameter	B	Std. Error	95% Wald Confidence Interval		df	Sig.	Exp (B)	95% Wald Confidence Interval for Exp(B)	
			Lower	Upper				Lower	Upper
Characteristics of entrepreneurs	1.035	0.209	0.624	1.447	1	0.000**	2.816	1.867	4.249
Business experience	0.32	0.010	-0.053	-0.012	1	0.002**	1.009	0.952	1.990
Production of plastic door and window (Reference category)									
Furniture (1)	0.892	0.412	-0.398	1.240	1	0.030**	2.440	0.845	2.586
Food industry (2)	0.752	0.516	0.153	1.761	1	0.145	2.122	0.677	2.209
Beverage industry (3)	0.199	0.484	-0.014	1.772	1	0.681	1.221	0.621	1.328
Processing of metals (4)	-0.826	0.754	-0.323	1.395	1	0.273	0.438	0.327	0.491
Institutional support	0.155	0.390	-0.053	1.230	1	0.234	1.167	0.948	1.436
Constant	**-3.203**	**1.421**	–	–	**1**	**0.024**	**0.041**	–	–

Notes: **significant at 5%.
Source: own calculations.

A characteristic of entrepreneurs shows a positive relationship appears between the type of entrepreneur and their market orientation; around 63% of the enterprises that export to the EU and other markets are opportunity entrepreneurs. In contrast, 83% of enterprises that operate on the local market are necessity entrepreneurs. The positive coefficient means that an increase in the independent variable leads to an increase in the predicted probability. Moreover, based on the probit model, the odds ratio is 2.816, which indicates that – due to their characteristics – entrepreneurs who operate on the EU markets have a higher probability of exporting to an EU market in comparison to the second group.

Business Experience confirms the positive correlation between experience and exporting trends, demonstrating that experience matters for export orientation. Our analysis shows that 53% (resp. 41%) of export-oriented enterprises were established in the period 2000–2010, while about 12% were established even earlier, after 1989. In contrary, most of the firms (around 80%) that operate in local markets are established after 2010, while around 20% before 2010. The odds ratio of Business Experience is 1.009, which means that longer business experience increases the chances to export, so firms that operate in EU markets – due to their long-term experience – are in a better position in comparison to firms oriented locally.

Economic sectors highlights as the first reference category the production of plastic doors and windows. This dummy will not be included in the analysis. As visible from the figures of the other four categories, only the firms involved in the category of processing metals (0.438) has no positive relationship with the reference category. The firms that deal process metals have a lower probability of orientation towards the EU market than firms that produce plastic doors and windows. Firms of the other three categories have a positive relationship with the reference category. Therefore, these firms (involved in such sectors as the furniture sector, the food sector, or the beverage sector) and the firms from the reference category sector (plastic doors and windows) are likely to orient themselves towards the EU market.

With regard to *Institutional Support,* there is evidence that only around 9% of the exporting firms were supported by local institutions, while 4% of firms that are concentrated in local markets receive institutional support. According to the results, while institutional support from the local government is insufficient, we may confirm that export-oriented enterprises benefit from institutions in comparison to local-oriented enterprises. Although the variable is not significant, the coefficient shows that the higher the institutional support, the greater the opportunities for enterprises to export to the EU market.

Compared to other studies and authors such as Wach, Maciejewski, and Głodowska (2018), who connected entrepreneur orientation with internationalisation, and McIntyre (2003), who studied the type of the entrepreneur, this paper combines the type of entrepreneur with market orientation and internationalisation, respectively the impact of the type of entrepreneur on market orientation.

CONCLUSIONS

The current business environment in the Western Balkans still constrains local entrepreneurs from penetrating the EU market. Despite a few improvements in the business environment, local entrepreneurs in Western Balkan countries, especially Kosovo, still face many external obstacles.

While necessity entrepreneurs are mainly characteristic of developing countries, in which the lack of other alternatives pushes individuals to engage in entrepreneurial activities, there is evidence that most of Kosovo's entrepreneurs are necessity- rather than opportunity-driven entrepreneurs. According to our survey, around 63% of entrepreneurs oriented towards the EU market are opportunity entrepreneurs, while 83% of the entrepreneurs oriented towards the local market are necessity driven. Therefore, our results reveal that, despite the benefits provided by various regional and EU trade agreements, firms from Kosovo cannot be sufficiently developed to compete in the international and EU markets due to their entrepreneur type, mostly locally-driven.

Although local enterprises in Kosovo do not have a long tradition in business activities in comparison to other countries, business experience has a positive impact on their sustainability and export orientation.

Besides, due to financial limitations, support from the local government and other stakeholders is small, while technical and financial support increases the probability of enterprises access the EU and the international market.

With regard to economic sectors, informed entrepreneurs with a long-term vision usually adapted their activities and production in accordance with EU standards, showing that the EU and global market changes affect their investments and market behaviours.

Moreover, the probit model offers explanations for our hypotheses:

- due to the capabilities of opportunity entrepreneurs, they have more chances to access the EU and achieve international market orientation,
- experience with the business environment matters for export orientation,
- economic sectors, i.e. industry branches, are an important but not sufficient condition for export orientation,
- local institutional support increases the probability that enterprises are export-oriented in comparison.

Finally, to target EU market needs, the local government should implement long-term policies – including technical and financial support – and provide valuable information about new industry trends, technologies, and market needs within the EU.

This paper demonstrates the interlinkage of entrepreneur types with market orientation; therefore, the type of entrepreneur matters for export orientation in the Western Balkans, especially Kosovo. Further added value of this research is the comparison of entrepreneurs who operate in local markets with entrepreneurs on the international market. The main limitation of this paper is the limited number of enterprises oriented at the international market, given the small sample of enterprises available for analysis in Kosovo. Finally, an additional issue is the short observation period. It is possible to extend our research by monitoring export trends in the future and analysing whether the number of exporting enterprises will increase due to improvements in the general business environment in Kosovo or due to the advancement of quality in production, market experience, and networks that involve international enterprises.

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African Immigrant Entrepreneurs in South Africa: Exploring Their Economic Contributions

Bernard Lama Ngota, Sookdhev Rajkaran, Eric Ernest Mang'unyi

ABSTRACT

Objective: The objective of this article is to determine the economic opportunities created by African immigrant entrepreneurs in South Africa. Furthermore, it is to investigate the impact that Afrophobia has on economic opportunities created by African immigrant entrepreneurs in South Africa.

Research Design & Methods: The text utilizes a mixed-methods approach that incorporates both self-administered questionnaire and qualitative in-depth interviews. Through a random sampling approach and snowballing technique, this study combines data from questionnaires of 153 participants and in-depth interviews with 12 respondents.

Findings: The findings confirm that immigrant SMEs fill economic gaps by contributing to innovation and technology developments. Such commercial migrants pay taxes, thus adding to the economy of the country. Challenges faced by African immigrant entrepreneurs are not few but centre on Afrophobic and xenophobic attacks which negatively impact business operations and economic growth.

Implications & Recommendations: Sound measures by the government regarding immigration could minimize existing tensions, stimulate local skills development, technology development and transfer, new business opportunities, and improve inclusion into the globalised economy.

Contribution & Value Added: This study is unique in that it contributes to our knowledge and literature on immigrant entrepreneurship while particularly providing insights into African immigrants' contributions to a national economy.

Article type: research article

Keywords: African immigrant entrepreneurs; entrepreneurial challenges; Small and Medium Enterprises; South Africa

JEL codes: J15, L26, M10

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INTRODUCTION

The role that immigrants play in the economic development of a country is well acknowledged (Ekwulugo, 2006; DeLancey, 2014; Fatoki, 2014; Marchand & Siegel, 2014; Khosa & Kalitanyi, 2015). Immigrants are widely perceived to be highly entrepreneurial; contributing to economic growth and innovation (Hohn, 2012; Marchand & Siegel, 2014), with self-employment often viewed as a means of enhancing labour market integration and success (Beaujot, Maxim, & Zhao, 1994; Bogan & Darity, 2008; Douglas & Shepherd, 2002; Portes & Zhou, 1996). Through entrepreneurship, immigrants reduce unemployment by investing the necessary resources into numerous sectors with potential growth (Thomas & Inkpen, 2013). As such, immigrant entrepreneurship is an important driver for the socio-economic development of host and home countries (Ojo, Nwankwo, & Gbadamosi, 2013; Turkina & Thai, 2013).

Scholars justify the impact of migrants to host economies in various forms (e.g. Anderson & Platzer, 2006; Borjas, 1990; Friedberg & Hunt, 1995; Hart & Acs, 2011; Ngota, 2017; Ojo *et al.*, 2013). For example, in the United States of America, it has been established that immigrant entrepreneurs significantly contribute to the technology and engineering sectors of the economy (Hunt & Gauthier-Loiselle, 2010; Hart & Acs, 2011; Fairlie & Lofstrom, 2014). Scholars acknowledges that immigrants have striking entrepreneurial propensity and their businesses significantly contribute to job creation, innovation, transfer of skills to locals (DeLancey, 2014; Dele-Ijagbulu & Chirau, n.d.; Kalitanyi & Visser, 2010; Mabadu, 2014; Ngota, Rajkaran, Balkaran, & Mang'unyi, 2017; Ojong, 2006; Saxenian, 2002; Vertovec, 2002) and gross domestic product (GDP); (Liebig & Mo, 2013; Brewer & Gibson, 2014). Therefore, through their entrepreneurial activities, immigrant entrepreneurs create wealth that reduces locals' dependence on the government for providing jobs (Mabadu, 2014), as they predictably become the leading employers in South Africa's economy (Kongolo, 2010).

Although entrepreneurship provides immigrants' societal self-respect in their host country, African immigrant SME owners face many obstacles (Asoba & Tengeh, 2016). For instance, according to Mabadu (2014), immigrants face major difficulties with regard to settlement and integration into the job market, which is as a result of discrimination and 'limited' skills. For example, in South Africa, perceptions, particularly about black foreigners regarded as 'dangerous' and 'undesirable' – often termed by locals as 'kwerekwere' (Maharaj, 2002) – gradually increased the 'Afrophobia' phenomenon in recent years (Crush, Ramachandran, & Pendleton, 2013). This 'phobia' has adverse consequences on job creation and trading activities (Hunter & Skinner, 2003). Further issues that hinder the flourishing of African immigrant businesses are gathering resources to start a business (Fatoki & Patswawairi, 2012; Urban & Naidoo, 2012; Mabadu, 2014; Khosa & Kalitanyi, 2015), access to reasonable business premises (Khosa & Kalitanyi, 2014), stringent government regulations (Asoba & Tengeh, 2016), and inadequate managerial and financial management competencies (Kim, Park, & Wier, 2012; Smith & Watkins, 2012).

It is evident that SMEs – specifically those owned by immigrants – are major contributors to every developed economy (Asoba & Tengeh, 2016). Hence, the immigrant SMEs cannot be an exception, even though their contributions continues to be underrepresented in the academic literature. Studies conducted in Africa mainly focus on factors that

contribute to or impede immigrant entrepreneurial development (Mubangizi & Mubangizi, 2005; Radipere, 2012; Tengeh, Ballard, & Slabbert, 2012; Fatoki, 2014; Khosa & Kalitanyi, 2014; Asoba & Tengeh, 2016). However, there increasingly appear concerns about immigrants' contributions to the South African economy (Ojong, 2006). Studies on the impact of African immigrants on local economies in South Africa are limited and rare. Many of the studies on immigrant entrepreneurship focus on USA-based, Asian, and European economies (DeLancey, 2014; Fairlie & Lofstrom, 2014; Marchand & Siegel, 2014). This is theoretically and practically challenging, as data collected from such research cannot be easily generalised onto developing economies such as South Africa, which has a different cultural setting. However, much work is available from other parts of the globe (Fairlie, Zissimopoulos, & Krashinsky, 2010; Fairlie & Lofstrom, 2013; Fairlie, 2008, 2012b).

Noting the dearth in context-specific research, the current study fills a gap in this under-researched area by investigating economic opportunities generated by African immigrant entrepreneurs and the challenges they face in conducting business in South Africa. Moreover, the article scrutinizes immigrant SMEs' contributions to the economic growth of the African region. This study contributes to the literature by showing immigrant entrepreneurship as an important contributor to the economic development of the host nation. This was achieved by employing a mixed-methods approach on a sample of 153 surveyed respondents and 12 interviews. Thus, the research objectives are:

1. To determine the perceptions of immigrant entrepreneurs on economic opportunities that they believe their businesses create.
2. To determine gender differences in the perceptions of immigrant businesses' contributions.
3. To investigate the impact that Afrophobia has on economic opportunities created by African immigrant entrepreneurs in South Africa.

This paper is structured as follows: the next section presents the literature review of studies, which discuss the key concepts of immigrant entrepreneurship, economic contributions by immigrant entrepreneurs, and immigrant entrepreneurship in South Africa. Next, we present the theory that underpins this study. Furthermore, the article presents the material and methods in the following format: research paradigm, sample, its description, data collection, data instruments, data analysis, and research ethics. Later, we explain the results and discuss them to identify the empirical dimensions with respect to the said objectives. Lastly, the study ends with concluding remarks about the findings.

LITERATURE REVIEW

In general, the literature on immigrant entrepreneurship and contributions are unreliable and inconclusive (Tengeh *et al.*, 2012; Tengeh & Lapah, 2013; Kalitanyi & Visser, 2014). Though small business and entrepreneurship are widely researched in both developed and developing countries, we cannot say this about immigrant-owned businesses in the latter. Limited studies conducted in South Africa endeavour to address how immigrant entrepreneurs contribute to the South African economy (Kalitanyi & Visser, 2010; Fatoki & Patswawairi, 2012; Ngota *et al.*, 2017), while most articles analyse developed countries such as Canada, Australia, the United Kingdom, and the USA (Fairlie, 2008, 2012a; 2012b;

Fairlie & Lofstrom, 2014). The following section presents an overview of the literature on immigrant entrepreneurs and economic contributions by immigrant entrepreneurship.

Overview of Immigrant Entrepreneurship

Immigrant entrepreneurship developed into an important socio-economic singularity, as it plays a vital role in economic development. It spawns jobs through new business ventures that contribute to wealth creation in a country (Kalitanyi & Visser, 2010; Ngota *et al*., 2017). Societal inequalities within the host nation may pose structural barriers that prevent immigrants and ethnic minorities from competing with the locals on an equal footing. Some authors (Bogan & Darity, 2008; Khosa & Kalitanyi, 2015) establish that it is difficult for immigrants to enter into the labour market due to their residency status in the host country, which makes entrepreneurship a better option. Khosa and Kalitanyi (2015) reveal that immigrants venture into entrepreneurship with the ambition to survive as an alternative means to confronting the harsh discrimination in the labour market of the host nation. In line with the latter, Vinogradov and Elam (2010) posit that discriminatory wages in the employment sector may push immigrants towards self-employment. Nestorowicz (2011) explains that self-employment refers to working for oneself instead of an employer and drawing income from trade or business one operates personally.

Economic Contributions by Immigrant Entrepreneurs

Some authors of studies about immigrant entrepreneurship (e.g. Chamuorwa & Mlambo, 2014; Kalitanyi, 2007; Todaro, 1969) state that the impediment of employment for immigrants – particularly African immigrants – in host country labour markets in most economies, in this case, South Africa, has these cohorts make a living in the only alternative of economic fertile grounds: through the establishment of small businesses that sustain them. A significant number of African immigrants successfully apply their entrepreneurial flair in creating businesses that remarkably create new job opportunities for both migrants and locals (Borjas, 1986; Kalitanyi, 2007; Ngota, 2017). Contrary to the unsubstantiated belief held by many South Africans that immigrants from the north steal South African jobs (Kalitanyi & Visser, 2010). Fairlie (2012a) indicates in a study conducted in the USA that immigrant business owners make important contributions to the US economy. According to Fairlie (2012a), immigrant entrepreneurs start approximately 17% of all the new businesses in the USA and represent about 13% of all business owners. About 12% of the total business income in the USA is generated by immigrant business owners (Fairlie, 2008, 2012b; Saxenian, 1999). Hence, immigrant entrepreneurship in the USA creates new wealth and jobs. There are substantial international publications on immigrant entrepreneurship (e.g. Saxenian, 1991; Razin, 1993; Goetz, 1999; Lewis, 2001; Mubangizi & Mubangizi, 2005; Fairlie & Lofstrom, 2014), which focus on the higher likelihood of immigrant than local start-up businesses, the former's contribution on job creation, and their impeding factors in developed countries.

Furthermore, some studies on immigrant entrepreneurial skills in South Africa indicate that African immigrant entrepreneurial activities are catalysts through which entrepreneurial skills are transferred to the locals (Kalitanyi & Visser, 2014; Ngota, Rajkaran, & Mang'unyi, 2019; Timberg, 2005). Others associate this with emerging immigrant entrepreneurial factors in developing countries and South Africa in particular (Fatoki & Patswawairi, 2012; Radipere, 2012; Tengeh *et. al.*, 2012; Khosa & Kalitanyi, 2015; Asoba &

Tengeh, 2016). Waldinger (2002) indicates that some immigrant groups are more entrepreneurial than others. Furthermore, Waldinger (2002) explains that the reasons for being entrepreneurial are related to culture, structure, ethnicity, and the situation of business operation. The literature analysis shows the utmost importance that studies examine the significant relationship further by exploring the economic contributions of African immigrant entrepreneurs, especially in South Africa.

Immigrant Entrepreneurship in South Africa

Since the 1990s, South Africa witnesses a rising movement of foreign migrants and refugees (Ngota, 2017). Though many primarily came from the Southern African Development Community (SADC) countries, a huge number come from more distant African regions. South Africa's new migration policy has generated considerable controversy within the country. The policy debate focuses on the implications of migration for the national labour market and for the development of a new national immigration policy.

Hypothetically, in terms of economic development and growth, the local economy should include the potential contribution that immigrant entrepreneurs can make to their host locations (Pinkowski, 2009). Although business opportunities are open to all, Pinkowski (2009) contends that it is the immigrants who are likely to produce a greater number of new business start-ups with their associated outcomes. Immigrants are not just fundamentally risk-averse, they believe in their ability to succeed and use their personal savings or even their homes and other personal assets on the line to grow their own businesses, while simultaneously creating employment opportunities for others (Pinkowski, 2009).

The CDE (2004) report shows that the debates about SME development and policy pay too little attention to the potential contribution of immigrant entrepreneurs and, in particular, African immigrant entrepreneurship to the economy. Although the South African government's SME development policy acknowledges the important contribution that SMEs make to economic development, nowhere are immigrants singled out as part of this process (Tengeh, 2007). The Department of Trade and Industry (DTI) categorically states that SMEs play a vital role in economic development because, on the one hand, they enable people to meet their basic needs and survive while, on the other hand, through the growth of the SME sector, surviving firms become small enterprises, thus creating jobs and raising the standard of living for millions of South Africans in urban and rural areas (Ntsika Enterprise Promotion Agency, 2000; Von Broembsen & Wood, 2005).

Nonetheless, immigrant entrepreneurship should be a vital resource in the host nation's economic development; as such, it should be formally recognised, encouraged, and even nurtured. Debates about immigration and entrepreneurship in South Africa continue in isolation from one another, ignoring the international and local experience, which indicates the important contribution that immigrants make to building a successful culture of entrepreneurship and supplementing the pool of positive role models for would-be South African entrepreneurs (CDE, 2004).

Theoretical Guide

This paper is anchored in the ethnic entrepreneurship theory (Waldinger, Aldrich, & Ward, 1990), which seeks to explain immigrant entrepreneurship based on three interactive components; namely, access to opportunities, group characteristics, and emergent strat-

egies. Opportunity structure describes the market conditions under which immigrant businesses operate, i.e. the market conditions, which may favour products or services orientated towards co-ethnics or to a non-ethnic market. The ease with which immigrant entrepreneurs access business opportunities highly depends on the level of inter-ethnic competition and state policies. For example, in South Africa, the past decade has seen aggressive competition between native-owned small business operators and businesses owned by African immigrants (Liedeman, Charman, Piper, & Petersen, 2013). Ngota and Rajkaran (2016) describe "Afrophobia" as a range of negative attitudes and feelings to-wards black people or people of black descent around the world. Afrophobia can be viewed as attitudes, prejudices, and behaviours that reject, exclude, and often vilify persons based on the perception that they are outsiders or foreigners to the community, society, or national identity. This form of resentment amongst African immigrant entrepreneurship in South Africa was criticized in recent years with the perception of locals' jealousy towards African immigrants' business prospects. Moreover, immigrant-owned businesses tend to flourish. Apart from the zeal and a culture of prudence displayed by African immigrant entrepreneurs, they usually exploit opportunities for business that present themselves, such as serving the needs of poorer consumers by offering inexpen-sive products anywhere anytime, therefore, meeting their specific demands (Washinyira, 2015). The continuous increase in Afrophobic attacks can severely impact economic contributions from African immigrant-owned businesses in South Africa.

Another dimension of literature in the field of immigrant entrepreneurship posits that entrepreneurial contributions are higher amongst male immigrant entrepreneurs than amongst the female. Evidence from studies in the field of immigrant entrepreneurship represents immigrant women – specifically those of African origin – as additional agents of economic contributions (Bennett & Dann, 2005; Nkealah, 2011; Nkrumah, 2016; O'Neill & Viljoen, 2001; Yetim, 2008). Nkrumah (2016) perceives the underrepresentation of immigrant women in most empirical studies as a cultural and political injustice, which removes women from equal representation over the past decades. Explaining it from the cultural perspective, it is a common cultural phenomenon in the Africa continent that men are regarded as breadwinners while women are to look after the house when men are gone. The stereotype has men migrate, leaving behind women and children. Protagonist of the feminist theory differs with the cultural views by arguing that, perhaps because of ignorance and lack of education in many societies in past, put men on high migratory trends than women. Nowadays, education and awareness has been created in many societies which have seen impacts in the migratory trends with many women being part of the process, hence they have been noted to play significant roles in the economic contributions of their host nations (Nkealah, 2011; Nkrumah, 2016).

According to Waldinger *et al.* (1990), the group characteristics define the predisposing factors, such as selective migration, culture, and aspiration levels. These include the possibility of resource mobilization, ethnic social networks, general organizing capacity, and government policy that constrains or facilitates resource acquisition. Coulthard and Loos (2007) contend that building and managing personal relationships with individuals and firms that surround one's business is important when employing networking tactics to exploit existing opportunities. Sufficient networking can create space for immigrant entrepreneurs to share ideas and solve problems (Khosa & Kalitanyi, 2015). However, this has

been complicated by the government through the implementation of stringent regulations on immigrant business owners (Asoba & Tengeh, 2016). The final component of the model describes the ethnic strategies that emerge from the interaction of opportunities and group characteristics, as ethnic groups adapt to their environments (Waldinger *et al.*, 1990). It has been noted (Aaltonen & Akola, 2014) that host entrepreneurs can gain new skills in entrepreneurship through interaction among immigrant entrepreneurs. Small businesses owned by immigrants tend to be competitive by adopting niche strategies such as flexibility, high quality of products, and response to the specific needs of customers (Mac & Bhaird, 2010). With such new ideas and improved product and service offerings, they promote their business. Furthermore, through competitive methods, immigrant entrepreneurs tend to prevent a monopoly in local markets (Mason & Rown, 2013).

The strong point of the ethnic entrepreneurship theory is that it provides a broader picture of how immigrants explore their host environments. Therefore, this theory fits the current study as one the first studies of its kind to scientifically test the survival and challenges of immigrant entrepreneurship in host countries (Aldrich & Waldinger, 1990; Habiyakare, Owusu, Mbare, & Landy 2009; Light, Bhachu, & Karageorgis, 1989; Waldinger *et al.*, 1990). The current study depicts African immigrants' entrepreneurial flair in a host community. Considering the aforesaid, this study investigated African immigrant entrepreneurs' (SMEs) economic contribution in South Africa. Furthermore, it sought to establish the impact of Afrophobia, which is a major challenge to African immigrants' economic activities (Crush *et al.*, 2013).

MATERIAL AND METHODS

Research Paradigm

We undertook an inquiry by using the convergent mixed-methods approach (Creswell, 2014) to ascertain the opinions and experiences of various African immigrant entrepreneurs regarding the contributions they make into the South African economy, with the aim to further inform the research agenda. A quantitative survey design (questionnaire) was used, which ensured variety (Saunders, Lewis, & Thornhill, 2012) in the sample of immigrants drawn from various countries. Moreover, in-depth qualitative interviews were conducted that complemented the quantitative data findings.

Sample and Its Description

The target population was all African immigrant entrepreneurs who own businesses in the Eastern Cape Province of South Africa. Immigrants targeted in the study were drawn from different countries; namely, Cameroon, the Democratic Republic of Congo, Ethiopia, Ghana, Nigeria, and Somalia. The sample elements were selected through straightforward random sampling and snowballing techniques from a list of African immigrant small businesses obtained from respondent ethnic groups within the Municipalities and Business Support Centres of selected towns and through referral. The sample comprised 165 foreign participants who own SMEs in the province. A pilot study was conducted on a convenience sample of 13 such owners prior to actual data collection, while face validity, content, and external validity were ensured through a representative sample at a 5% marginal error.

Data Collection Methods

Data was collected through personally administered questionnaire surveys, distributed to and received from participants at an agreed date and time. In-depth interviews were also conducted on a one-on-one basis with 12 respondents. Both questionnaires and in-depth interviews were developed in English as most of the immigrants use the English language as a means of communication. However, in some instances, pidgin English was used, a local dialect mostly employed in the West and Central African states. Pidgin English was used to capture the exact perceptions of immigrant entrepreneurs in their own language. The data was collected from July to September 2016. During that period participants were constantly contacted to complete questionnaires. A personal follow-up resulted in an increase in response rate.

Data Collection Instruments

The questionnaire used contains both closed-ended and open-ended items. Questionnaires were used because they are easy to administer to a large population at a low cost, unambiguous, and easily analysed (Zikmund, Babin, Carr, & Griffin, 2010; Sekaran & Bougie, 2016). Before adopting the questionnaire, we sought expert views in the business field and used their suggestions to refine questions. The questionnaire had three parts that sought information on business resources, employment, resource challenges, entrepreneurial skills, and transfer of skills. We generated the questions ourself based on the literature. Moreover, the questionnaire contained a section for gathering demographic information on the respondents' age, gender, country of origin, duration of stay in South Africa, and the period of time they own a business. The in-depth interview was generated based on questionnaire items. The alpha (α) reliability coefficient for the questionnaire was above the recommended threshold of 0.7 (Hair, Black, Babin, Anderson, & Tatham, 2006), which indicates that it had acceptable internal consistency reliability.

Data Analysis

The data consisted of responses to the survey questionnaires, audio transcripts, and notes taken during the interviews. Firstly, the data collected through questionnaires were checked for omissions, legibility, and consistency in classification; discarding incomplete responses that lacked data; and identifying potential errors in data collection and discussing their implications (Zikmund *et al*., 2010; Vogt, Vogt, Gardner, & Haeffele, 2014). Secondly, we transcribed all the audio recordings in pidgin English before translating them into English and, next, we read each transcript to get an overall sense of the whole. Thirdly, we read the transcripts to identify transitions in experience, with each transition signifying a separate unit of meaning. We followed this process to find a deeper meaning in what the respondents said. The redundancies in units of meaning were eliminated so that the remaining units related to one another. Finally, we rephrased answers in a scientific manner and synthesized insights into descriptions of perceptions on how African immigrant entrepreneurs contribute to economic opportunities in the Eastern Cape Province. Themes were captured, coded, and analysed. Using the inductive approach, we achieved patterns, themes, and categories to group similar responses into categories (Creswell,

2014; Sekaran & Bougie, 2016). The identification of themes provided depth to the understanding of individual views of immigrant entrepreneurs (Creswell, 2010, p. 256).

Research Ethics

While engaging with the participants, the study recognised all ethical considerations, as proposed by Sekaran and Bougie (2016). Informed consent was sought from respondents by disclosing the procedures of the survey and how would be later used, hence the importance of participation. The study used fictitious names to typify transcribed data wherever necessary.

RESULTS AND DISCUSSION

Upon analysing data from all 165 completed returned surveys and the interviews on the contributions of African immigrant small businesses in South Africa, several primary findings emerged. These findings are now presented and then discussed in relation to the theoretical framework of the study. However, first, we present the socio-demographic information.

Sample Characteristics

We noted that (Table 1) the participants came from varied cultural, geographic, and linguistic backgrounds, including Nigeria, Cameroon, Ethiopia, Ghana, Somali, and the Democratic Republic of Congo. Over 69.9% were male, 68.6% were 31-40 years old, and 35.3% were from Nigeria. The majority, 54.9% lived in South Africa for 5-10 years. The majority, 58.8% operated their businesses 5-10 years, while 24.8% ran businesses for less than five years, with a meagre 1.3% for more than 20 years.

Form of Entrepreneurship and Economic Contributions

The forms of entrepreneurship and their economic impact on the economy was analyzed inferentially. Figure 1 shows that most participants earned a living by engaging in sole proprietorship. More particularly, 95.4% of the respondents were individual owners of businesses, 3.3% ran family businesses, and only 1.3% were in partnership. Researchers like Radipere (2012) show that the most common type of business ownership among immigrants involves sole proprietorship (57.8%) and partnership (25.4%), while the least common is a close corporation and private companies (14.7% and 2%). The majority of the participating entrepreneurs (52.9%) offered services, 41.8% traded, whilst 5.2% manufactured. Therefore, it was evident that the service and businesses were the most preferable options among African immigrant entrepreneurs.

Economic Opportunities Created

The researchers deemed necessary to determine which opportunities African immigrant entrepreneurs created in the South African economy. Figure 2 reveals that competition was the most important contribution (approximately 73.9%), followed by innovation (about 17%). Technology was the third factor (9.2%).

Table 1. Participants' background attributes

Background attribute	Value label	Frequency	Percentage
Gender	Male	107	69.9
	Female	46	30.1
Age	<20	1	0.7
	21-30 years	18	11.8
	31-40 years	105	68.6
	41-50 years	27	17.6
	51-60 years	2	1.3
Country of origin	Nigeria	54	35.3
	Cameroon	41	26.8
	Ethiopia	5	3.3
	Ghana	27	17.6
	Somali	1	0.7
	DRC	13	8.5
	Other	18	7.8
Duration of stay in South Africa	< 5 years	24	15.7
	5-10 years	84	54.9
	11-15 years	39	25.5
	> 15 years	6	3.9
Years of business operation	< 5 years	38	24.8
	5-10 years	90	58.8
	11-15 years	21	13.7
	16-20 years	2	1.3
	>20	2	1.3

Source: own elaboration based on the survey (n = 153).

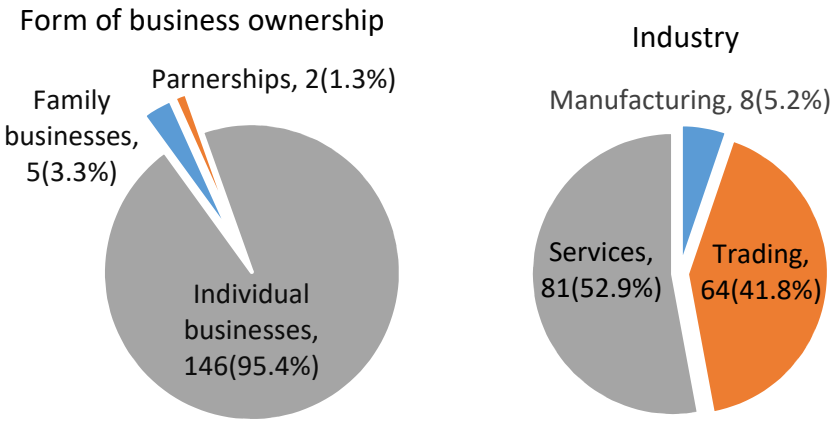

Figure 1. Forms of entrepreneurship and industry
Source: own elaboration based on the survey (n = 153).

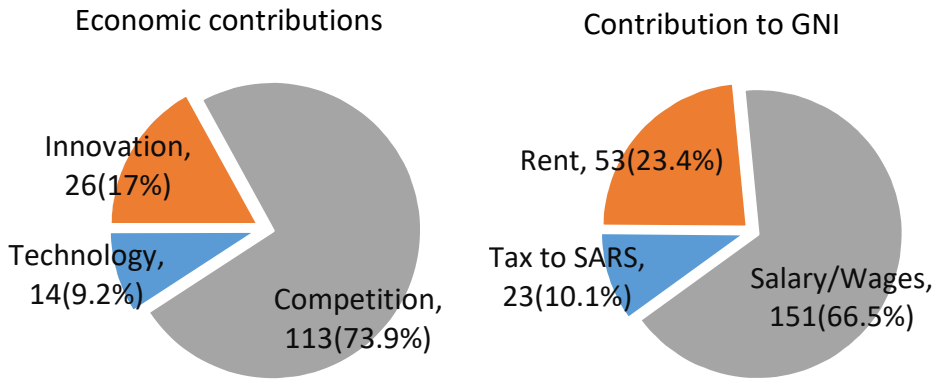

Figure 2. Socio-economic contributions
Source: own elaboration based on the survey (n = 153).

To corroborate the quantitative findings, we use the following respondents' quotes to highlight each point.

> "I think my business offers competition in the business environment as clients will turn to compare the best prices for goods, we provide to those provided by competitors" (P#01).
>
> "as I try to bring in new knowledge by not only relying on the traditional routine operations as the other big garages will do" (P#02).
>
> "I believe I offer the best quality of food I serve to my customers compared to what is provided by my competitors…. the evidence is seen as customers keep on coming here for the food" (P#04).

Based on the outcomes, other important facets with respect to innovation and technological development pertinent to business growth, maintenance, and survival were highlighted by respondents, which they indicated as important. The following excerpts complement the quantitative findings and cement the importance of innovation among SMEs operated by African immigrant entrepreneurs:

> "I can say that my business offers innovation and competition in the business environment. I try to make things differently by shifting away from the normal routine applied in sophisticated workshops and bring in new ways of doing things" (P#05).
>
> "We are involved in the construction industry and I think our business offers innovation by bringing in and applying new designs, which our clients love so much" (P#06).
>
> "There is innovation in our manufacturing business…. Since we deal with product development, we have to bring in new product lines which we distribute to certain of our outlets who like and buy them… keeping us competitive in business all this while" (P#03).

> "I believe that my business offers innovation as it brings creative knowledge and helps equip the community with services on technology" (P#07).

Contributions to the Gross National Income (GNI)

Regarding how African immigrant-owned businesses contribute to the economic growth of the province and the country as a whole, the results in Figure 2 demonstrate that contributions are made to the GNI through payment of salary/wages to employees (66.5%), rents for businesses premises (23.4%), and taxes to the South African Revenue Service (SARS; 10.1%). These findings are corroborated by findings from personal interviews, for example, when asked on how their businesses contribute to the GNI of the province, the interviewees answered:

> "Yes, my business pay tax to the SARS, I also pay salaries/wages to my employees and rent to the owner of the premises, in which I operate my business" (P#01).

> "Sure, my business pays salaries to my employees. I also pay some money every month in the form of rents to a representative who says he is a municipal agent (street committee leader) since I operate my business in a container" (P#08).

Moreover, in order to determine the differences in the gender perception of immigrants' businesses contributions a cross-tabulation was done as shown in Table 2. Table 2 shows that the majority (144; 94.1%) of the respondents stated that their entrepreneurial activities contribute 'very positively' to the economy, while a few (0.7%) remained 'neutral.'

Table 2. Cross-tabulation between gender and immigrants' businesses contributions

Gender	Variable	Immigrants' businesses contributions to the SA economy			Total
		Very positive	Positive	Neutral	
Male	Count	102.0	5.0	0	107.0
	Expected Count	100.7	5.6	0.7	107.0
	% within Gender	95.3%	4.7%	0%	100.0%
Female	Count	42.0	3.0	1.0	46.0
	Expected Count	43.3	2.4	0.3	46.0
	% within Gender	91.3%	6.5%	2.2%	100.0%
Total	Count	144.0	8.0	1.0	153.0
	Expected Count	144.0	8.0	1.0	153.0
	% within Gender	94.1%	5.2%	0.7%	100.0%

Source: own elaboration based on the survey (n = 153).

The association between gender perception of African immigrant entrepreneurs' contributions to the South African economy was analysed using Pearson Chi-square test statistics, in which gender was the independent variable while perceived business contributions the dependent variable, as illustrated in Table 3.

Chi-square statistic test (X^2) of the difference between gender perceptions regarding immigrant businesses' contributions to South Africa's economy resulted in a *p*-value (0.274). Table 3 shows that there is no variance in their perceptions, implying that no difference existed between men and women in views about their business influence on the economy.

Table 3. The relationship between gender and perceived business contributions

X^2 tests	Value	Degree of freedom	P-value (2-sided)
Pearson X^2	2.592[a]	2	0.274
Likelihood Ratio	2.661	2	0.264
No of Valid Cases	153.000	–	–

Source: own elaboration based on the survey (n = 153).

Challenges and Consequences to Immigrant Entrepreneurship in South Africa

Afrophobia is the key challenge that adversely impacts immigrant entrepreneurship in South Africa (Khosa & Kalitanyi, 2014; Mutambanengwe, 2013, Khosa & Kalitanyi, 2015). Table 4 shows that most participants attributed this to unemployment (43.4%), jealousy (30.9%), disregard for the rule of law (22.3%), or rampant corruption (3.5%). These results are not different from those from the interviews, as interviewees shared similar sentiments. The following quotes reinforce test results:

> "In my humble opinion, I believed that the root causes of this violence perpetrated against African immigrant entrepreneurs are… unemployment; stealing, jealousy, and looting are the brain behind the violent attacks against us" (P#04).

> "I think jealousy and corruption are the main causes of Afrophobia because the South Africans feel that the other nationals are doing well in their businesses and also, they take advantage to take from these immigrants falsely" (P#08).

> "Jealousy is the main cause of Afrophobia because the South Africans feel others from outside are better off than them. Also, as a foreign employer always pay your employees especially the South African nationals at the right time that you promised to pay them because failure of this circumstance also is the secondary cause of such attacks" (P#05).

> "I think hatred and jealousy by some South African nationals towards their African brothers/sisters with a criminal intention" (P#09).

> "I think unemployment is the main cause of Afrophobia because if everyone has something to do, people will think less of such violence" (P#01).

The researchers were interested to explore the effect that perceived attacks on African immigrants businesses will have on the economy as a whole. As reflected in Table 4, the majority (95.4%) of the participants stated that continuous attacks will force them to close down their businesses, while 3.9% mentioned that in the event that their businesses are closed down, it would resort to not providing jobs to locals. The resulting effects on business are inadequate skills transfer, a reduction in foreign direct investment, and increased unemployment. Such consequences negatively affect both the informal and formal sectors (Tshishonga, 2015). Statements such as the following epitomise the effects of violence:

> "In an event of Afrophobia directed towards immigrant businesses… immigrants owning small businesses will be affected in that if their businesses are looted and burnt down, as it was witnessed recently in some parts of the country… they will

be forced to close them down permanently… This will affect the people that are employed by these businesses. Therefore, it will affect contributions made to the GDP of the country" (P#06).

"If I close down my business today, because of such attacks, it means that even the people I have employed today will become unemployed as a direct consequence" (P#10).

"In my opinion, I think that the close down of foreign immigrants owned businesses can lead to job losses thereby increasing the level of unemployment in South African" (P#11).

"If some of these businesses owned by the immigrants are closed down, it will definitely mean that knowledge and skills transmission to the South Africans by such businesses would not be possible" (P#03).

"Looking at what is happening, Afrophobic attacks directed towards African immigrants can threaten foreign investments… as investors will be scared to bring in their investments into such an environment, where the law is not strengthened on such perpetrated acts… This will definitely have a negative impact on the country's economy in the long run" (P#01).

"Afrophobia can threaten foreign investments as investors will be scared to bring their investments into such an environment, where the law is not strengthened on such perpetrated acts" (P#03).

Table 4. Causes of attacks and their consequences on economic opportunities

Variables	Value label	Frequency	Percentage
Causes of violence	Unemployment	111	43.4
	Jealousy	79	30.9
	Failure to uphold justice	57	22.3
	Corruption	5	1.8
	Others	4	1.6
Perceived consequences	Business close down	147	95.5
	Refusal to employ South Africans in retaliation	6	3.9
	Others	1	0.6

Source: own elaboration based on the survey (n = 153).

DISCUSSION

Regarding the contextual factors, especially socio-demographic, the findings highlight that African immigrant entrepreneurs 31-40 years old are highly involved in entrepreneurship. The majority of this age group consists of Nigerian nationals, followed by Cameroonians. The middle-aged population may result from youthful exuberance when most young people venture abroad in search of greener pastures. It appears this sample is typical of start-ups owned by young immigrant entrepreneurs who wish to gain economic mileage or better chances of survival (Habiyakare *et al*., 2009). It is also interesting to note that there were many younger male immigrant entrepreneurs who operate businesses in South Africa than female. These findings corroborate those of Khosa and Kalitanyi (2014) who affirm that the majority of African immigrant entrepreneurs are mostly middle-aged men.

This gender imbalance is possibly a cultural factor because African men are more open to this sort of high-risk venture than women. Traditionally, African men are more involved in activities that financially support their families, while women are more involved in household activities. Therefore, there is a strong interplay between age and economic contributions, making it the key economic contributing factor.

Moreover, we ascertained from the inferential statistics presented in Figure 1 that the majority of African immigrant entrepreneurs followed sole proprietorship, with only a few partnered with others. This may be the result of limited start-up capital available at the establishment stage and, as such, each business must be carefully nurtured, groomed, and then developed by the owner (Tengeh *et al.*, 2012). Radipere (2012) affirms that sole proprietorship is the most common type of business ownership amongst immigrants who operate small businesses, as the burden to establish, grow, and develop it is perhaps manageable. Most sole proprietors engage in service businesses and trading to generate economic benefits as against a limited number in manufacturing, affirming the capital deficiency theory (Tengeh *et al.*, 2012).

Furthermore, economic opportunities created by African immigrant entrepreneurs were also determined, and our analysis showed that economic competition and innovation were strongly initiated in the business environment. Ntsika Enterprise Promotion Agency (2012) affirms that – with such high level of competition – small businesses owned by African immigrant entrepreneurs tend to drive away monopoly in the local markets by providing specialized goods and services at competitive costs. This was corroborated by qualitative data from our interview excerpts, which strongly affirmed that immigrant entrepreneurs brought innovation and created competition in the business environment. Immigrants utilise their skills and capacities to earn a living (Kreitzer, 2012) by effectively applying those skills (Kalitanyi & Visser, 2010). This has been highlighted in some studies (Kalitanyi & Visser, 2010; Tengeh *et al*., 2012) that show immigrant entrepreneurs to have the ability to bring about technological developments, hence tremendously contributing to the growth of technology in a country while also playing a role in the reduction of inequality and poverty.

The study indicated that African immigrant contributed to the GNI of South African as a host nation. This is supported by studies conducted by Liebig and Mo (2013) and OECD (2016), which show that the GNI impact of immigrants is the highest in many developed countries. The study indicated that African immigrant contributed to the GNI of South Africa as a host nation. This is supported by studies conducted by Liebig and Mo (2013), and OECD (2016), which show that the GNI impact of immigrants is the highest in many developed countries, for example, countries such as Switzerland and Luxembourg witnessed the highest net benefits estimated at about 2% of GNI contributed by immigrants. This indicates the positive contributions that would emanate from entrepreneurship to a developing nation such as South Africa if immigrant entrepreneurship is supported and nurtured.

Gender differences in the perception of immigrant businesses' contribution found a positive contribution from both men and women. From the Pearson Chi-square test (Table 3) on variables, gender and economic contribution emerged as variables, since the p-value was 0.274 with a 2 degree of freedom, showed that there were no significant differences in the perception of African immigrant contributions amongst genders.

Fairlie (2012a; 2012b) states that immigrant business owners make important contributions to the economy of their host countries.

The challenges that immigrant entrepreneurs encounter in the host nation – Afrophobia – emerges as a factor that deters African immigrant entrepreneurs from business. This finding corroborates a previous study by De Jager (2013) who demonstrates that jealousy of the success of foreign business contributes immensely to Afrophobic attacks on African immigrant-owned ventures. These sentiments were equally shared among interviewees. Moreover, other previous studies confirm such findings (Bordeau, 2010), in which fear and jealousy related to employment and income were blamed for Afrophobic attacks on African immigrants. The lack of knowledge and understanding of how foreigners find money to start their businesses fuels jealousy (Bordeau, 2010). Attacks on African immigrant-owned enterprises have serious implications for the economy.

Researchers (IOM, 2006; Radipere, 2012) indicate that South Africans should view immigrant entrepreneurs as contributors to the economy. Moreover, Khosa and Kalitanyi (2015) affirm that country initiatives that support immigrant entrepreneurship lead to economic triumph and work creation.

CONCLUSIONS

The current study investigated the economic contributions that African immigrant entrepreneurs make to the South African economy, but also the challenge of Afrophobia and its consequences. The study sheds light on an area deficient in empirical research. Our analysis of the economic contributions created by African immigrant entrepreneurs produced the following results: African immigrant entrepreneurs create such economic opportunities as competition that drives away monopoly, innovations, and technology. Moreover, African immigrants' SMEs contribute to the economic growth of the province under scrutiny through employment, rental payments, and tax remissions. While respondents in the survey were overall positive and optimistic, they still noticed challenges that impede economic growth: Afrophobic tendencies and attacks on African immigrant businesses that adversely impact their continuity and survival. Consequently, Afrophobia emerged as harmful to job creation and socio-economic well-being of a community. We conclude that African immigrant entrepreneurs clearly influence economic growth in a positive way. There is a need to reform immigration policies in order to minimize existing tensions and stimulate local skills development, technology development and transfer, new business opportunities, and improve the transformation of the country into a globalised economy.

Despite the fact that the study is limited by its South African focus and investigative nature, which restricts the possibility of generalisations, we hope that it lays a foundation for further examination of immigrants' economic contributions in the SME context, which may make use of available panel data with superior data analysis approaches. These techniques may shed more light on the economic contributions of African immigrant-owned SMEs. The potential also exists to replicate the study in other cultural contexts and on a larger scale.

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A Theoretical Expansion of Talent Allocation Model: Evidence from Selected Developing Countries from 2014-2018

Rozita Moayedfar, Mohsen Madani Chafi

ABSTRACT

Objective: The objective of this study is to propose a model for talent allocation to economic activities and rent-seeking based on some effective factors.

Research Design & Methods: We examined the research model using the panel data method based on data from selected developing countries in the years 2014-2018.

Findings: Our results indicated that market size, firm scale, and the quality of property rights all affect the talent allocation based on the theoretical logic of our research's modelling.

Implications & Recommendations: It seems necessary for an economy to worry about circumstances that influence the quality of property rights, market size, and firm scale in addition to human capital accumulation in order to reinforce the talents' tendency towards productive activities rather than rent-seeking; that is, to promote economic growth.

Contribution & Value Added: Moving a step forward from the quality of human sources towards allocating them as "economy talents," we proposed a model to explain how market size, firm scale, and quality of property rights affect talents' choice between productive activities and rent-seeking, via Romer's quality of property rights model expansion.

Article type: research article

Keywords: allocation of talent; market size; firm scale; property rights

JEL codes: E7, O3, O4

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INTRODUCTION

In the present competitive situation with incessant changes and innovations, the economies that achieve higher levels of prosperity are those which appreciate the important role of their human resources, which are skilful, knowledge-working, eminent, talented, and high-powered.

Among different skills, psychological features like intelligence or aptitude play a key role in individual development. In theories of economic development, not only the accumulation of human capital but also the way of capital allocation – especially the allocation of with high capabilities in economic, social, and cultural fields – attracts the attention of scholars and theoreticians. When skilful individuals become entrepreneurs, they develop technology and increase productivity. On the contrary, when they tend towards rent-seeking, it results in wealth redistribution rather than production (Jones, 1998; Jones & Schneder, 2010).

Romer (2006) divides economic activities into two categories: productive activities (which increase production) and rent-seeking activities (which redistribute existing wealth). Murphy, Shleifer, and Vishny (1991) discuss that the rate of economic growth, in which talented people are involved in production activities, is higher than economic growth, in which talented people tend towards rent-seeking activities.

Therefore, it seems that one of the most important subjects for analysis is to determine the mechanisms that drive talents and how they should be allocated to economically productive activities.

Collins, McMullen, and Reutzel (2016) believe that the incentives imposed by institutions influence entrepreneurial behaviours; but some researchers focus on individual factors like intention and talent. Despite efficient institutions, during a systematic review of Baumol theory, Aeeni, Motavaseli, Sakhdari, and Mobini Dehkordi, (2019) reveal that the individual characteristics can lead talents to unproductive activities. Hmieleski and Lerner (2016) also address the individual characteristics in the tendency towards entrepreneurial activities.

While most studies focus on positive personality traits like optimism, dispositional positive affect, and generalized self-efficacy, Hmielski and Lerner (2016) try to highlight the dark aspects of personality and their relationship with entering the entrepreneurial activities. Their results show narcissism as the only personal character to be positively related to entrepreneurial intentions (Hmieleski & Lerner, 2016).

Moreover, some studies largely focus on the role of institutions like property rights in the allocation of talents to productive vs unproductive activities like rent-seeking. Murphy *et al.* (1991) believe that the talent allocation to the production sector of the economy alongside property rights is influenced by market size and firm scale. Regarding this issue, the objective of the current article is to propose a model for talent allocation to economic activities and rent-seeking based on some effective factors. The current study uses Murphy *et al.* (1991) and Romer (2006) as the foundation, attempts to extend their theoretical ideas in order to provide a model that explains the way the talents would be allocated, and describes the factors affecting talent allocation. The current article is a novel theoretical and practical expansion, which is the first to include market size and firm scale in talent allocation to economic activities model (Romer, 2006) and examine the influence

of these variables along with the quality of property rights on the allocation of talents either to the production sector or rent-seeking redistribution of production.

The remainder of this paper is organised as follows. First, we provide a theoretical background, then elaborate the theoretical model, and next discuss the results in detail. The last part concludes the paper.

LITERATURE REVIEW

As mentioned above, this study uses the protection of production and rent-seeking described by Romer (2006). According to Murphy *et al.* (1991), this study attempts to model the way different factors affect the talent allocation in research and development sector and raise the tendency of rent-seekers to employ resources only for wealth redistribution rather than production.

When some talents establish an institution, they distribute growth and innovation; however, when they turn into rent-seekers, they redistribute wealth and decrease growth and development (Natkhov & Polishchuk, 2012). Acemoglu (1995) believes that the proportional benefit of productive and rent-seeking activities influences the allocation of talents in both of these activities. He believes that labour force selected their favourite career by contrasting the rewards and productivity functions of productive vs rent-seeking activities (Acemoglu, 1995).

In every society, there are innovative people who are steered towards great jobs by the power of such traits like greed, ambition, curiosity, and sympathy. When individuals have freedom in choosing their jobs, they select the one that allows them to show the maximum amount of their capabilities. Murphy *et al.* (1991) discuss the forces, which affected the choices of highly talented individuals, considering whether they choose socially-productive activities or not. In this regard, Murphy *et al.* especially emphasise three factors: individuals' capabilities' return, the scale of each sector (firm scale and market size), compensation contracts, and property rights. The larger the market size in which talents can achieve productivity, the higher the talents' tendency towards these activities. To sum up, clear property rights encourage productive activities, while legal rent-seeking activities (those supported by the government) or illegal rent-seeking raise the appeal to socially non-productive activities. From a broader perspective, we may conclude that the large market size, the capacity of firm development, and the quality of property can cause talents to tend towards economically productive activities (Murphy *et al.*, 1991).

The Allocation of Talent and Rent-Seeking

According to Baumol (1990), individuals have two options. They can either strive to create wealth in the private sector or redistribute wealth through political and legal activities. Inspired by popular ideas of endogenous growth theory, we believe that the development of knowledge and technology not only occurs through research and development but also relates to entrepreneurship activities (Baumol, 1990).

Regarding entrepreneurship and its relation to productive activities, Holcombe (1998) refers to entrepreneurship as a process of providing opportunities for others to work, therefore considering it a productive activity (Holcombe, 1998). On the other hand, previous studies on productive economic activities often deal with the issue of rent-seeking. In this regard, Baumol (1990) claims that those activities that do not increase the wealth of

society and only enhance their own proportion of existing wealth are called rent-seeking. Baumol believes the determining factors of entrepreneurial action are only institutional factors, but he does not notice how these factors lead talents to choose rent-seeking vs entrepreneurial activities (Aeeni *et al.*, 2019).

Boudreaux, Nikolaev, and Holcombe (2018) highlight the role of institutions in leading entrepreneurs. They believe an inefficient institutional environment leads entrepreneurs to destructive activities and crowds out value-creating entrepreneurs.

In inefficient institutional environment, entrepreneurs encounter corruption that corrodes trust in governments, market institutions, and the rule of law. With corrupt institutions, profit opportunities come from rent-seeking; therefore, the resources are distorted towards capital projects that are more susceptible to rent-seeking (Boudreaux, Nikolaev, & Holcombe, 2018).

Rent-seeking refers to the process of expending resources and efforts in order to politically preserve or transfer economic rights (Busse & Hefeker, 2007). Rent-seeking is a rather new issue, which was first introduced by Krueger in 1974 (Samadi, Renani, & Dallali-Esfahani, 2010; Tullock, 1967). Murphy *et al.* (1991) classify rent-seeking into private and public categories. Private rent-seeking includes robbery, piracy, illegal copy, and other forms of transferring wealth among private firms like capital gaining. Public rent-seeking includes redistribution of income from the private sector to the government (e.g. taxation) or from the private sector to bureaucrats (e.g. bribery).

The influence of rent-seeking on society is pervasive. Besides developing inflation, poverty, inequality, and corruption, rent-seeking makes talents abandon production and appeal to unproductive activities or choose passiveness or migration (Acemoglu & Verdier, 1998).

Regarding the effects of talents' inclination towards rent-seeking, Murphy *et al.* (1991) acknowledge that the allocation of talent to rent-seeking is destructive for several reasons. Firstly, if rent-seeking develops, it attracts the labour force and other resources, which decreases their income. A large portion of official bureaucracy in some less-developed countries confirms that. Secondly, taxes imposed because of rent-seeking on the production sector reduce the incentive for production and decrease the labour force income again. Finally, the allocation of most talents to the rent-seeking sector means that entrepreneurs have no power and, consequently, the growth rate of economy and technology will most probably reduce.

Talent Allocation Factors

By emphasising knowledge-based economy, modern economic ideas suggest that the most successful economy in the future will be the one that deals with the production and distribution of knowledge. Therefore, modern economic theories highlight the role of human capital in the production of knowledge and wealth more than ever (Nunn, 2007). Previous studies confirm the influence of talents' career choices on economic development. Murphy *et al.* (1991) state that the country's talents typically organise production. Thus, they could spread their ability advantage over a larger scale of production. Murphy *et al.* mention three major factors as the determinants of career choice and talent allocation. These factors include market size, firm scale, the quality of reward, compensation contracts, and the quality of property rights (Murphy *et al.*, 1991).

Market Size

From the macroeconomics perspective, the size of the market can influence a talent's choice of career between productive and rent-seeking activities. In fact, large markets or broad economic capacities of a country – besides other factors mentioned below – encourage outstanding people to allocate their talents to production, activate the maximum amount of their capabilities, and take advantages. Murphy *et al.* (1991) argue that if the official rent-seeking sector such as the government, religious institutions or army was very powerful in a country, rent-seeking could provide much privilege to those involved.

To sum up, we may say that – depending on its size and nature – the market competes with official rent-seeking activities as the indicators influence a talent's choice of productive or unproductive activities.

Firm Scale

Some jobs do not find chances for development in a specific society due to situational conditions. Such conditions include rules, cumbersome bureaucracy, customs, traditions, and culture, which bring about constraints for some occupations. Accordingly, we may conclude that the growth and development ability of a country's economic activities are the factors that affect the occupational choice of economic agents, especially talents. In this study, the ability of institutions' development was defined in terms of their size, so that an institution's size indicates its legal and situational capacity for developing economic activities.

In a limited context, which does not allow the institution to develop or grow, rent-seeking and unproductive activities provide alternative opportunities for talents. According to Murphy *et al.* (1991), in many less-developed countries, legal constraints on the establishment and development of private institutions or corporations, e.g. industrial capacity licensing, is a limitation imposed by the government. This limitation reduces the appeal to entrepreneurship. For example, when official rent-seekers levy heavy taxes on entrepreneurs, owners become suppressed and appeal to rent-seeking (Murphy *et al.*, 1991).

The Quality of Property Rights

Talents need to preserve their ability returns and be sure about receiving rewards or compensations. In weak-property-rights countries, talents are greatly incentivised to rent-seeking. Actually, when the official rent-seeking sector – like high-ranking officials or the army – is very powerful, it expropriates a huge amount of money freely or even legally. Be levying high taxes on economic activities or a reformulation of property rights in favour of the rent-seeking sector, official rent-seeking leaves less room for productive economic activities and frustrates talents. Besides official rent-seeking, non-official rents like bribery and robbery disturb the economic and social safety and prepare grounds for an unfair redistribution of wealth. In such conditions, talents have only one choice of rent-seeking activities and, thus, which engenders the inappropriate allocation of talents in society.

Berdiev and Saunoris (2018) focus on the effects of corruption on entrepreneur allocation; they find that corruption deters entrepreneurs in formal sectors and promotes entrepreneurship in informal sectors; we know that corruption is the other meaning of domestic institutions' weakness and so, in this situation, property rights are not transparent.

Murphy *et al.* (1991) indicate the role of property rights as one of the factors that affect the allocation of talents. They find that if the returns on inventions are not preserved through patent and privileges for entrepreneurs, productive activities like entrepreneurship will lose their approval.

Our investigation shows that the allocation of talents to rent-seeking and productive activities is influenced by three categories:

- institutional,
- individual,
- economic.

Until now, most researchers focused on the first two categories, whereas we entered in our literature review market size and firm scale as economic factors and concluded that these two variables – along with property rights – influence the allocation of talents. Therefore, we propose the following hypotheses:

H1: The improvement of property rights index affects the allocation of talents to production activities positively and significantly.

H2: The increase of firm scale affects the allocation of talents to production activities positively and significantly.

H3: The increase of market size affects the allocation of talents to production activities positively and significantly.

MATERIAL AND METHODS

Data

Measuring the variables of our model is the next important step to find practical results. Since entrepreneurship is the core of every productive activity, the use of Global Entrepreneurship Index (GEI) as a multidimensional entrepreneurship index can be an appropriate proxy for the number of talent allocation to economic activities in countries. GEI is published by the Global Entrepreneurship and Development Institute every year from 2014 (Acs *et al.* 2018).

According to Chakrabarti (2001), market size can be measured by per capita Gross Domestic Product while firm scale can be quantified with the data of company market capitalisation. World bank annually publishes the market capitalization of listed domestic companies and the number of listed companies in countries, and these data helped us to measure the average scale per firm as follows (database, 2018):

$$average\ scale\ per\ firm_{it} = \frac{market\ capitalization_{it}}{listed\ domestic\ companies_{it}} \quad (1)$$

where:

i, t - respectively indicate country and time.

The international property rights index (IPRI) also is a standard quantitative criterion for measuring the property right variable in countries. Property right index is prepared based on three main indicators: 1) Legal and Political Environment (LPE), 2) Physical Property Rights (PPR), and 3) Intellectual Property Rights (IPR) by Property Rights Alliance

(PRA; Levy carciente, 2018). These three main indicators contain ten sub-indicators conceptually identical with the property right variable.

Our approach applies panel data analysis for 27 selected developing countries that consist of: Iran, Malaysia, Saudi Arabia, Turkey, Egypt, Indonesia, India, Nigeria, Jordan, Thailand, Morocco, Chaina, Colombia, Russia, Peru, Hungary, Argentina, Panama, Vietnam, Sri Lanka, Croatia, Kazakhstan, Lebanon, Oman, Philippines, Qatar, and the United Arab Emirates in years 2014-2018. We intended to prepare an empirical estimation for all developing countries but the limited availability of data forced us to select only these 27 developing countries.

Theoretical Model

Modelling the Quality of Property Rights

This model supposes that there are active groups of producers and rent-seekers in any economy; the latter attempt to legally or illegally intercept the returns of producers. Therefore, taking rent-seekers into account, the number of employed individuals in the research and development sector can be considered $a_L - R$, in which R is the number of rent-seekers. Producers spend f unit of time on preserving their product while the rest (1-f) on production. Here, we apply two modifications to Romer's model: first, unlike Romer (2006), we do not consider the average production to be an identity function parallel to 1-f, but we introduce the average production of every producer as (1-f)Y so that the producer spends 1-f on production. Therefore, production reduces as much as fY (the time spent on protection). In fact, if the producer spends all their time on production (f=0), the production will be equal to Y on average. On the other hand, f is a function of Y besides R, because it is logical to suppose that the higher the individual's returns, the more significant proportion of the income spent on protection. Therefore, we can say that f(R,Y) and $f_Y \geq 0$.

A proportion of this production goes to the rent-seeker because, despite protection, there is the possibility of the appropriation of producers' returns by rent-seekers. The proportion of the product appropriated by rent-seekers is indicated by L. In this case, L equals L(f,R), so that $L_f \leq 0$ and $L_R \geq 0$. Regarding the second-order derivatives of L, we suppose that the protection benefit is decreasing for the producer. This means that if f increases, the benefit of f decreases $(L_{ff} \geq 0)$. Furthermore, the higher the number of rent-seekers, the lower their amount of benefit. This means that the second-order derivative of L to R is negative $(L_{RR} \leq 0)$. Moreover, if there is no rent-seeker, then no proportion of income is allocated to rent-seekers. Thus, we have L(f,0)=0. Regarding the second-order derivative, the higher the number of rent-seekers, the lower the compensation of the product protection $(L_{fR} \leq 0)$.

Based on the principles of microeconomics, if the producer's return is higher than the rent-seeker's return, the proportion of those who appeal to productive activities increases, and vice versa. As a matter of fact, talents incline towards those activities that reward them more.

The model extended in this study follows Romer's assumptions that the return of production is an identity function of the production function. The return of every producer and every rent-seeker is, respectively:

$$[1 - L(f(R,Y),R)][1 - f(R,Y)]Y \quad (2)$$

$$\frac{(1-R)L[f(R,Y),R][1-f(R,Y)]Y}{R} \quad (3)$$

In this way, equilibrium is achieved in the Equation (4), in which R is "equilibrium R:"

$$[1 - L(f(R,Y),R)][1 - f(R,Y)]Y = \frac{(1-R)L[f(R,Y),R][1-f(R,Y)]Y}{R} \quad (4)$$

The left side shows the producer's return, in which $[1 - f(R,Y)]$ decreases with an increase in R. Regarding the other statement$[1 - L(f(R,Y),R)]$, we cannot have an accurate prediction of the behaviour of L with the increase in R; although L is an increasing function of R and a reducing function of f, and f itself increases with an increase in R. However, in general, the producer's return decreases when the number of rent-seekers enhances. The right side shows rent-seekers' returns that decrease with an increase in R. 1-f and 1-R on the right side decrease with an increase in R. However, whether L becomes an increasing or decreasing function of R, L/R will be a function relative to R. In this fraction the increase in the denominator (R) is always more than that in the numerator (L) due to the fact that L obeys the principle of decreasing returns relative to R. Moreover, when R=1, rent-seekers' returns equal zero. This means that when there is no producer, rent-seekers intercept no value.

When the economic system experiences an increase in the quality of property rights, it means that the returns of producers are protected through some policies that legally retake what was grabbed by the rent-seekers. Next, the confiscated properties can be distributed among individuals by the government. This action does not affect the curve of producer's returns, but only affects the curve of rent-seekers' income.

The possibility of disclosure leads to a decrease in rent-seekers' expected income for a specific *R*. This affects the curve of rent-seekers' income and turns it downwards. As illustrated in Figure 1, the curve that indicates rent-seekers' income turns downwards. It is clear that the decrease in *R* is more than the amount needed for preserving rent-seekers' income at the primary level. When *R* reduces, the appeal of production increases which, in turn, leads to a fall of *R*. Moreover, the equilibrium point shifts from A to C (Figure 1). Although the equilibrium income of producers and rent-seekers in Point C is higher than the equilibrium income before disclosure, rent-seekers' expected income has decreased, and at this point, the proportion of rent-seekers has decreased as well. As Figure 1 indicates, in the state before disclosure, rent-seekers' income at point R_2 on the primary curve of rent-seekers' income enjoys a higher level. On the other hand, when *R* diminishes, producers naturally allocate fewer resources to protection; therefore, producers' income increases. The important point here is that if we return rent-seekers' income to its pre-disclosure state, the proportion of rent-seekers does not return to its previous point. Point B demonstrates this state so that – under these conditions – the appeal of rent-seeking has decreased.

Therefore, we may say that the government's support for producers – in the form of enhancing the quality of property rights and anti-rent actions – positively affects talents' inclination towards production and the decrease of rent-seekers' proportion.

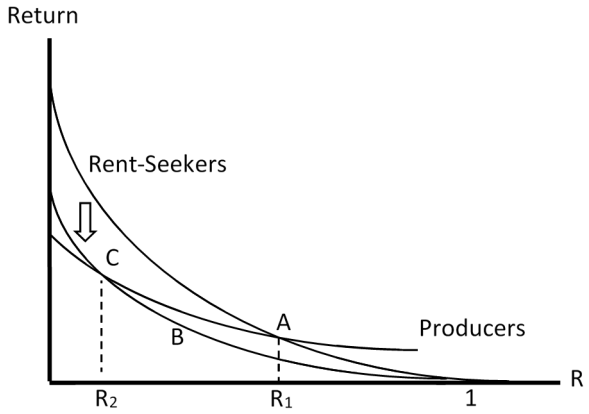

Figure 1. Effects of the property rights quality
Source: Romer, 2006, p. 159.

Modelling Market Size and Firm Scale

Now, putting forward a new idea, we extend the model to show the effects of changes in market size and firm scale proportionally to the number of rent-seekers. Based on this, we suppose that firms encounter an increase in their market size; so the demand will grow on average and – based on the principles of microeconomics – the upwards turn of the curve of demand leads to the creation of another equilibrium point with higher levels of demand and supply of products or services.

Considering the increase in demand in a competitive market, the firm should increase its production to achieve a new equilibrium Y. According to a production function, the scope of the labour force – as an indicator of firm scale – should increase.

The increase in market size and firm scale makes a new Y. Now, it is time to analyse the Equation (4) and examine changes in the ratio of rent-seekers when Y increases due to the increase in market size and firm scale. For this purpose, we simplify the Equation (4) as follows:

$$L[f(R,Y),R] = R \rightarrow L[f(R,Y),R] - R = 0 \quad (5)$$

The Equation (5) indicates that in order for producers' return to equal rent-seekers' revenue, a portion of marginal revenue grabbed by rent-seekers (L) should equal the rent-seekers' portion.

Now, considering the increase in Y, in order to know how the equilibrium R changes, we calculate the partial derivative of Equation (5) with respect to R:

$$\frac{\partial L}{\partial f}.\frac{\partial f}{\partial R}.\frac{dR}{dY} + \frac{\partial L}{\partial f}.\frac{\partial f}{\partial Y} + \frac{\partial L}{\partial R}.\frac{dR}{dY} - \frac{dR}{dY} = 0 \rightarrow \frac{dR}{dY} = \frac{\frac{\partial L}{\partial f}.\frac{\partial f}{\partial Y}}{(1 - \frac{\partial L}{\partial f}.\frac{\partial f}{\partial R} - \frac{\partial L}{\partial R})} \quad (6)$$

In Equation (6), the expression $\frac{dR}{dY}$ shows how the "equilibrium R" changes in proportion to Y. In fact, when the right side of the equation is negative, it reveals that an increase in Y causes a reduction in the equilibrium R, and a reduction in the rent-seekers' proportion.

Now, we examine the Equation (6) in order to find out the sign of its right side. We previously explained that $\frac{\partial L}{\partial f}$ was negative and $\frac{\partial f}{\partial Y}$ was positive; therefore, the sign of the numerator will be negative. As mentioned before, in the denominator, $\frac{\partial L}{\partial f}$ is negative, $\frac{\partial f}{\partial R}$ is positive based on the model so, consequently, $\frac{\partial L}{\partial f}.\frac{\partial f}{\partial R}$ will be negative.

Since $\frac{\partial L}{\partial R}$ is positive based on the model's presupposition, the denominator sign on the right side of Equation (6) is not clearly specified. However, this denominator sign can show that, when R is high regarding the decreasing outcome, the amount of $\frac{\partial L}{\partial R}$ is lower than $1-\frac{\partial L}{\partial f}.\frac{\partial f}{\partial R}$. In this case, the denominator of Equation (6) will be positive, while the whole statement on the right side will be negative. This indicates the reduction in the equilibrium R by an increase in Y.

Therefore, we may say that – at least in countries with a large number of rent-seekers – the increase in market size and firm scale leads on average to a reduction of the rent-seekers' proportion and, consequently, results in talents' inclination towards production.

RESULTS AND DISCUSSION

Our theoretical model estimates the relationship between property rights index, firm scale, and market size as the effective factors, and the allocation of talents status to production activities logic.

Thus, the specification of our empirical model is:

$$Allocation\ of\ talent_{it} = \beta_0 + \beta_1 Market\ size_{it} + \beta_2 Firm\ scale_{it} + \\ + \beta_3 Property\ rights_{it} + U_{it} \quad (7)$$

In the model (7) "Allocation of talents" means "Global Entrepreneurship Index" for country i in year t with the range between 0 to 100, "Market size" means "per capita GDP" for country i in year t in terms of USD, "Firm scale" means "Average Market Capitalisation" per firm for country i in year t in billion USD, and "Property rights" means "International Property Rights Index" for country i in year t with the range between 0 to 10.

The results of F-Limer (Chaw test) reveal that the null hypothesis is rejected (chi2 = 8.177, df = (3,92), *p*-value = 0.0001; Table 1). Therefore, we must use Hausman test to investigate the fixed effects estimation in comparison with random effects estimation. The result of Hausman test shows that the null hypothesis is rejected (chi2 = 20.182, df = 3, *p*-value = 0.0002), while Fixed effects (FE) estimation is preferred to Random effects estimation. We show the results in Table 2.

Moreover, in order to check for the heteroscedasticity error across our panel data, we used the likelihood ratio test procedure recommended by Wiggins and Poi (2001). Table 3 represents the result of Wiggins and Poi test across our panel data.

Based on the results of Wiggins and Poi likelihood ratio test, we failed to reject the null hypothesis as there is no heteroscedasticity error across our panel data. The autocorrelation in residuals was assessed by Breusch-Godfrey serial correlation LM test as well, and the results revealed the presence of first-order error. Table 4 shows the results of the autocorrelation test in residuals.

Table 1. The results of F-Limer (Chaw test)

Redundant Fixed Effects Tests; Equation: Untitled; Test period fixed effects			
Effects Test	**Statistic**	**d.f.**	***p*-value**
Period F	8.177000	(3,92)	0.0001
Period fixed effects test equation: Dependent Variable: GEI; Method: Panel EGLS (Period weights); Sample (adjusted): 2014 2017; Periods included: 4; Cross-sections included: 27; Total panel (unbalanced) observations: 99; Use pre-specified GLS weights.			

Source: own calculation in E-views7.

Table 2. The result of Hausman test

Correlated Random Effects-Hausman Test; Equation: Untitled; Test period random effects.				
Test Summary		**Chi-square**	**d.f.**	***p*-value**
Period random		20.181939	3	0.0002
** WARNING: estimated period random effects variance is zero. Period random effects test comparisons:				
Variable	**Fixed**	**Random**	**Var (Diff.)**	**Prob.**
GDP_PER_CAPITA1	0.426583	0.441733	0.000238	0.3263
MARKET_CAPITALIZATION1	1.181523	1.036471	0.009769	0.1422
PROPERTY_RIGHTS	3.067403	2.694473	0.024042	0.0162
Period random effects test equation: Dependent Variable: GEI; Method: Panel Least Squares; Date: 09/07/18 Time: 20:10; Sample (adjusted): 2014 2017; Periods included: 4; Cross-sections included: 27; Total panel (unbalanced) observations: 99.				

Source: own calculation in E-views7.

Table 3. The result of Wiggins and Poi likelihood ratio test

Equation No.	**Value**	**P-value**
11	2.30	0.51

Source: own calculation in E-views7.

Table 4. The result of Breusch-Godfrey serial correlation LM test

Equation No.	**Type of test**	**Value**	**P-value**
11	Chi-square	29.65	0.00
	Fisher	129.48	0.00

Source: own calculation in E-views7.

As a result, we entered the one lagged of residual component into our empirical model to correct the first-order error and then estimated our empirical model for selected countries in the years 2014-2018. Table 5 shows the results and Table 6 demonstrates the coefficient of equation (7).

A systematic review of 76 articles published from 2001 to 2018 analysed Baumol theory and emphasised the importance of incentives presented by institutions for entrepreneurial behaviour (Aeeni *et al.,* 2019). This and many other studies about talent allocation to productive and entrepreneurial activities formed our literature review. The common point of our research and these studies is "property rights" as an effective institutional factor.

Table 5. The results of the estimation of the coefficient of equation (11)

Dependent Variable: GEI; Method: Panel Least Squares; Date: 09/10/18 Time: 22:28; Sample (adjusted): 2015 2017; Periods Included: 3; Cross-sections included: 27; Total panel (unbalanced) observations: 72.				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
GDP_PER_CAPTA1	0.490529	0.062343	7.868211	0.0000
MARKET_CAPITALIZATION1	1.233491	0.644495	1.913887	0.0600
PROPERTY_RIGHTS	3.566829	0.646148	5.520138	0.0000
RESL(-1)	0.770295	0.071310	10.80204	0.0000
C	9.427953	3.113400	3.028186	0.0035
Effects Specification				
Period fixed (dummy variables)				
R-squared	0.876267	Mean dependent var		34.15062
Adjusted R-squared	0.864846	S.D. dependent var		–
S.E. of regression	3.735223	Akaike info criterion		5.565658
Sum squared resid	906.8731	Schwarz criterion		5.787000
Log likelihood	-193.3637	Hannan-Quinn criter.		5.653775
F-statistic	76.72080	Durbin-Watson stat		1.496140
Prob(F-statistic)	0.000000	–		–

Source: own calculation in E-views7.

Table 6. The results of the estimation of the model

Variables	**Coefficient**	**T-test**	**P-value**
β_0	9.43	3.03	0.004
Market size	0.49	7.87	0.000
Firm scale	1.23	1.91	0.060
Property rights	3.57	5.52	0.000
Residual (-1)	0.77	10.80	0.000
R-squared: 0.88; Adjusted R-squared: 0.86; Prob (F-statistic): 0.00.			

Source: own calculation in E-views7.

Berdiev and Saunoris (2018) show the significant negative effect of corruption – as a weakness of property rights – on formal entry to entrepreneurship in 60 countries in 2001-2010 (Boudreaux *et al.* (2018) emphasise the significant positive relationship between corruption and the concentration of firms in corruptible activities and rent-seeking by using 30,000 evidence of convictions with significant variation across districts and over time in the United States of America (Boudreaux *et al.*, 2018). The study by Natkhov and Polishchuk (2012) also focuses on the role of institutions in talent allocation, and its results show a significant positive relationship between the quality of institutions and the tendency of talents to educate in engineering and science instead of law. This study used Murphy *et al.'s* (1991) study that scrutinises the combination of talent education as an appropriate proxy for talent allocation status in the economy (Murphy *et al.*, 1991; Natkhov & Polishchuk, 2012). Similar to these studies, we analysed the effect of property rights on talents' inclination towards productive activities, and we noticed that the strongest effect belongs to property rights.

Our review revealed no mention of two other factors used in our research: "firm scale" and "market size." Our results showed that the coefficients of the model affect talent allocation to production activities significantly and positively. Each unit increase in firm scale and market size increases the allocation of talent index by 1.23 and 0.49, respectively.

As we mentioned above, rent-seeking activities include any activities that waste economic resources and transfer wealth from productive labourers to rent-seekers. Every economy in which productive labour is not sufficiently supported witnesses the expansion of rent-seeking activities and free actions of rent-seekers, while talents will have a strong inclination towards rent-seeking awards.

Therefore, on the one hand, one should support innovative thinking on the way towards its transformation into products and then into wealth, while on the other hand, one should limit rent-seeking activities, including capital gains, robbery, piracy, copyright infringement, and redistribution of income from the private sector to the government (e.g. tax-taking) or from the private sector to bureaucrats (e.g. bribery).

CONCLUSIONS

Accumulation of human resources, especially talents, is of great importance not only for universities but also for policymakers. Talents' inclination towards the productive sector of the economy and the quality of their allocation influence the economy in general and the indicators of economic growth in particular. In fact, the activities selected by talents, based on the economic situation of the society and social factors, have great effects on a country's development process. Thus, the present study focused on the factors that affect this tendency, and it attempted to propose an extended model in order to indicate that talents' inclination towards the productive sector of the economy is influenced not only by property rights quality but also by market size and firm scale at the macro-economic level.

In this process, the marginal revenue of rent-seekers and producers determine the rate of allocation of the talent to either rent-seeking or productive activities. An increase in the quality of property rights, firm scale, and market size leads to a higher appeal of talents to the production sector and reduces the proportion of rent-seekers.

Therefore, each policy that limits rent-seeking gains and facilitates productive activities is recommended. Increasing the cost of speculation activities by taxing these activities, limiting bureaucratic process and regulations, and rating the credibility of persons helps to heighten the efficiency of institutions and transparency of property rights. Furthermore, market expansion and firm scale are two interacting factors related to the economic function at macro and micro levels. Hence, we recommend that policymakers consider the effect of their policies on market size and firm scale.

We faced limitations in selecting the appropriate indices for talent allocation, the quality of property rights, and the availability of data for developing countries. Moreover, we supposed that $\frac{\partial L}{\partial R}$ (the slope of the curve L to R) is smaller than $(1 - \frac{\partial L}{\partial f} . \frac{\partial f}{\partial R})$ which is true only for countries with a large number of rent-seekers.

Future studies should focus on finding a more appropriate index for talent allocation, which would include the allocation of talents to rent-seeking activities. Furthermore, this study considered the fact that f depends both on R and Y, but it seems that $\frac{\partial f}{\partial R}$ can be re-examined in another study.

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The contribution of co-authors is equal and can be expressed as 50% for each of the authors: R. Moayedfar proposed the main idea of this study, developed the mathematical framework of the model, and wrote the manuscript. M. Madani Chafi reviewed the literature for relevant studies and contributed in the writing of the manuscript. Both authors read and approved the final manuscript.

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The Impact of Vertical R&D Cooperation on Market Performance of Firms

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ABSTRACT

Objective: The aim of this article is to investigate the impact of vertical R&D cooperation on market performance of firms. Specifically, we explore the impact of vertical R&D cooperation on firms' process innovation, outputs, market prices, and economic profits.

Research Design & Methods: We apply microeconomic methods of analysis, i.e., mathematical modelling and optimisation procedures. We perform a comparative static analysis of two selected patterns of R&D in a supply chain, i.e. independent behaviour of firms and behaviour of firms in a vertically integrated industry.

Findings: Vertical integration leads to significantly higher individual R&D investments. For all values of knowledge spillovers, consumer surplus and social welfare are higher under vertical integration compared with the independent behaviour of firms. Under independent behaviour, profit of the supplier is significantly larger compared with the vertical integration. The profit of the final-good manufacturer is significantly lower under independent behaviour compared with the vertically integrated industry.

Implications & Recommendations: In regard to business and public policy implications, the large knowledge spillovers promote consumer surplus and social welfare in the vertically integrated industry, while small knowledge spillovers promote process innovations in the vertically integrated industry.

Contribution & Value Added: Firms' process innovation benefits from the vertical integration of the industry. Moreover, the greatest benefits from vertical integration for consumers and social welfare come from the largest knowledge spillovers in the industry.

Article type:	research article
Keywords:	vertical R&D; supply chain; investments; process innovation; knowledge spillovers; social welfare
JEL codes:	L1, O3

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INTRODUCTION

In the last 25 years, cooperation in research and development (R&D) increased significantly due to important structural changes in the business environment of innovation-oriented enterprises (Van Beers & Zand, 2014; Kosała, 2015; Wach, 2016; Dai, Zhang, & Tang, 2017; Belderbos, Gilsing, Lokshin, Carree, & Sastre, 2018; Capuano & Grassi, 2019). First, the rising complexity of products and technologies dramatically increased the R&D costs and risks for innovation-oriented firms, such that modern R&D can hardly be dealt with by only relying on a firm's own investments, resources, or capabilities (van Beers & Zand, 2014). As a result, networking or cooperating in R&D with different and diverse partners – competitors, suppliers, buyers, universities, or research institutes – became a standard innovation activity, as witnessed by the rapid growth in strategic alliances with various R&D partners in recent years (Hagedoorn, 2002; Belderbos, Carree, Diederen, Lokshin, & Veugelers, 2004a; Wassmer, 2010; Van Beers & Zand, 2014; Witek-Hajduk & Napiórkowska, 2017; Belderbos *et al.*, 2018; Karbowski & Prokop, 2018; Bustinza, Gomes, Vendrell-Herrero, & Baines, 2019). The globalisation wave of the last 25 years brought about significantly more possibilities for cross-national alliances and partnerships, which definitely contribute to competitive advantages of global firms in foreign markets (Lavie & Miller, 2008; Van Beers & Zand, 2014; Belderbos *et al.*, 2018; Karbowski & Prokop, 2018).

The business shift towards R&D cooperation is reflected by the growing interest of scholars from diverse fields – e.g. economics, engineering, management, or sociology – in different forms of R&D collaboration (see, e.g. Harryson, 2006; Belderbos *et al.*, 2018). Surprisingly, there is a lot of research on horizontal R&D cooperation (cooperation with competitors) and institutional R&D cooperation (cooperation with universities or research institutes), but little on vertical R&D cooperation (for overviews, see, e.g. Bhattacharya, d'Aspremont, Guriev, Sen, & Tauman, 2012; Ge, Hu, & Xia, 2014). The following paper aims to, at least to some extent, fill in the identified research gap by examining the impact of vertical R&D cooperation on industry performance of firms. Specifically, our research questions consider the impacts of vertical R&D cooperation on enterprise innovation, consumer surplus, and social welfare in the presence of knowledge spillovers in the industry. We contribute to the literature by showing when the benefits from the vertical R&D cooperation are the highest for the firms' profits, innovation, consumer surplus, and social welfare. The relatively low values of knowledge spillovers the most effectively promote firms' innovation, while the relatively high values of knowledge spillovers the most effectively promote firms' profits, consumer surplus, and social welfare.

Using mathematical modelling and optimisation procedures, this article compares two models of vertical R&D: (i) the independent behaviour of firms in a supply chain, and (ii) the behaviour of firms in a vertically integrated industry. In particular, we compare the values of R&D investments, quantities (outputs), prices of the goods, economic profits, consumer surpluses, and the values of total welfare between industry setups under scrutiny.

The paper proceeds as follows. First, we review the relevant economics and management literature. Next, we briefly describe the materials and methods used in the present research. Then, we model R&D activities of firms under two distinct industry setups: (i) the independent behaviour of enterprises in a supply chain, and (ii) the behaviour of firms

under vertical integration. We discuss the obtained results in a section that follows and, lastly, draw conclusions in the final section of the article.

LITERATURE REVIEW

According to Un, Cuervo-Cazurra, and Asakawa (2008), knowledge obtained from cooperating with suppliers is quite narrow, since both suppliers and the cooperating firm operate in the same or similar industry. However, according to these authors, the knowledge provided by suppliers is still useful as a part of specialised set of skills possessed by suppliers and not the given firm. The cooperating firm can rely on its suppliers' specialised knowledge to create better products (Takeishi, 2002; Liu & Atuahene-Gima, 2018).

Among many others, Hagedoorn (1993), Hendrikse (2003), Becker and Dietz (2004), Belderbos *et al.* (2004a; 2018), Belderbos, Carree, and Lokshin (2004b) and van Beers and Zand (2014) claim that firms may streamline and save R&D and manufacturing costs within the supply chain by setting up the cooperative R&D arrangements. Moreover, R&D cooperation within the supply chain is often related to input or component improvements (Hagedoorn, 1993; Un *et al.*, 2008; Capuano & Grassi, 2019). R&D cooperation with suppliers may also be beneficial for product innovations due to the existence of complementary product development capabilities between the cooperating firm and its suppliers (Un *et al.*, 2008; Liu & Atuahene-Gima, 2018). Furthermore, Clark (1989a; 1989b) observes that buyers can benefit from engaging suppliers in the product development through gaining better time-to-market of new products, reducing product development costs, or achieving product quality enhancements (Li & Chen, 2018). Suppliers can also help the cooperating firm gain new competencies, share risks, or move faster into the new markets (Wynstra & Weggemann, 2001; Un *et al.*, 2008; Belderbos *et al.*, 2018).

Most papers on the impact of R&D cooperation on market performance of firms focus on the horizontal R&D cooperation, i.e. R&D cooperation between competitors. The seminal works by d'Aspremont and Jacquemin (1988; 1990) compare the non-cooperative (R&D competition) scenario to the cooperative one (R&D cooperation or R&D cartel). Scholars proved that total welfare is higher with cooperative R&D (Bhattacharya *et al.*, 2012) under sufficiently strong knowledge spillovers in the industry (for a wider discussion on the knowledge spillovers, see Marshall, 1890; Arrow, 1962; Jacobs, 1969; Romer, 1986; Porter, 1990; Glaeser, Kallal, Scheinkman, & Shleifer 1992; Geroski, 1995). This result is confirmed by Kamien, Muller, and Zang (1992) in a more general model with the possibility of product differentiation. However, some suggest that the horizontal R&D cooperation between firms may also lead to the anti-competitive behaviour of firms at the production stage (see, e.g. Belleflamme & Peitz, 2010; Sovinsky & Helland, 2012; Karbowski & Prokop, 2018). As a result, the enterprises that cooperate in R&D may collude on the final product market to the detriment of total welfare and consumer surplus (Leibowicz, 2018).

As Geroski (1992), Harabi (2002), and Ge *et al.* (2014) observe, vertical R&D cooperation may perform better than the horizontal one, since the latter brings a significant risk of industry cartelisation. Moreover, vertical R&D cooperation is a more frequent mode of cooperation between enterprises than the horizontal one (Arranz & de Arroyabe, 2008; Ge *et al.*, 2014; Dai *et al.*, 2017). Surprisingly, little theoretical work appeared on vertical R&D cooperation (cf. Inkmann, 2000; Ge *et al.*, 2014). One of the notable exceptions is Steurs (1995), who extends the analytical framework developed by d'Aspremont and

Jacquemin (1988) and shows that the vertical R&D agreement is more likely to result in higher individual R&D investments, output, and total welfare compared with the horizontal agreement (also see Ge *et al.*, 2014). Allowing for both horizontal and vertical R&D spillovers, Atallah (2002) investigates R&D investments and total welfare among (i) non-cooperative R&D, (ii) two horizontal RJVs (research joint ventures), (iii) two vertical RJVs, and (iv) one complete RJV. The obtained results turned out ambiguous. In turn, following Kamien *et al.* (1992), Ishii (2004) analyses vertical R&D cooperative arrangements (vertical R&D cartels) with vertical non-cooperative RJVs and vertical RJV cartels (for interesting comparisons, see Manasakis, Petrakis, & Zikos, 2014). The advantage of one of the above models of vertical R&D over the others turned out to depend on the value of knowledge spillovers in the industry. Xu, Liang, Duan, and Xiao (2015) use the analytical framework developed by Kamien *et al.* (1992) to formally show that vertical R&D cooperation is unstable, as the downstream firm is more likely to break the cooperation agreement. Therefore, when establishing R&D cooperation, firms must carefully consider the reputation of potential partners and the extent of trust between the firms operating in the supply chain.

Manasakis *et al.* (2014) consider the downstream firms' incentives in a vertically related industry – to invest in cost-reducing R&D (aimed at process innovations) and to form an RJV in the final product market – under two alternative modes of input (component) supply, i.e. (i) exclusive vertical relations and (ii) a single supplier. In contrast to the well-known hold-up argument (for a brief elaboration, see e.g. Lemley & Shapiro, 2007; Karbowski & Prokop, 2015), in which downstream firms invest non-cooperatively and knowledge spillovers are relatively low, R&D investments turn out to be higher under a single supplier mode than under competing vertical chains. Furthermore, downstream firms' incentives to create an RJV appear stronger in the former case than in the latter.

More recently, Dai *et al.* (2017) compare two cooperative R&D behaviours in a supply chain, i.e. R&D cartelisation and R&D cost-sharing contract. The mathematical analyses led to conclusions that the upstream firm mostly favours an R&D cartelisation behaviour, while the downstream firm prefers a non-cooperative scheme. For the upstream firm, it is always more profitable to cooperate with the downstream buyer than to operate under the vertical non-cooperative scheme. Under cooperation, the upstream supplier can effectively extract some surplus from the downstream buyer, to the detriment of the latter. Thus, the downstream firm favours a non-cooperative scheme. Supply chain-wide cooperation always benefits the consumers (in terms of consumer surplus) compared with a non-cooperative mode.

Belderbos *et al.* (2018) examine the collaboration in R&D with the two value chain partners: customers and suppliers. The authors suggest that the firm's R&D collaboration with either suppliers or customers constitutes the antecedent of the stable vertical integration of the industry.

Based on the above overview of the relevant literature, we formulate the following research hypotheses. First, drawing on Hagedoorn (1993), Steurs (1995), Hendrikse (2003), Becker and Dietz (2004), Ishii (2004), Belderbos *et al.* (2004a; 2004b; 2018), van Beers and Zand (2014), and Capuano and Grassi (2019), we hypothesise that vertical R&D cooperation enhances firm's process R&D investments and innovation. Second, drawing on Ishii (2004), Manasakis *et al.* (2014), and Capuano and Grassi (2019), we hypothesise that the innovation-related benefits from vertical R&D cooperation are the greatest for

the relatively small knowledge spillovers in the industry. Third, based on Dai *et al.* (2017) and Belderbos *et al.* (2018), we hypothesise that the vertical R&D cooperation benefits consumer surplus and social welfare compared with the vertical non-cooperative R&D, especially for the larger knowledge spillovers in the industry.

The above hypotheses can be supported by the innovation economics and management theory. As Nieto and Quevedo (2005) notice, in the non-cooperative case, the knowledge spillovers constitute a significant disincentive to corporate investment in R&D. This disincentive effect can be explained as follows. First, firms limit their investments in R&D if they perceive a smaller likelihood of being able to make exclusive use of the results of their R&D works, i.e. knowledge spills over to other firms. Second, if they can use the stock of technological knowledge produced by other companies, imitators will do so to the detriment of their own investments in R&D. The private R&D investments should then decrease with the rising knowledge spillovers in the industry. The R&D cooperation internalises knowledge externalities to some extent, and alleviates the disincentive effect mentioned above. As a result, the R&D cooperation should enhance firms' R&D investments and innovation. The smaller the knowledge spillovers, the smaller the disincentive effect and the larger R&D investments and innovation. Therefore, the cooperative R&D investments should dominate the non-cooperative ones, and the latter should be particularly visible for the relatively low values of spillovers in the industry.

Note that in the supply chains the inefficiency problem occurs, since the upstream firm faces incentives to raise the price of the intermediate good, and so charge a higher than efficient price of that good, to the detriment of the social welfare (Lemley & Shapiro, 2007). The vertical cooperation solves the above inefficiency problem by mitigating the opportunistic behaviour of the upstream supplier. From the welfare perspective, knowledge spillovers can simultaneously play an important role in the economy, as the knowledge spillovers contribute to the diffusion of knowledge in the society and can work towards the promotion of the social welfare (Karbowski, 2016). Thus, taking into account both the inefficiency problem and the welfare promotion effect, we expect that the consumer surplus and total surplus benefit from vertical R&D cooperation (the supply chain inefficiency is mitigated), and those benefits are the highest for the large spillovers in the industry (due to the welfare promotion effect).

MATERIAL AND METHODS

We apply standard microeconomic methods of analysis, i.e. mathematical modelling and optimisation procedures. As a complementary method, we further turn to the numerical analysis in order to show equilibrium solutions of the developed systems of equations. Data present in tables 1 and 2 are the numerical data which constitute the solutions of the systems of equations derived within the microeconomic models in the next section. All computations have been run in the Wolfram Mathematica 11 (2018) package. Using the above-mentioned tools, we perform a comparative static analysis of two selected patterns of R&D behaviour of firms operating in a supply chain. For comparative purposes, and based on the literature review, we take into account the following variables: process R&D investments (spendings on process R&D), outputs (quantities produced by firms), market prices (market prices of the final goods), economic profits (total revenues net total costs), consumer surpluses (the monetary gain obtained by consumers), and total welfare values

(the monetary gain of both consumers and producers). All these variables are measured directly (without the use of proxies) as the equilibrium values derived within the microeconomic model, and expressed in monetary (R&D investments, market prices, economic profits, consumer surpluses, total welfare) or quantitative (outputs) terms.

RESULTS AND DISCUSSION

The following analysis considers two distinct cases, i.e. the independent behaviour of firms in a supply chain and the behaviour of firms in a vertically integrated industry.

Independent R&D activities

We consider a supply chain with a final-good manufacturer, denoted as firm 1 and an input (component) supplier, denoted as firm 2. Firm 1 is assumed to face the market demand for its product given as a linear price function:

$$p_1 = a - q \tag{1}$$

in which p_1 denotes the market price, q is the volume produced by firm 1, while a is the demand intercept. After deciding about the level of production, firm 1 places an order to firm 2 for the input (component) used to produce final goods. Firm 2 supplies only the firm 1. It is assumed that the quantity of input equals the quantity of the final product. The price of the input set by firm 2 is denoted by p_2; if the component is under patent protection, the price of the input should also cover royalty rate. Initially, the cost functions of each firm are given by a quadratic function:

$$\frac{q^2}{c} \tag{2}$$

in which c is a given parameter of an initial efficiency of a considered firm. The quadratic cost function allows for varying marginal costs of production which are closer to reality than the constant marginal cost of production resulting from the linear cost function (cf. Ahn & McQuoid, 2017). Since the entry barriers to the industry are assumed to be high, there is no issue of new entry to this industry, both to the upstream and the downstream market. Thus, we consider a case of the bilateral monopoly in the supply chain.

Both firms decide about their levels of R&D investments, x_i. The costs of investments are given as a quadratic function (such specification allows for diminishing marginal returns to R&D that occur in business practice, compare e.g. Dasgupta, 1986):

$$\gamma \cdot \frac{x_i^2}{2} \tag{3}$$

in which γ $(\gamma > 0)$ is a constant parameter. Since we focus on the impact of firms' R&D investments and knowledge spillovers between companies on a firm's cost-reducing (process) innovation, we assume that the initial cost-related efficiencies (production cost efficiency and R&D cost efficiency), c and γ, are the same for both firms. In this way, we can concentrate on the relationship between the effective cost reduction of a single firm and firms' R&D investments or knowledge spillovers between enterprises. The initial cost-related asymmetries between firms are excluded from the current study in order to isolate the links between R&D investments, knowledge spillovers, and process innovation.

When firm i invests in R&D, its cost of manufacturing is given by the following function:

$$C_i(q_i, x_i, x_j) = \frac{q^2}{c + x_i + \beta x_j} \tag{4}$$

in which x_i denotes the amount of R&D investments made by the firm *i*, and x_j denotes the number of R&D investments made by the other firm. Parameter β $(0 \leq \beta \leq 1)$ determines the size of knowledge externalities, i.e. the benefits for a given company obtained as a result of research undertaken by the other firm. Higher levels of parameter β mean that the R&D investments made by one enterprise allow the other firm to reduce the manufacturing costs by a greater amount for free. The parameter beta is the same for both companies.

For a given amount of R&D investments, x_1 and x_2, the profit of firm 1 is given by:

$$\pi_1 = (a - q) \cdot q - \frac{q^2}{c + x_1 + \beta x_2} - \gamma \cdot \frac{x_1^2}{2} - p_2 q \tag{5}$$

and the profit of firm 2 (component supplier) is written as:

$$\pi_2 = p_2 q - \frac{q^2}{c + x_2 + \beta x_1} - \gamma \cdot \frac{x_2^2}{2} \tag{6}$$

The first order condition for profit maximisation of firm 1, $\frac{\partial \pi_1}{\partial q} = 0$, generates the optimal output level of the final good:

$$q = \frac{(a - p_2)(c + x_1 + \beta x_2)}{2(1 + c + x_1 + \beta x_2)} \tag{7}$$

After substituting (7) into (6), the profit of firm 2 is given as:

$$\pi_2 = \frac{(a - p_2)^2 (c + x_1 + \beta x_2)^2}{4(c + \beta x_1 + x_2)(1 + c + x_1 + \beta x_2)^2} + \frac{p_2 (a - p_2)(c + x_1 + \beta x_2)}{2(1 + c + x_1 + \beta x_2)} - \frac{1}{2} \gamma x_2^2 \tag{8}$$

The first order condition for profit maximisation of firm 2, $\partial \pi_2 / \partial p_2 = 0$, generates the optimal price level of the input as a function of R&D investments of both firms; denoted by $p_2(x_1, x_2)$. By substituting $p_2(x_1, x_2)$ for p_2 into (5), (6) and (8), we obtain profits of both firms as a function of R&D investments: $\pi_i(x_1, x_2)$.

Assuming that the firms decide about research spending independently and simultaneously, as the simultaneous strategic decisions taken by the supplier and the buyer are quite common in business practice (see, e.g. Dumrongsiri *et al.*, 2008; Wu, Chen, & Hsieh, 2012), we obtain the equilibrium levels of R&D investments at the initial stage of the game by solving the following system of two equations with two unknowns, x_1 and x_2:

$$\frac{\partial \pi_i(x_1, x_2)}{\partial x_i} = 0 \; for \; i = 1, 2 \tag{9}$$

Let us denote it by $\hat{x}_1$ and $\hat{x}_2$. Substituting $\hat{x}_1$ and $\hat{x}_2$ for x_1 and x_2 in (7), we obtain the equilibrium output of firm 1 (final-good manufacturer); denote it by $\hat{q}$. Now, we can also calculate the equilibrium levels of prices $\hat{p}_i$, profits $\hat{\pi}_i$, consumer surplus $\widehat{CS}$, and total welfare $\widehat{TW}$. Due to a relatively complex form of the analysed equations, a closed form solution to the system (9) cannot be obtained. For that reason, we turn to numerical analysis. A wide range of simulations for different levels of parameters a, c, and γ have been conducted. They showed that there was always a single solution to the system (9) in the set of nonnegative numbers and that the results of the model do not

change. As an illustration of the results, we present the calculations for $a = 100$, $c = 1$, and $\gamma = 3$. Table 1 shows the equilibrium for various levels of parameter β.

Table 1. Independent behaviour of firms in the supply chain: equilibrium outcomes for $a = 100$, $c = 1$, $\gamma = 3$, and $\beta \in [0, 1]$

β	$\hat{x}_1$	$\hat{x}_2$	$\hat{q}$	$\hat{p}_1$	$\hat{p}_2$	$\hat{\pi}_1$	$\hat{\pi}_2$	$\widehat{CS}$	$\widehat{TW}$
0.0	4.10890	4.36169	19.3950	80.6050	53.6173	424.47	941.21	188.08	1553.77
0.1	4.05715	4.53818	19.7538	80.2462	53.3234	436.33	956.80	195.12	1588.24
0.2	3.96530	4.71001	20.0615	79.9385	53.0849	447.01	969.80	201.23	1618.04
0.3	3.84917	4.86908	20.3307	79.6693	52.8945	456.62	980.97	206.67	1644.26
0.4	3.72434	5.00482	20.5696	79.4304	52.7446	465.21	990.91	211.55	1667.67
0.5	3.60396	5.10972	20.7834	79.2166	52.6269	472.80	1000.00	215.97	1688.78
0.6	3.49686	5.18157	20.9755	79.0245	52.5334	479.48	1008.50	219.99	1707.96
0.7	3.40716	5.22269	21.1486	78.8514	52.4569	485.32	1016.52	223.63	1725.47
0.8	3.33533	5.23793	21.3050	78.6950	52.3922	490.46	1024.10	226.95	1741.50
0.9	3.27958	5.23287	21.4466	78.5534	52.3351	494.99	1031.26	229.98	1756.23
1.0	3.23712	5.21272	21.5753	78.4247	52.2831	499.03	1038.01	232.75	1769.79

Source: own study.

Vertically integrated firms

In this section, we move on to analyse the case of vertical integration of firms. Note that under vertical integration the duplication of the R&D works – possible in the non-integrated industry – is avoided. The joint profit of integrated firms is given by:

$$\pi = (a - q)q - \frac{q^2}{c + x_1 + \beta x_2} - \gamma \frac{x_1^2}{2} - \frac{q^2}{c + x_2 + \beta x_1} - \gamma \frac{x_2^2}{2} \tag{10}$$

For a given amount of R&D investments, x_1 and x_2, the first order condition for profit maximisation of integrated firms generates the following optimal output level of the final good:

$$q = \frac{a}{2\left(1 + \frac{1}{c + \beta x_1 + x_2} + \frac{1}{c + x_1 + \beta x_2}\right)} \tag{11}$$

After substituting (11) into (10), the profit of integrated firms will become a function of R&D investments, i.e., $\pi(x_1, x_2)$. The optimal level of research investments is obtained as a solution to the following system of two equations with two unknowns, x_1 and x_2:

$$\frac{\partial \pi(x_1, x_2)}{\partial x_i} = 0 \; for \; i = 1, 2 \tag{12}$$

Let us denote the optimal level of R&D investments as x_1^* and x_2^*. By substituting x_1^* and x_2^* for x_1 and x_2 in $\pi(x_1, x_2)$, we next obtain the equilibrium profit of the vertically integrated firm; denote it by π^*. Now, we can also calculate the equilibrium level of output, q^*. Since the equilibrium is symmetric, we have $x_1^* = x_2^*$. We assume that the integrated firms split the profits equally, i.e., $\pi_i^* = 0.5\pi^*$, so the following results apply to that symmetric case. The symmetric division of profits in R&D cooperation is a common case between firms with similar cost efficiencies (see, e.g. d'Aspremont & Jacquemin, 1988; Kamien *et al.*, 1992; Kamien & Zang, 2000; Kaiser, 2002; Karbowski, 2016; Capuano & Grassi, 2019).

For the analysis of social efficiency, we also consider consumer surplus and total welfare. The consumer surplus, CS^*, is obtained as the area of a triangle under the demand curve and above the market price. The total welfare, TW^*, is calculated as the sum of consumer surplus and the profit of integrated firms.

Since a closed form solution to our model cannot be obtained, we use numerical analysis to find the equilibrium outcomes. Various levels of parameters a, c, and γ have been applied to investigate the behaviour of firms. The basic conclusions seem to be invariant to the changes in these parameters.

We use the numerical analysis to find the equilibrium outcomes. For the purpose of this paper, we restrict our considerations to the case when three parameters of the model are: $a = 100$, $c = 1$, and $\gamma = 3$; the same values as in the previous section, thus justified comparisons can be drawn in discussion. The equilibrium results of the numerical analysis, for various levels of parameter β, are given in table 2.

Table 2. Vertical integration of firms in the supply chain: equilibrium outcomes for $a = 100$, $c = 1$, $\gamma = 3$, and $\beta \in [0, 1]$

β	x_i^*	q^*	p^*	π_i^*	CS^*	TW^*
0.0	7.52406	40.4980	59.5020	927.53	820.04	2675.11
0.1	7.39453	41.0185	58.9815	943.44	841.26	2728.15
0.2	7.27211	41.4723	58.5277	957.48	859.98	2774.94
0.3	7.15655	41.8722	58.1278	969.98	876.64	2816.61
0.4	7.04744	42.2278	57.7722	981.20	891.60	2853.99
0.5	6.94434	42.5465	57.4535	991.33	991.33	2887.76
0.6	6.84679	42.8340	57.1660	1000.53	917.38	2918.44
0.7	6.75437	43.0951	56.9049	1008.94	928.59	2946.48
0.8	6.66667	43.3333	56.6667	1016.67	938.89	2972.22
0.9	6.58331	43.5518	56.4482	1023.79	948.38	2995.95
1.0	6.50397	43.7531	56.2469	1030.38	957.17	3017.92

Source: own study.

Using table 1, we may discuss the impact of parameter beta, i.e. the extent of knowledge externalities (spillovers), on the equilibrium conduct and performance of firms in a supply chain. When the extent of knowledge spillovers increases, the downstream company (final-good manufacturer) reduces investments in R&D. The R&D spending of the upstream company (component supplier) simultaneously behaves non-monotonically with respect to beta. For the values of beta not greater than 0.8, an increase in the level of technological spillovers encourages the upstream firm to invest more in R&D. However, when beta exceeds 0.8, research spending decline but are still significantly higher than the investments of the downstream company. The supply of the final product is an increasing function of beta, which translates into the declining price paid by consumers. The profits of both firms react monotonically to the size of externalities generated by the investments in R&D. A wider extent of research spillovers in the industry results in higher profits for both companies. Thus, independently acting firms have incentives to engage in the exchange of research results to earn higher profits. Interestingly enough, the consumer surplus – but also the total welfare – are growing together with the size of research spillovers.

Using table 2, let us now consider the impact of parameter beta, i.e. the size of knowledge externalities, on the equilibrium conduct of vertically integrated firms. When external benefits for a given company resulting from the research undertaken by the other firm are relatively small (parameter beta is low), R&D investments of each firm are relatively high and decline with the growing scale of knowledge spillovers. The supply of the final product is also growing, which results in the declining level of the market price, and the highest consumer surplus. The profits of each firm and the total welfare are increasing together with the greater extent of technological spillovers.

Comparing tables 1 and 2, we may observe that vertical integration leads to significantly higher individual investments in R&D for all values of knowledge spillovers in the industry. Moreover, for all values of knowledge spillovers, consumer surplus and total welfare are higher under vertical integration than the independent behaviour of firms. When we compare the economic profits, note that under independent behaviour of companies profit of the component supplier is significantly larger than under vertical integration. In turn, profit of the final-good manufacturer is significantly lower under independent behaviour of enterprises than in the vertically integrated industry. Interestingly, much more product is delivered in the marketplace – for all values of knowledge externalities – when the industry is vertically integrated than under independent behaviour of companies. The price of a final good is significantly higher when firms behave independently than under vertical integration.

Thus, from the social and policy viewpoint, it seems pretty straight-forward – that in our model – vertical integration serves enterprise innovation and social welfare better than the independent behaviour of firms in a supply chain. The latter is only beneficial to the upstream firm (component supplier), but it is mainly due to the equal split of profits under vertical integration. Slightly larger share of profits for the input supplier under vertical integration would make firm 2 prefer integration over independent behaviour.

Interestingly enough, the process innovation benefits from vertical integration are the highest for the lowest values of knowledge spillovers in the industry. By contrast, the greatest benefits from vertical integration for consumers and total welfare are for the largest knowledge spillovers in the industry. This may be an interesting observation for policy-makers who could be either oriented at industry innovation enhancement or social welfare improvement.

Clearly, the result that the greatest benefits from vertical integration for consumers and total welfare are for the largest knowledge spillovers in the industry is conditioned by the existing absorptive capacities of companies operating in the industry. Cohen and Levinthal (1989; 1990), Levin (1988), Levin, Klevorick, Nelson, and Winter (1987), Levin and Reiss (1988), and, recently, Jimenez-Barrionuevo, Molina, and Garcia-Morales (2019) indicate that enterprises differ in their ability to absorb knowledge produced by other firms. Thus, enterprises can be characterised by varying degrees, in which they can use knowledge spillovers occurring in the industry (see also Kaiser, 2002; Karbowski, 2016). The firm's absorptive capacity was first formalised by Kamien and Zang (2000). These authors consider a three-stage game in a Cournot duopoly. In the first stage of the game, firms made decisions about the level of generality of their research. The firm's absorptive capacity was defined as $(1-\delta_i)x_i^{\delta_i}$, in which δ_i stands for the degree of generality of research undertaken by *i*-th player, while x_i denotes the firm's R&D investments. Higher values of parameter delta

correspond to a more specialised nature of research. For $\delta_i = 1$ the *i*-th duopolist conducts very specialised research and the knowledge produced by the other firms is of no value to the given duopolist. Thus, when delta reaches its upper bound, the *i*-th duopolist does not absorb knowledge spillovers in the industry. By contrast, when δ_i=0, the *i*-th firm conducts the very general research and the knowledge produced by others can be directly absorbed and utilised by the *i*-th enterprise. In the second stage of the game, the firms decide about the value of R&D investments, and, in the next stage of the game, about the production volume of the final goods. Based on that model, Kamien and Zang (2000) show that an increase in the degree of generality of the firm's research leads to a higher enterprise R&D investment, provided that the initial degree of generality of research is sufficiently high (for a more elaborate discussion, see Kamien & Zang, 2000; Kaiser, 2002; Karbowski, 2016). Moreover, the authors show that R&D cooperation between enterprises is more likely to occur, if prospective partners conduct more general research.

Based on the Kamien and Zang's (2000) observations, we suggest some appropriate implications for our model of behaviour in a supply chain. Based on Kamien and Zang (2000), we predict that the greatest benefits from vertical integration for consumers and total welfare are for the largest knowledge spillovers in the industry and the most general nature of research conducted by the enterprises operating in the industry. For very specialised research programmes undertaken by firms, the welfare benefits from vertical integration should be significantly smaller.

Another factor important in the discussion on the extent of R&D spillovers in the industry is the organisation of R&D activities on the given market. In their seminal paper, Kamien *et al.* (1992) distinguish four different forms of R&D organisation that may arise between market rivals, i.e. (i) R&D competition, (ii) R&D (cooperation) cartelisation, (iii) RJV competition, and (iv) RJV cartelisation (see also Prokop, 2014; Karbowski & Prokop, 2018; Capuano & Grassi, 2019). In an R&D competition, enterprises decide about their R&D investments unilaterally so as to maximise their individual profits. In an R&D cartelisation, firms coordinate their R&D investments but compete in the production of goods so as to maximise the sum of their profits. In an RJV competition, enterprises act as in the R&D competition, but they fully share results of R&D (beta equal 1). In an RJV cartelisation, firms fully disclose their knowledge (beta equal 1) and coordinate their R&D investments so as to maximise the sum of overall profits (for more details, please see Kamien *et al.*, 1992). However, Kamien *et al.* (1992) do not take the vertical cooperation between firms into account. Please observe that – in our model of vertical relations – a wider extent of knowledge spillovers in the industry results in larger profits for both enterprises. Thus, independently acting firms have strong incentives to engage in the exchange of knowledge to achieve higher profits. Since the largest profits can be earned for maximal technological spillovers (beta equal 1), both firms face strong incentives to form an RJV. This will also work towards consumer surplus and total welfare maximisation.

Lastly, it seems interesting to discuss the behaviour of the input supplier. Observe that – in a non-integrated industry – the difference between the input price and the final product price is more than 26 monetary units. Under vertical integration, the final good price falls to about 60 monetary units at the maximum (being about 81 monetary units at the maximum prior to integration). Clearly, this decrease in the final product price is partly due to the elimination of the patent holdup problem by means of vertical

integration. Prior to the integration, the upstream firm – as the patent holder – faces some incentives to raise the price of its component and so charge a higher than efficient patent royalty (Lemley & Shapiro, 2007; Karbowski & Prokop, 2015). Vertical integration eliminates those incentives of the patent holder.

CONCLUSIONS

In this article, we compared two models of corporate R&D in a supply chain: the independent behaviour of firms and the behaviour of firms in a vertically integrated industry. With the use of microeconomic methods – i.e. mathematical modelling, optimisation procedures, and numerical analysis – we performed a comparative static analysis of two selected patterns of R&D behaviour in a supply chain. Based on the obtained results, we can say that firms' process innovation benefits from the vertical integration of the industry. The innovation-related benefits are particularly high for the relatively small values of knowledge spillovers. In turn, the greatest benefits from vertical integration for consumers and social welfare are for the largest knowledge spillovers in the industry.

The analysis of firms' behaviour in a supply chain allowed us to conclude that, first, a wider extent of knowledge spillovers in the industry results in higher profits for both enterprises. Consequently, independently acting firms have incentives to engage in the exchange of research results in order to earn higher profits. This constitutes a direct implication for the managers who can boost firms' profits through the creation of the supply chain-wide RJV. Second, vertical integration leads to significantly higher individual investments in R&D, higher market output (resulting in lower market price), larger consumer surplus, and total welfare (for all values of knowledge spillovers in the industry). From the public policy perspective, the vertical integration constitutes then a preferred option compared with the non-integrated industry. Third, the innovation-related benefits from vertical integration are the highest for the lowest values of knowledge spillovers, and the greatest benefits from vertical integration for consumers and social welfare are for the largest knowledge spillovers. It means that business managers focused on process innovation should not pursue an RJV option. On the other hand, managers oriented at short-term profits, can increase them thanks to the RJV creation. Fourth, the greatest benefits from vertical integration for consumers and social welfare should occur for the most general nature of research conducted by the enterprises operating in the industry. For very specialised research programmes undertaken by firms, welfare benefits from vertical integration should be significantly smaller. This is an interesting observation for policy-makers who can incentivise different natures of research undertaken by companies, i.e. more general (fundamental) or narrower (applied) research programmes. Fifth, vertical integration seems to eliminate incentives of the patent holder to raise the price of its component and charge a higher than efficient patent royalty. From the public policy perspective, it means that vertical integration of the supply chain solves the problem of patent holdup and subsequent royalty stacking, as this problem hinders innovation in the industry.

As regards possible future extensions of the present research, scholars may also consider the impacts of vertical R&D cooperation on product innovation. However, the technical challenge is, then, how to model the impacts of product innovation? As a product quality enhancement parameter, as a market size expansion parameter, or in a totally different, original way?

The lack of product innovation considerations constitutes a limitation of the current study. Another limitation is no consideration of the impact of competition either on the upstream or downstream market and the impact of competition on the equilibrium outcomes. However, the above limitations give rise to the new research endeavours and subsequent corresponding publications.

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Internationalisation as Institutional Escape for Family Businesses in Conflict Zones: Evidence from Afghanistan

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ABSTRACT

Objective: The objective of this article is to investigate the use of internationalisation to "escape" the institutional voids present in conflict economic systems, through interviews with fifteen Afghan family business leaders who run businesses in Kabul.

Research Design & Methods: Relying on grounded theory, we explore the role of internationalisation in providing security and stability for family businesses in conflict zones. In total, fifteen family business leaders were interviewed by three members of the research team working in pairs, after an analysis of transcripts subsequently described over the course of the interview process.

Findings: We find that Afghan family business leaders demonstrate interest in internationalisation as a method of escaping institutional voids in the domestic environment, and that their most commonly cited motive in doing so is to obtain legitimacy in foreign markets through the establishment of quality standards.

Implications & Recommendations: The appropriate way to proceed with internationalisation is to follow a stepwise process, so that family business leaders can draw upon both strengths inherent in their family and also engage in organisational learning through relationships with family businesses in neighbouring countries with similar cultures.

Contribution & Value Added: We contribute to institutional theory by advancing our understanding of how insecurity, lawlessness, and tribalism play a role in the internationalisation of family businesses in conflict zones and to the family business literature by documenting how family business internationalisation is a response to domestic institutional voids.

Article type:	research article
Keywords:	entrepreneurship; business internationalisation; family business; conflict zones; Afghanistan institutional theory
JEL codes:	M10, M16, F3, Y8

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INTRODUCTION

Afghanistan has been consumed by distinct waves of violent conflict within the lifetime of an Afghan towards the end of his or her life expectancy of sixty years: the Soviet/American proxy war in the 1980s, the brutal Taliban rule, which killed over a million people and ended in 2001, and the US occupation and ensuing insurgency, which may presently be giving way to an even more ominous regime consisting of the Islamic State and the Taliban. As of 2018, the Afghan is the world's least powerful passport in terms of the number of countries that permit Afghan entry without a visa (Global Passport Power, 2019). Over half of the population lives in poverty, the unemployment rate is 40%, financial capital for business development is extremely scarce, while corruption is among the worst in the world (World Bank, 2019). Suicide bombings are familiar events even in the heavily protected Green Zone of Kabul.

Institutional theory provides a theoretical basis for assessing internationalisation by conflict zone family-owned businesses. In particular, given the characteristics of the Afghan economic and social environment, we argue that the co-option of formal institutions of governance and jurisprudence by oppressive, powerful forces creates an opportunity for Afghan family business leaders to engage in "institutional escape" through the establishment of foreign markets. The aim of this paper is to provide insights into how conflict zone family business leaders perceive internationalisation. Through a qualitative research method, we interview fifteen Afghan family business leaders and obtain insights into how internationalisation is viewed as a survival strategy in the context of the stage model theory.

The importance of this research lies in its implications for family business leaders in conflict zones and failed states worldwide. From a practical perspective, our results have implications for various levels of government in Afghanistan and for nongovernmental organisation in terms of supporting internationalisation; from a theoretical perspective, we identify a gap in the literature by documenting how warlords in country tribalism – referred to as "the Mafia" by our sample participants – and extreme resource constraints (cf. Arregle, Duran, Hitt, & Van Essen, 2017) limit the volition of families in governing these enterprises. Exposure to new products, markets, and ideas which occurs due to internationalisation is significant, but also critical is the opportunity to observe how business functions in "normal" peace-time environments. These insights cannot be obtained in Afghanistan, thus necessitating internationalisation. Foreign development aid should promote the interests of these family businesses in supporting the establishment of a framework for establishing export markets and partnerships in non-conflict zone neighbouring countries.

The paper proceeds as follows. In the framework of an exploratory study, we first describe the literature on the subject of family business and internationalisation and present our research questions. We then present the materials and methods used in our analysis of our research questions. Our results and discussion follows, and we conclude the paper, in which we provide limitations of the study, along with recommendations for subsequent research and for policymakers based on our findings.

LITERATURE REVIEW

Institutional Theory and Family Owned Businesses

The family business is the most enduring organisational business structure, comprising 80% to 98% of world's businesses according to Poza (2013), who reviews the social science research on family-owned firms. A family business means a set of individuals from a family who work or own the same business. It can be difficult to distinguish family business from other businesses in terms of operations and objectives; although a number of definitions exist (Bouges, 2013; Poutziouris, Smyrnios, & Klein, 2008; Kemppainen, 2011; Short, Payne, Brigham, Lumpkin, & Broberg, 2009). Each of these studies propose own definitions after a review of the relevant literature. We rely on the definition proposed by Chua, Chrisman, and Sharma (1999), which posits that, "The family business is a business governed and/or managed with the intention to shape and pursue the vision of the business held by a dominant coalition controlled by members of the same family or a small number of families in a manner that is potentially sustainable across generations of the family or families."[1]

In a theoretical framework, Casson (1999) argues that the defining characteristics of family-owned businesses lie in the cohesion generated by the dynastic motive, which encourages trust among family members across generations. De Massis Kotlar, Mazzola, Minola, and Sciascia (2018a) review recent studies on family-owned firms, and explain that recent research indicates that these features involve family business leaders pursuit of non-economic goals (Kotlar & De Massis 2013; De Massis *et al.*, 2018a) and the centralisation of administrative of control (Carney 2005). The features of family-owned firms regarding emotional investment in the business and dynastic intention are tied to "patient capital" (De Massis *et al.*, 2018a) – a willingness to invest long-term rather than to meet quarterly earnings numbers – and superior governance relative to non-family-owned firms, which is revealed through lower agency costs, as document empirical analyses (Denis, Denis, & Sarin, 1999; Chrisman, Chua, & Litz, 2004). Furthermore, family-owned firms tend to exhibit strong family brand identity and greater depth of knowledge of the business (Miller & Le Breton-Miller, 2005). These same features also lead family-owned business leaders to exhibit greater risk aversion (Casson, 1999) and to be more conservative in decision-making (Gómez-Mejía, Makri, & Larraza-Kintana, 2010). Moreover, family firms face greater resource constraints in terms of the availability of professional management (Graves & Thomas, 2008) and financial capital (Anderson & Reeb, 2003).

Institutional theory argues that "structures – however defined – do matter" (Peters, 2012), whether formal structures of government or informal structures rooted in cultural values. The family business is an institution grounded in family governance through the control of decision rights in some form; i.e., through the nuclear family, kinship group, or ownership of equity in the case of external professional management (Leaprott, 2005). An external institution – such as the government, insurgents, or organised crime groups – can engage in coercion of the family business in order to achieve a legitimacy of its own. The family business structure is a means to fulfil needs beyond simply security, but also the self-actualisation of family members (Leaprott, 2005).

[1] All of our sample Afghan SMFEs meet these criteria.

Institutional theory also argues that formal institutions seek legitimacy from values present in the cultural framework by "acting collectively" on shared values (Meyer & Rowan, 1977). From an institutional perspective, a misalignment can develop between the institutions of the formal and cultural sectors, such as laws and rules established through the justice system and government and – for cultural sectors – including the values held as cultural norms. When this misalignment occurs, institutional voids are created (Mair & Marti, 2009). These voids can remain empty, thus requiring strategic behaviour from firms to compensate for it, or it can be filled with a variety of pro- or anti-social institutions.

Family is the single most important institution in the Afghan society (Dupree 1997; Muller & Paulien 2011; Omidian, 1996; Smith, 2009), which is relied upon as the primary source of economic and socioeconomic capital. Afghan is a collectivist society, in which important decisions related to business and social dealings are determined within the family. The extended family is one's social environment, with agency over personal decisions such as marriage, educational decisions, and migration decisions, while families represent a "harbor of trust and comfort that cannot be found elsewhere" (Fisher, 2013). Family-owned firms employ more than one-third of the Afghan population eligible for work (Mashal, 2014). Therefore, from an institutional theory perspective, a family is the central platform for business organisation in less developed countries without functioning external capital markets, so family businesses face compelling "institutional voids" in terms of traditional mechanisms of economic and political governance, as these are either absent or extremely corrupt. Business in Afghanistan exhibits a curious duality: it simultaneously refers to the corruption of political leadership as an illegitimate sector network (i.e. through a warlord, clan, or "mafia") and to the natural context of an extended family business as a source of support for economic and social activity (Ahmad, 2018). In a sense, the "family business" can either represent the most enduring human organisation or a pervasive and oppressive force that undermines access to capital and economic growth in order to retain power. A family business leader in this context may wonder what kind of opportunity exists for his or her business and the future generations who might run the business. The literature in conflict zone entrepreneurship indicates that the available choices for survival often boil down to becoming either predator or prey (Sanders & Weitzel 2013).

Institutional theory has been applied to describe circumstances in which internationalisation, such as trade or foreign direct investment, occurs due to institutional voids in the local environment. Bhaumik, Driffield, and Pal (2010) and Carney, Duran, van Essen, and Shapiro (2017) argue that the country specific formal and informal institutional attributes contribute to the decision to internationalise. For instance, Dunning (1996) argues that outward foreign direct investment occurs to escape burdensome restrictions at home, while Caves (1996) makes a similar argument regarding tax regimes. Schoppa (2008) finds that outward FDI is a form of escape from onerous institutional environments. Gordon and Hines (2002) show that companies relocate their nation of incorporation to avoid oppressive taxation regimes.

The Afghan economic ecosystem can be considered a "warlord economy" in that it suffers from characteristics of institutional failure common to conflict zones: lawlessness, corruption, and poverty. In this environment, a predator-prey relationship forms when powerful entities co-opt the institutions of governance towards rent-seeking activities,

and divert economic resources generated from extortion, fraud, kidnapping, and terrorism towards entrenching own power. In these environments, the warlord takes the place of the state and diverts economic activity to maintain control. At low levels of economic development, when respect for property rights is low, these warped institutions gather strength and the economic system evolves to the point where the government and judicial system themselves become tools of the warlords (Mehlum, Moene, & Torvik, 2003). To survive, entrepreneurs in the warlord economy must choose between joining the warlords or becoming prey, if they wish to remain in the domestic environment (Sanders and Weitzel, 2013). However, we argue that internationalisation is a mechanism to escape the situation – and thereby avoid being predator or prey – for family businesses in conflict zones such as Afghanistan.

Family-Owned Firms and Escape through Internationalisation

Many family-owned businesses acknowledge that internationalisation is an important step to business success, stability, and expansion (Claver, Rienda, & Quer, 2009). However, rather than strictly economic objectives, it is considerations of the socioeconomic wealth of the family (status, emotional attachment, control over decision-making, social relationships with stakeholders) that may lead family firms to neglect internationalisation and focus on domestic markets (Gomez-Mejia, Haynes, Núñez-Nickel, Jacobson, & Moyano-Fuentes, 2007; De Massis, Kotlar, Wright, & Kellermanns, 2018a). Greater risk aversion exhibited by family-owned firms may also preclude "taking chances" outside of the norm, while human capital and financial capital constraints may further preclude internationalisation. Graves and Thomas (2008) argue that family business leaders exhibit some level of dissonance regarding ties to their home country and interest in globalisation.

The literature on family business internationalisation shows that Afghan family businesses encounter a variety of constraints that inhibit their ability to grow even in the most conducive operating environments, including limited access to financial and human capital and an unwillingness to share control with outsiders. For a nontrivial part of the population, the main challenge that family businesses face is the constant threat of physical violence due to war, armed insurgency, or hostile occupation. Thus, family business groups must leverage the operational advantages they have from the family structure in these conflict environments to ensure the survival of their business but also the family itself. However, domestic and global policymakers do not prioritise support of internationalisation by family-owned firms, because the government pays more attention to strategies related to imports. As a result, the export orientation of Afghan businesses has been largely neglected. In terms of escape, internationalisation may help Afghan family businesses generate stable cash flows when local demand is low, decrease production costs, and enter low cost markets.

Furthermore, institutional environments, in which social structures, rules, cultural norms, and routines establishes authoritative guidelines for social behaviour and – according to Yang and Su (2014, p. 721) – the authoritative guidelines which are the constructs of institutional theory, "exert significant effects on organisational behaviour, structure, strategy, governance, and process," which may also play a role in the intentions of these family businesses to internationalise. Thus, from the perspective of Arregle *et al.* (2017), the resource set required for successful internationalisation is either non-existent or extremely weak.

Therefore, for family-owned businesses to internationalise, family business leaders must anticipate benefits that outweigh their natural tendency towards conservatism. Further, Verbeke and Kano (2012) and Hennart, Majocchi, and Forlani (2017) argue that – given an optimal level of internationalisation for each firm – research should assess the conditions under which family-owned firms move towards or away from the optimal level. Institutional theory provides a framework for assessing the trade-offs associated with internationalisation in conflict zones, where warlord economy effectively filled the institutional void. It is a means of escape for the family from the institutions absent in the home country or, as Gomez-Mejia *et al.* (2007) argues, geographically concentrated business risks. Furthermore, the long-term orientation that generates "patient capital" of family-owned businesses may benefit them in terms of long-term planning required to successfully internationalise and escape the institutional voids.

In sum, the domestic institutional infrastructure in Afghanistan presents many challenging voids filed by anti-social entities – such as drug lords and other organised crime networks, the Islamic State, and the Taliban – which creates a need for escape with the use of the unique institutional qualities of family-owned businesses. However, the characteristics of family-owned businesses generate socioeconomic trade-offs to internationalisation. Therefore, our first research question relates to institutional theory and the perception of the net effect of trade-offs of internationalisation by Afghan family businesses:

RQ1: Given the institutional voids present in Afghanistan, how do Afghan family business leaders view internationalisation?

Institutional theory describes the nature of institutional voids, from which entities escape. In the Afghan context, many functioning institutions are at best absent and, at worst, co-opted by the warlord economy. On any given day, an academic in the West might notice news related to a suicide bombing or insurrection in Afghanistan. In fact, the Suicide Attack Database of the University of Chicago identifies 1164 suicide attacks in Afghanistan, causing 5427 deaths and 13885 injuries, with a kill rate yield of 4.7 per attack, between 1974 and 2016, making it a fairly routine event that Afghan business owners have to live with (http://cpostdata.uchicago.edu/search_results_new.php). Referred to as the "city of concrete blast T-walls" among the expats who live there, Kabul is one of the least hospitable capitals on Earth in which to do business from a number of perspectives, including weak security conditions, corruption, instability, infrastructure problems, a low educational level, and high poverty. What opportunities for long-term growth are available to family business leaders in on ongoing war zone characterised by a population of 36.6 million, half of which is under the age of 21 and has never experienced a peacetime environment, 70% of which is illiterate, and where the life expectancy is below 60 years of age? At present, family businesses in Afghanistan operate only in their local markets – Kandahar or Kabul – although some have facilities and distribution throughout the country, while most find it difficult to internationalise due to many resource constraints. As one of the poorest countries in the world, demand for products and services of Afghan SMFEs is chronically low. Sociocultural constraints on women further reduce the ability of Afghan SMFEs to grow and expand even in the local market, not to mention abroad.

The literature uncovers a number of characteristics, which limit family businesses in pursuing internationalisation. Arregle *et al.* (2017) summarise the family business interna-

tionalisation literature, observing a distaste by families for outside knowledge and resources. This restriction on assets and human capital results in a lower orientation towards internationalisation of family-owned firms. Pukall and Calabrò (2014) argue that risk perception and interest in socioeconomic wealth impacts the manner in which family-owned business internationalisation proceeds. Calabrò, Torchia, Pukall, and Mussolino (2013) argue that at very high levels of family ownership, managers of family-owned firms exhibit greater risk aversion and greater reluctance to pursue internationalisation, while Calabrò, Campopiano, Basco, and Pukall (2017) find that German family business owners obtain external human capital to navigate the internationalisation process. In Afghanistan, given the low educational level even in the capital, outside expertise in modern management practices would be difficult for a family business to obtain domestically. The human capital void present in Afghanistan would make it difficult to internationalise successfully, but on the other hand, the relatively high educational indicators in neighbouring countries provides an opportunity for businesses who manage to internationalise to obtain the managerial talent pool to succeed.

At the same time, internal and external challenges for Afghan family business owner survival in Afghanistan have increased, while questions remain regarding the competitiveness of local businesses and their ability to survive large-scale political transitions in a system dominated by warlords. Compounding the problem of the prioritisation of import substitution by the government at the expense of the development of a formal export sector is collusion in the grey market. Between 70% to 80% of exports are unregistered, and thereby operate beyond the periphery of the formal economy (Mashal, 2014). The wealth maximisation strategy for these businesses involves the export of their products through a "mafia of exporters" called the "Commission," which negatively affects the quality of products and revenue of the country (Mashal, 2014). Our second research question seeks to identify which aspects of institutional voids in Afghanistan's warlord economy are the most critical push (or exo) considerations for escape for Afghan family business leaders.

RQ2: Which institutional voids in Afghanistan provide the strongest motivation for Afghan family business leaders to escape through internationalisation?

Theories of internationalisation differ in terms of their predictions for which characteristics of businesses lead to successful internationalisation. In that the internationalisation of entrepreneurial ventures is based on the entrepreneur's unique proximity to customers and markets that support the business, Afghan family-owned business leaders may have unique knowledge-based assets that could allow them to internationalise. As posited by Antoncic and Hisrich (2000), the human and social capital of entrepreneurs who work for the SMFE sector may facilitate internationalisation. For instance, borders between Afghanistan and Iran or Afghanistan and Pakistan are relatively porous, while their respective languages are comparable. There is a large expatriate Afghan community in several countries that border Afghanistan, among which community, family, tribal, and social ties could facilitate business exchange. On the other hand, the previously mentioned stability and security situation is such that Afghan SMFEs may not have the luxury of considering expansion in Afghan provinces, not to mention foreign markets. Pukall and Calabrò (2014) argue that risk perception and interest in socioeconomic wealth impacts the manner, in which family-owned business internationalisation proceeds. Furthermore, many family firms that internationalise prefer to do business with other family businesses in their target foreign markets, possibly because

they have comparable governance, shared values, incentive alignment, and objectives, which helps to bridge national borders and cultural barriers between them (Okoroafo, 2010). This tendency towards isomorphism is likely better executed in neighbouring countries, which share similar cultural features like language.

The strategies for internationalisation of Afghan family-owned businesses are also tied to the unique characteristics of family-owned firms and to the institutional voids they seek to escape. Gomez- Mejia, Makri, and Larraza-Kintana (2010) argues that family firms prefer to internationalise in geographically and culturally similar environments. Hernandez, Nieto, and Boellis (2018) find that family-owned firms seek locations for internationalisation with greater institutional quality, consistent with the idea of institutional escape. Yamanoi and Asaba (2018) find evidence that host country institutional quality as measured by the level of corruption also impacts entry strategy, in that high levels of host country corruption are significantly and positively correlated with greenfield investment versus acquisitions. However, these studies focus on firms from the West or Japan, and little remains known about internationalisation strategies of conflict zone entrepreneurs.

The literature on internationalisation argues that firms choose from several different processes to extend their reach beyond borders. The network approach developed by Johanson and Mattson (1988) argues that the internationalisation process is based on building relationships and maintaining them for the purpose of attaining the organisation's objectives. Network relationships inspire and influence firms to internationalise and creates the opportunity to get market specific information and establish a supply chain in the foreign market. It also helps the firm obtain business and political contacts establish reputational capital through earning trustworthiness and reliability in the new market. Among others, Hennart (2014) describes the sudden internationalisation of "Born Global" firms, who internationalise from inception. Varghese (2015) states that there are five stages of internationalisation in the staged theory: (1) the development of the local or domestic market to the point when a firm gains production and financial confidence through organisational learning; (2) market research; (3) planning process, in which the company chooses its target country for the business expansion; (4) the establishment of the primary plan for entering the potential market, often implemented by starting with a small amount of exports to the target country and then extending the businesses if the primary plan for entering the market is successful; and, lastly, (5) using ownership intensive foreign direct investment like acquisitions, strategic alliances, and joint ventures. Hence, our third research question addresses the strategies considered ideal for Afghan family business owners to pursue internationalisation:

RQ3: What internationalisation processes do Afghan family business leaders believe provide the best means of institutional escape?

The bottom line for any business owners is the value of the firm to the owners, and Afghan business owners rightly seek the best ways not only to escape the current institutional void that hinders their progress and growth in the domestic market but also to generate income from different streams as a safety measure to mitigate the ever deteriorating domestic political, economic, and security environment. Hence, this question explores the strategies considered ideal for Afghan family business owners to pursue internationalisation.

MATERIAL AND METHODS

In this study, we adopt grounded theory and qualitative research methodology by employing the interviewing method of data collection to obtain family business leaders' first person perspectives on internationalisation. The survey was pilot tested on a sample of MBA students at a university in Kabul, then administered in compliance with the university's Internal Review Board processes. An initial sample of firms was obtained from the Afghanistan Chamber of Commerce and Industry.

Firms from the list were contacted by phone and email to obtain recommendations for survey participants, after which snowball sampling yielded additional family business leaders of firms divided into six broad industry categories: textiles, agriculture, food and beverage, manufacturing, transportation, and services. As there is limited research relating to this study and its location, a convenience sampling approach was adopted in the form of conventional snowball sampling technique for the qualitative stage of this study. Conventional snowball sampling technique is known as a technique, in which one person provides the researcher with the name of another person to take part in the research and, in turn, this latter person provides the name of a third person to the researcher, and so on (Vogt, 1999). As documented by Bullough, Renko, and Myatt (2017), whose research involves interviews with Afghan entrepreneurs, snowball sampling is often the only way to obtain a sample in a danger zone environment with a low literacy rate and high suspicion of outsiders; mainly because Afghanistan is a "hard to reach population" – according to Marpsat and Razafindratsima (2010) – in that its population is hard to identify, has no sampling frame, and its behaviour is unknown. The combination of these elements may lead to a poor selection of participants or places to approach them. This sampling technique is a non-probability sampling technique, in which research participants are identified and recruited by identifying a few individuals from the research population, and then asking those individuals to refer other qualified individuals. To minimise bias in this stage of data collection, the researchers' first contacts were not interviewed; however, they were asked to refer qualified subjects to participate.

Five firms were then randomly selected from each of the six industry categories to be contacted by phone to obtain consent for a preliminary phone interview, followed by a personal interview with purposive sampling, in which people those are selected for interviews who have different experiences, behaviours, qualities, and attributes. The reason for choosing this type of sampling was to gain a wide range of insights in order to examine the factors that influence the internationalisation of these businesses and methods for confronting challenges from several perspectives.

Two interviews per business leader – one by phone and one in person – were done to examine differences between the two interviews and reduce potential bias. As for data validation and reliability, we conducted a comprehensive review of the available literature and the designs and methods it used to collect data, as special attention was paid to ensure that the face-to-face questions were valid, smoothly communicated, and offered an accurate representation research problem. Furthermore, as there are three spoken main languages in Afghanistan, participants were also given the choice of languages they would use, as offering this option was thought to enable better communication during each interview. The research team explained to each of interviewees that the intended interviews

were for academic purposes only and no personal identity information would be collected at their request beyond first names and company industry.

The total of fifteen family business leaders were interviewed by three members of the research team working in pairs, after the analysis of transcripts subsequently described over the course of the interview process revealed comparable themes with no new information (cf. Creswell, 2013) and given the logistical and security constraints confronted by the research team in travelling throughout the city during the insurgency. Each phone interview lasted for approximately 15 minutes and each in person interview lasted 45 minutes.

Primary data were collected through structured interviews of these fifteen family business leaders. This study adopted Yin's (2003) approach, as this is an exploratory case study of 15 family business leaders in the Afghan capital city of Kabul. Exploring internationalisation opportunities and challenges faced by Afghan family businesses are complex phenomena from an Afghan perspective not only for geographical or demographic reasons but also for safety and security reasons. Yin (2003, p.3) argues that, "the distinctive need for case studies arises out of the desire to understand complex social phenomena," and we strongly believe that the context of the current study is truly a complex phenomenon. Furthermore, this study follows an interpretive approach to data analysis, which assumes that our social reality is shaped by human experiences and social contexts, which are not singular or objective. Hence, in-depth interviews were conducted to explore these human experiences and support the findings of the study.

The interviews were recorded and converted into transcripts. Data was aggregated and organised based on themes identified during the literature review and – for data analysis – we followed a deductive approach, which involves data analysis based on predetermined themes and research questions developed from the literature review. The research questions were our guide for grouping and analysing the data.

We then conducted a thematic analysis using Nvivo software, which is a software for categorizing, analysing, and reporting data. The coding process in grounded theory is done in three steps: (1) transcripts are categorised at the initial stage called open coding; (2) the relation between the primary codes is established, which is called axial coding; and (3) the categories are merged to establish a theory called selective coding (Kothari, 2004).

Open coding was conducted by two researchers independently and repeatedly reading the transcripts to classify the data, during which each researcher wrote detailed memos regarding coding structures; next, the researchers compared reflective comments on the transcripts to better identify important themes in the text. Then, interrelations between data segments were mapped and key themes were tabulated. Refinements were made using axial coding in Nvivo. This allowed us to summarise the central themes of the collected data, so that pattern identification could be followed to group these identified patterns into the themes that were connected to our research questions.

Finally, another faculty member experienced in qualitative methods reviewed the transcripts, memos, and notes in order to verify that the analysis was conducted properly. SPSS 25.0 was used for subsequent data analysis. Moreover, during data analysis, the team followed a minimum inference strategy as proposed by Seale (1999) to eliminate possible bias originating from the research team's own assumptions of participants' viewpoint on presented issues. While common method bias may be a consideration in all qualitative

research, we hope to minimise the effect of this bias by using several different information gathering techniques and multiple interviewers.

The first 14 questions included the demographics and information about the businesses, so as to identify he current business situation and condition, discover what challenges the business faces in the domestic country, and find out what strategies the businesses implement for growth and stability. The motive for these questions were to identify the influencing factors which affect internationalisation of the SMFEs in Afghanistan. The other 11 questions of the interview were to ask about the planning and implementation strategies used by the businesses leaders for the internationalisation. Sample descriptive characteristics are provided in Table 1.

Table 1. Characteristics of Surveyed Afghan SMFEs

Panel A		
Generation	**Number of firms reporting**	**% of firms reporting**
First	13	86.67%
Second	2	13.33%
Family members employed		
<3	1	6.67%
3-5	10	66.67%
>5	4	26.67%
Woman Owned		
Yes	2	13.33%
No	13	86.67%
Total	**15**	**100%**
Panel B		
Sector	**Number of firms reporting**	**% of firms reporting**
Flour/Soybean	1	6.67%
Industrial breads	1	6.67%
Agriculture	1	6.67%
Medical equipment	1	6.67%
Honey	2	13.33%
Handcrafts and Carpets	1	6.67%
Confectionery	1	6.67%
Food processing	1	6.67%
Engineering services	1	6.67%
Construction/road design	1	6.67%
Fabrics	1	6.67%
Tailoring	3	20.00%
Total	**15**	**100%**

Source: own study.

As shows Table 1, Panel A, most of the sampled family businesses (13 out of 15) are owned and run by the first generation, i.e. the founders, with the remaining founded by parents. Most firms in the sample employ between 3 and 5 family members. In two of the fifteen firms surveyed, the founder business leader is a woman. Panel B of Table 1 provides

the sample breakdown by industry. The sample contains businesses from business lines such as agriculture, tailoring, construction engineering, food processing, medical equipment, honey cultivation, fabrics, and clothing. While different firms in Kabul face challenges unique to their particular industry, we attempt to identify the interrelated themes common to Afghan family businesses regarding internationalisation.

RESULTS AND DISCUSSION

While the Afghan environment is characterised by vast institutional voids, literature on family business internationalisation indicates that Afghan family businesses may face skill deficits that would make internationalisation difficult, including the lack of access to external human capital. Our first research question explores how internationalisation is viewed by Afghan family business leaders in light of institutional theory. Details related to the internationalisation status and plans of surveyed SMFEs are shown in Table 2.

Table 2. Current Internationalisation Status and Plans

	Number	%
Present Status		
Presently Internationalised	2	13.33%
China	1	6.67%
Pakistan	2	13.33%
Iran	1	6.67%
Turkey	1	6.67%
Presently Not Internationalised	13	86.67%
Foreign experience of Owner		
Yes	3	20.00%
No	12	80.00%
Outside partner		
Yes	5	33.33%
No	10	66.67%
Plans		
None	3	20.00%
Yes	12	80.00%
Same culture beneficial		
Yes	13	80.00%
No	2	20.00%
Total	**15**	100%

Source: own elaboration.

Among the fifteen SMFE owners surveyed, we found that two currently have foreign operations – one in Turkey, Pakistan, and Iran, another in Pakistan and China – while another one closely cooperates with European firms to purchase medical equipment. These firms had founders who worked abroad: one in Turkey in textiles and another in Iran in tailoring. Furthermore, twelve (80%) hoped to internationalise. Only three (20%) expressed no will or interest to internationalise at the present time. However, thirteen of the fifteen surveyed

family businesses responded positively when asked about either expanding or initiating internationalisation, with two stating that they perceive it negatively due to concerns about their business survival in the short term. This provides some surprising insights that suggest that Afghan family business leaders perceive advantages to internationalisation that overcome the tendency of family businesses towards risk aversion.

A summary of the perceptions of motives for internationalisation of surveyed business leaders is shown in Table 3.

Table 3. Perceived benefits from internationalisation

Perceived Benefit	Number of responses	% of Firms Identifying the Benefit
Legitimacy (Quality of products will improve due to international standards)	8	53.3%
National pride (Familiarise foreigners with products)	3	20.0%
Insufficient demand (Greater stability in foreign markets)	3	20.0%
Expansion of networks for future business/ development of supply chains for future relationships	1	6.7%
Greater chances for innovation	1	6.7%
None mentioned	3	20%

Source: own study.

Surprisingly, the most common theme related to the perceived reasons for internationalisation is that it would lead to business stability through an improvement in the quality of processes and products that meet international standards. As stated by one of the survey participants, Haji Qaher, whose family business focuses on the production and selling of improved seeds: "For the purpose of my business stability, I will increase the quality of products with international standards, be self-dependent financially, and increase the varieties of seed for an increase in target market and attracting new markets."

Nearly half of all respondents viewed the chance to improve product quality as a perceived benefit of internationalisation positively, albeit with some trepidation about their ability to do so without greater government support, which is absent in the current warlord economy. One respondent mentioned using internationalisation to obtain external quality certification, while another one suggested that partnering with foreign entities could lead to an opportunity for greater innovation. Therefore, it appears that a major perceived benefit of internationalisation to Afghan family business leaders is the opportunity to escape the low standards expected domestically, to establish legitimacy and credibility of the company and to enhance the product market reputation of the business.

From an institutional theory perspective, it is logical that Afghan family businesses seek legitimacy outside of the country in global markets as a means of escape from the institutional voids in Afghanistan. This is consistent with Scott (2001), who argues that professional standards for operations can act as a normative influence on institutions, and Selznick (1996), who finds that the adoption of best practices is a way of obtaining external legitimacy. Given that there is no institutional support for quality standards in Afghanistan, Afghan families seek security by following best practices established outside of the country, in the hopes that their products will be attractive to a global market. Where there is no institutional regulation to control Afghan family businesses' product quality, this void

is filled by co-opting global standards. Three respondents mentioned that the foreign market may be more stable or exhibit greater demand than the Afghan market; another felt that internationalisation could help develop their company's position in the global supply chain. As a business leader in the agricultural sector stated: "If the government provides us the opportunity and platform, we are willing to internationalise, as Afghanistan has better quality of vegetables and fruits. We have other traders who buy from us and export it to foreign countries."

Another interviewee identified a theme that drives the interest in internationalisation unrelated to institutional voids: national pride. Several respondents indicated that internationalisation would allow Afghans to demonstrate what their culture has to offer to the world, revealing pride in national competencies. As stated by one business leader: "The carpets of Afghanistan are famous worldwide. We already have a great demand in Europe and America. We only need to deliver the carpets to every corner of the world." Another one responded: "As you know, Afghanistan honey is one of the best ranked honey in the world; therefore, we try our best to find our place in the global market."

Our second research question assesses which institutional voids in the domestic ecosystem are viewed as critical to escape by the Afghan family business leaders surveyed. A summary of themes uncovered is provided in Table 4.

Table 4. Institutional voids promoting internationalisation according to Afghan family business leaders

External Institutional Voids (outside of the control of the family)	Number of responses	% of Firms Identifying the Challenge
Security	10	66.67%
Lack of government support	9	60.00%
Corruption/the mafia	9	60.00%
Lack of resources	8	53.33%
Infrastructure	7	46.67%
Import substitution	3	20.00%
Instability	3	20.00%
Limited domestic market	3	20.00%
Poverty	1	6.67%
Social limitations related to gender	1	6.67%
Internal Challenges (In family business)		
Access to capital	10	66.67%
Lack of partner	5	33.33%
Knowledge/Skilled labour	2	13.33%
Inappropriate tax payment systems	2	13.33%
Ability to meet international quality standards /Technology	2	13.33%
Lack of experience	1	6.67%
Lack of interest/Resistance from management team	1	6.67%

Source: own study.

The institutional voids that Afghan family businesses face are related to the lack of security, resources, and infrastructure, alongside corruption. The most common theme was physical security, with 60% of surveyed business owners expressing worries re-

garding safety, especially in the provinces. This is consistent with the image of the Afghanistan as a highly fragmented, tribal, war-torn nation that continually faces internal uprisings and routine suicide bombings.

Related to security, the primary concern of most of the surveyed business leaders is the value the company's success brings to the family and – as a result – the family business leaders are concerned about the security of their family members. For this reason, they hesitate to include their family members in the businesses, where they face many hardships and security problems. These companies are willing to increase their value through geographic expansion, but this is risky when expansion even internally, to other provinces, can be deadly. One of the participants, Malika, who is the owner of a construction and road design company, mentioned that many projects are revoked due to the contingencies caused by security concerns in the provinces. They perceive that these problems would be mitigated in environments with greater security.

Another common theme was the warlord economy, which has filled the voids abandoned by legitimate sector functions of the state, popularly known as the Mafia. Nearly all of the businesses cited the Mafia and official corruption as a problem at home driving international expansion, while corruption was documented nearly as often as security concerns. A business leader in the soya/flour production sector stated that, "The existence of the Mafia, ministerial corruption, security issues, and the lack of lending agencies is a huge obstacle in front of Afghan businesses." Afghan family business leaders reported "being choked by the Mafia and ministerial corruption." According to Abdul, family business leader of a construction and engineering firm, his family's intention to internationalise arises from a variety of limitations in Afghanistan: "Regarding the limitations in the local environment, the huge challenges we face are disloyalty at work, administration corruption, security issues, and poverty; security and instability are the major reason for the failure of family-owned businesses here."

Corruption is the major obstacle behind the failure of economic development of the country, and one of the main reasons for corruption in business in Kabul is the centralised system used in many of the ministries, which creates barriers for businesses who lack supporters in the ministries to obtain funding and expand their business. This is consistent with the findings of Mashal (2014) of the Small and Medium Enterprises Development and Regional Trade Agency in Afghanistan, who documents that – for SMEs – the mafia and corruption are one of the major challenges for the SMEs. Mashal states that, "For Afghan traders, challenges related to transportation, border transit, and corruption at customs and taxation offices impede growth."

Corruption in Afghan businesses impacts the quality of work, and results in the lack of motivation to develop beyond the immediate local market, not to mention expand into foreign markets. Most of the businesses interviewed revealed that the foundation of the corruption in businesses appeared in the government sectors, and this corruption instils Afghan entrepreneurs with a sense of futility and hopelessness. Indeed, Afghanistan ranks number 169 out of 175 countries, as one of the worst countries in the world in terms of corruption based on Transparency International's Corruptions Perceptions Index.

Related to corruption and the Mafia are unethical practices in the process of bidding on projects. Specifically, construction related companies had problems with unethical competition in the construction businesses; many of the companies were concerned with

uneven competition because of self-dealing through private relationships with governmental authorities or officials who support them indirectly. When asked about constraints for her business to be successful in the local market that could be overcome through internationalisation, one of the construction business owners, Malika, answered: "The unethical competition between companies is the major problem restraining our company to be successful in bidding for projects and getting new projects for the purpose of success and company's retention in the market."

The lack of access to resources was also identified as a major concern, consistent with Arregle *et al.*'s (2017) meta-analysis of family business internationalisation. Although, for Afghan business leaders surveyed in this study, the resource constraints are external to the firm, not internal to the family. While Afghanistan has become dependent on aid from international organisations and donors, the decline in global development funding deepened since 2014, while government support became the focal point of businesses who expect government to assist with businesses expansion, growth, and stability. Many of the interviewed businesses exhibited resentment towards the government, because of its lack of interest and attention to the needs of family businesses. Considering challenges as a whole, 60% of the surveyed businesses had concerns about the lack of government support due to which they were unable to achieve their business goals. Some interviewees hoped for assistance from the Afghan government and Afghan embassies in different countries to help them establish networks with foreign business leaders.

Resources are one of the main drivers of the business and, in Afghanistan, most of businesses are forced to import resources from neighbouring countries, which can be financially inefficient due to high supply costs and the low quality of materials. Due to decades of wars in Afghanistan, access to many resources declined, especially in the agriculture products, one of the major strengths of Afghan production. Nasrat and Karimi (2016) explain the major challenges the carpet industry faces that affect the industry's stability in the economic market of Afghanistan: "Only 40% of domestic raw materials (e.g. wool) are used in carpet weaving. The remaining raw materials are imported from countries such as Iraq, New Zealand, Belgium, Saudi Arab and Pakistan".

Among the surveyed business leaders, over half cited resource limitations and the inability to obtain raw materials and other financial resources within Afghanistan as factors encouraging internationalisation. The leader of a successful family tailoring business, Nasir, mentioned that his family must import fabrics from the neighbouring countries such as Iran, Turkey, and Pakistan, because Afghanistan lacks domestic fabric production, despite having a more developed agricultural sector. Mohammedd Ilyas Faizi, whose company imports medicines and medical equipment from the Western countries, also had concerns regarding domestic resources. These problems could be resolved by operating in neighbouring countries, where the Mafia does not control imports or levy bribes on importing companies.

Another documented institutional void is related to infrastructure. Afghanistan lacks a sufficient amount of electricity due to the uneven conditions and prolonged war. SMFEs face a lack of power, water, sewerage, and waste disposal. Sumaya Rezaie, who is an entrepreneur of a bakery for industrial breads, says that, "The big problem we face is security, the second one is that government doesn't have any facilities for entrepreneurs like land, water, or electricity." The electricity problem exists not only in the capital city of Kabul but is severe in other provinces, including the major cities of Mazaar, Herat, and Jalalabad.

In other words, internationalisation offers a means of escape from the domestic environment: escape from poverty, instability, corruption – as one would expect – but also from the low standards of life and weak physical, technological, and human capital infrastructure. However, while internationalisation may be of great interest to family businesses, planning to do so may be a luxury they do not have, because survival, or stability, must be the top concern of Afghan family business leaders, unless they perceive cross-border activity can contribute positively to the success of the business and their family. As a result, this hardship appears to generate even greater commitment of Afghan family business leaders. 90% of the business leaders in this study revealed plans that focus on business stability, developed with the use of resources available in the family, which they felt could be implemented through internationalisation. As Sherman (2018) states, internal business environment and challenges are such that influence business operations and expansion, while external environment factors and challenges are such over which businesses have little to no control. This analysis found that external institutional voids are more frequently mentioned by family business leaders as reasons to internationalise than internal challenges in the business.

Our third research question addresses the preferred internationalisation process by Afghan family business leaders. As previously mentioned, three of the fifteen business leaders have foreign operations. Moreover, five of the fifteen business leaders already have a potential or existing foreign partner in a culturally similar country, with whom they discussed establishing cross-border activities – generally in Pakistan and Iran – to ultimately establish extensive joint business operations. For thirteen of the surveyed firms, culturally similar countries like Iran or Pakistan were cited as the most likely location for the expansion, if the firm internationalised. Of the Afghan business leaders who stated that they intend to internationalise, most expressed keen interest in working with a foreign partner and in establishing relationships with foreign entities for the purposes of business development and trade, in part to compensate for the deficits in human capital resources identified by Arregle *et al.* (2017) as barriers to internationalisation. One of the responses was: "I would prefer to first proceed stepwise to neighbouring countries, due to the lower level of risk if the business fails."

Table 5. Desired internationalisation strategies

Strategy	Number of firms reporting strategy as ideal	% of firms reporting the strategy as ideal
Staged Internationalisation	5	33.33%
Network strategy (alliance/JV)	5	33.33%
Born Global	2	13.33%
Export	1	6.67%
M&A	1	6.67%
Office/Branch	0	0.00%
Unwilling to internationalise at this point in time	3	20.00%

Source: own study.

Around 33% of other business leaders indicated that they prefer to internationalise using network models (see Table 5). First developed by Johanson and Matsson (1988), the network model argues that the firm develops relations with international companies to achieve organisational goals and objectives in the foreign market. This networking will help

firms remain stable in the new market and to more easily access target market information. As one business owner said: "Before internationalising, we should build relations with other companies, we should know where are we investing, and we should analyse whether we can get profit and be stable in the foreign market or not." Another business owner stated that: "First we must plan a joint venture with a company outside of our country to acquaint ourselves with global standards of production and, then, we try that the company certified from international agencies and hand international business permit. What is more, our company is trying to forecast some cost for attending international business training to consider demand of target market."

Considering possible globalisation strategies, another family business leader argued that a local partner in a joint venture would be helpful to obtain knowledge of the local market: "The first challenge in our way is to find a good market for investment, then we will find a local partner who will be familiar with the local market and establish a joint venture with them."

The sample also contains two born global firms, who internationalised their business shortly after starting their operations. One of largest tailoring companies in Kabul, Poshak Istanbul, internationalised to Iran and Turkey. First, it started its operations in those countries and then internalised by starting its operations in different branches in Kabul. On the other hand, one of the surveyed entrepreneurs chose to internationalise through a stagewise process even though she preferred to be a born global. However, she recognised that – as an early entrant – the probability of success for her internationalisation are very low, unless she could quickly develop the required competencies on her own. The surveyed entrepreneurs had knowledge and interest in a variety of global expansion strategies, and they appeared to exhibit intimate knowledge of the requisite skills for specific internationalisation strategies, thus reinforcing the importance of personal dialogue with entrepreneurs in academic entrepreneurship and international business research.

To summarise, this study assessed the institutional voids that promote internationalisation of Afghan family business leaders, about which little has been published, despite the 100 billion USD in foreign aid for security and economic development over the past decade. Thus far, it appears that supranational entities were very active in "doing something" to improve living conditions in Afghanistan, but this has not translated into tangible benefits for Afghan family business owners, possibly because no one has endeavoured to ask family business owners what kind of support they actually need to internationalise.

We found that, consistent with Claver, Rienda, and Quer (2009), Afghan SMFE owners are greatly interested in internationalisation and perceive many benefits in terms of improvement in product quality and establishing reputational capital in foreign markets. In a sense, this finding is interesting, because it indicates that – when the home country market is so inhospitable – the desire for internationalisation overcomes the perceived trade-off of dilution of family control. This contradicts non-conflict family business situations examined by Arregle *et al.* (2017), which indicate that family-owned firms prefer not to involve non-family resources, even if it results in suboptimal outcomes. Moreover, family business leaders express optimism regarding the potential of cross-border partnerships in culturally and linguistically similar neighbouring countries, which agrees with the findings of Antoncic and Hisrich (2000). In other words, consistent with Gomez-Mejia *et al.* (2007), there are geographically determined constraints imposed on Afghan family businesses by non-existent,

inefficient, or perversely incentivised institutions, from which internationalisation is a means of escape. Moreover, our results agree with Schoppa (2008). In fact, given the warlord economy described by Sanders and Weitzel (2013), growth in the home country market may be perceived as a threat to the economic and political power of Afghanistan, supporting the conjecture that internationalisation has additional value to conflict zone family businesses.

However, family businesses often lack the human capital resource base to internationalise, thus making foreign operations and partnerships appear risky. This partly yields to some hesitation on behalf of family business leaders regarding internationalisation, who argue that more support from outside of the family is required for them to engage in cross border operations. This finding agrees with Graves and Thomas (2008). Future research could address entrepreneurial intention in a more comprehensive manner. However, the environment for entrepreneurship in Afghanistan is so weak that many entrepreneurs depend on their businesses for survival, which is continually threatened, resulting in emotional fatigue and risk aversion. They do not have the opportunity to bring in foreign investors or professional managers, as companies examined in the West do (see e.g. the discussion regarding German family-owned firms in Calabrò *et al.*, 2017). They overwhelmingly cited corruption at all levels of institutions, the lack of personal security, and the lack of government support as the key barriers to expanding across borders. Furthermore, they lack the external institutional framework that exists in the developed world, including an adequate physical infrastructure, personal security, and access to financial resources to feel comfortable in their endeavours. Moreover, they also lack the internal infrastructure for internationalisation, including liquidity/financial constraints, knowledge about foreign firms, skilled labour, and face disincentives from the tax payment system in Afghanistan.

As stated by IFERA (2003), opportunities for internationalisation of SMEs, including family businesses (or SMFEs) can strongly influence a country's GDP. On the other hand, the deterioration conditions facing the SMFEs could negatively affect the country's income. Identifying strategies for SMFE internationalisation is of great importance, as Afghanistan requires a strong economic foundation for development.

Arregle *et al.* (2017) argue that factors such as resources internal to the family and trust of foreign entities impact internationalisation strategies. They observe that family-owned firms avoid obtaining resources external to the family. In the case of the Afghan environment, trust has been continually undermined to the point that tribalism predominates, and the Mafia seeks to propagate unrest among ethnic and religious groups in order to retain its grip on resources and power. Accordingly, we find that resource deficits are cited by most Afghan SMFE owners as a significant barrier to internationalisation. Therefore, a theoretical extension of conflict zone family entrepreneurship theory could draw in the scarcity of resources that exist in these environments and domination of family interests by warlord entrepreneurs.

Our results are not generalisable to only Afghan SMFEs. Much of the world survives in conflict-driven environments with high rates of poverty and low educational levels, where the SMFE is the predominant organisational form. In order to promote economic growth and development of these countries, including Afghanistan, it is useful to have first-hand narratives regarding perceived barriers to the development of international markets by SMFEs.

CONCLUSIONS

Institutional theory yields explanations for organisational behaviour not explained by standard economic theory (DiMaggio & Powell, 1991). Realistically, from an institutional theory perspective, organisational behaviours will remain in place to support the warlord economy and little will be done to address the development of entities of commerce through the resolution of physical security considerations, the resolution of widespread corruption, or the establishment of democratic processes in Afghan political environment. Kabul will remain the "city of concrete blast T-walls." The institutional landscape is likely to remain incomplete or co-opted by perverse incentives, as the Allied forces that currently support Afghan security withdraw, and the security landscape will likely worsen. Rent-seeking by public officials is the norm, and there is no incentive to change.

To escape these terrible operating conditions caused by vast institutional voids, Afghan family-owned firms require the support of structures internal to the family: loyalty, trust, and socioeconomic wealth objectives. While for some family-owned firms, constraints on financial capital and human capital resources – such as professional management – may restrict their ability to internationalise, many family-owned businesses in the West have not needed to develop the resilience that their conflict zone counterparts have, as they do not confront suicide bombings, famine, "disappearances," and blackouts in the ordinary course of business.

Our findings indicate that – despite a scarcity of professional management resources – Afghan family business leaders are highly interested in using internationalisation to escape from the institutional voids they face in the local environment. Furthermore, common themes regarding legitimacy in global markets and national pride underscore sampled business leaders' desire to internationalise. Our study extends the literature relating to institutional theory by describing the institutional voids that push conflict zone family businesses to internationalise, but also a non-economic explanation of the hurdles conflict zone family business leaders face in warlord economies, such as corruption, security concerns, and the chronic lack of resources in poor and aid-reliant countries like Afghanistan. Furthermore, we extend the family business literature by indicating that the majority of conflict zone family business leaders who expressed the interest in internationalisation believe that the appropriate way to proceed with internationalisation is to follow a stepwise process, so that one can draw upon both strengths inherent to the family and also engage in organisational learning through relationships with family businesses in the higher institutional quality of neighbouring countries with similar cultures.

For the donor community or supranational entities that operate in Afghanistan, it is essential to understand how capital can effectively be deployed so that there is some hope for these SMFE owners to expand their markets. Based on Bullough *et al.* (2017), the damaging psychological impacts of war on entrepreneurial intention can be mitigated to the extent that entrepreneurial resilience can be cultivated through entrepreneurship training. Where internationalisation can begin is with development assistant directed at the development of human capital, in the local language, brought directly to the leaders of family businesses. Such human capital development should include training for employees regarding efficient production, and for business leaders regarding educational resources related to professional management in business disciplines. Secondly, production requires investment in power and

technology, so donor funds could perhaps be allocated towards purchasing generators and modern business equipment along with training to use this technology. Moreover, if the security situation deteriorates, collective funding for private security shared by several SMFEs in the same geographic area may be of use. From this starting point of basic business literacy, SMFE leaders can then begin the process of establishing long-term plans related to the development of a foreign market entry strategy.

Our research contains several limitations. One of the challenges was the unavailability of appropriate data, as there are very few studies done on the internationalisation of SMFEs in Afghanistan. Due to the lack of secondary data, we use qualitative data analysis to learn from the experiences of Afghan SMFE managers. Data collection and interviews were very challenging due to the uncertainties related to unfavourable security conditions. Obtaining more detailed information was also difficult due to time limitations and busy schedules of the family business leaders. The study has only been conducted based on the businesses in Kabul city; they may differ in other cities.

We hope this will be a starting point for subsequent research on the internationalisation interests, strategies, and outcomes of conflict zone family businesses beyond the Afghan environment. Given that an estimated one in six children in the world today is growing up exposed to violent conflict, an understanding of the psychosocial processes underlying family business in war zones is important. Future research could uncover the dynamic between resilience and family business outcomes in conflict zones or explain how family businesses in conflict zones leverage family resources to internationalise successfully. What would also be useful would be the understanding of the dynamics in family businesses in supporting the process of recovering from "institutional forgetting" through the exposure to new ideas offered by internationalisation. Finally, an understanding of how family-owned businesses can contribute to peacebuilding efforts is relevant to the conflicts in Syria, Sudan, Yemen, and Iraq.

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The Use of Evolutionary Algorithms for Optimization in the Modern Entrepreneurial Economy: Interdisciplinary Perspective

Marek Sieja, Krzysztof Wach

ABSTRACT

Objective: The objective of the article is to present the concept of evolutionary algorithms and indicates the possibility of their implementation for the needs of the economy, especially the entrepreneurial economy.

Research Design & Methods: This conceptual article relies on literature review and desk research. The article elaborates on available literature via a systematic literature review methodology.

Findings: The article elaborates on the idea of action and typology of evolutionary algorithms as the broadly applied search and optimisation technique based on Darwin's theory of evolution and modern natural genetics. The article focuses on the examples of evolutionary algorithms application in economics and management.

Implications & Recommendations: The current state of applications of evolutionary algorithms for the needs of the economy and business confirms that we still await an implementation breakthrough. The growing interest in evolutionary algorithms in connection with the dynamic development of information technologies may lead to the use of evolutionary algorithms in hybrid systems, which in turn will contribute to significant progress in optimization theory.

Contribution & Value Added: The article structures scientific knowledge on the application of evolutionary algorithms in business and economy. The promotion of the application of evolutionary algorithms in economics, finance, and management is mainly limited to journals in operational research, decision-making process, or financial engineering, whereas this article includes entrepreneurship.

Article type:	conceptual article
Keywords:	evolutionary algorithms; genetic algorithms; computational techniques; optimization techniques; entrepreneurial economy
JEL codes:	C63, C65

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INTRODUCTION

Knowledge-based economy or entrepreneurial economy (Wach, 2015), especially various drivers of entrepreneurial activities in the entrepreneurial society (Zygmunt, 2018; Rogalska, 2018; Zajkowski & Domańska, 2019), and the intensive and turbulent development of information technologies (Köppelová & Jindrová, 2017; 2019) increased the popularity of the application of the latest achievements in the field of artificial intelligence (Wiśniewska, Lula, Oczkowska, & Wójcik, 2019). Current scholarship shows high interdisciplinarity and convergence of individual scientific disciplines. For example, earth and life sciences utilise game theory developed within economics, technical sciences seek inspiration in the theory of evolution developed by biologists, and economics draw on the theory of chaos elaborated by physicists. Knowledge receives support from artificial intelligence, whose application accelerates the progress of research (Kožíšek & Vrana, 2017) and the modern business practice (Khan *et al*., 2017), and what is more, such aplications can be named distruptive innovations (Benazzouz, 2019). A good example of the practical use of artificial intelligence are evolutionary algorithms. These are widely used in many fields of science, primarily in pragmatic engineering and construction issues, or managerial and investment decisions, but also in marketing (Hurley, Moutinho, & Stephens, 1995). Evolutionary algorithms (EG) gain popular in matters of optimization in the field of economic sciences: economics, finance, management (Deb, Pratap, Agarwal, & Meyarivan, 2002). EG are used in operational research and financial engineering, in which quantitative methods are key (Mukerjee, Biswas, Deb, & Marhur, 2002). EG gain importance in view of the development of Big Data (Batistic & van der Laken, 2019) and Industry 4.0, including the development of blockchain technology (Wyciślak, 2017; Nowiński & Kozma, 2017; Ilyash, Dzhadan, & Ostasz, 2018; Prokop & Karbowski, 2018).

The current article presents the idea of evolutionary algorithms and indicates how can we implement them in the economy, especially the present knowledge-based economy. The article poses the following exploratory research questions:

RQ1: How do evolutionary algorithms work from a computational – mathematical and engineering – standpoint?

RQ2: What are the pros and cons of using evolutionary algorithms to optimize economics, finance, and management?

RQ3: What are the current and potential fields of application of evolutionary algorithms in economics, finance, management, along with – especially – entrepreneurship and international business?

This conceptual article relies on literature review and desk research. The article elaborates on available literature via a systematic literature review methodology. The article consists of three parts. The first will describe the research methodology, including the principles of selection of reference sources. The second, main part will undertake a conceptual review of the literature and proposes answers to the three research questions above. The third, final part will summarise the article and outline further research directions.

MATERIAL AND METHODS

The article elaborates on available literature and online sources. We searched through secondary literature with a combination of two screening terms "evolutionary algorithms" and one of the possible uses described in the article: "finance," "economics," "management," "marketing," or "business." This article uses a qualitative design of research based on cause-effect analysis, along with predictive synthesis, modelling, induction, and description of the synthetic and systematic literature review (Figure 1).

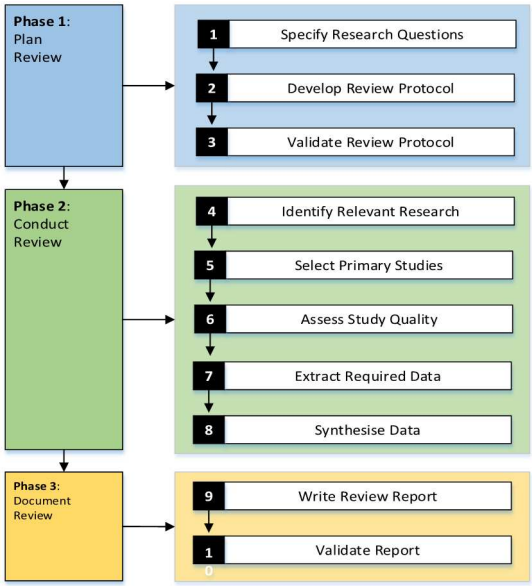

Figure 1. Methodology of the systematic literature review
Source: Brereton, Kitchenham, Budgen, Turner, & Khalil (2007).

Smooth and efficient conducting of scientific research requires a procedure according to pre-determined steps in order to obtain the most valuable cognitive effects of the research process (Babbie, 2012). The nature of the research project is multidimensional, it realises exploratory, descriptive, analytical, and predictive purposes (Collis & Hussey, 2009). The thorough literature study was prepared in order to conceptualise and operationalise the research problem. Therefore, the main research method was literature review and its constructive critics, a critical literature review proposed by Fisher (2010).

LITERATURE REVIEW AND CONCEPTUALIZATION

The Operational Principle of Evolutionary Algorithms (RQ1)

EAs are a type of heuristic methods based on Darwinian theory of evolution (Lichy, Mazur, Stolarek, & Lipiński, 2018). Thus, we may define EAs as a transposition of the Darwinian metaphor into a stochastic search and optimization algorithm that uses advanced mathematical operations.

To understand how EAs work, it is best to refer directly to Charles Darwin's theory of evolution. The mechanism and course of biological evolution is based on the following five assumptions (Hurley, Moutinho, & Stephens, 1995; Sieja & Wach, 2008):

- limited resources: individuals must compete for the same environmental resources,
- fitness: some features are more desirable in the competition for environmental resources, hence specific features give individuals the competitive advantage in a certain environment,
- heredity: individuals inherit the features of their ancestors,
- variation: the heredity process is not accurate but fraught with changes that can take the form of mutations (primary variation) and recombination i.e. crossover (secondary variation), caused by natural selection, genetic drift, or the level of gene flow,
- natural selection (survival of the fittest): more adapted individuals to an environment have a better chance of surviving and producing offspring than the less adapted individuals.

To elaborate on Darwin's theory of evolution, let us add that a specimen means a genotype with an appropriate genetic code and features identical with genes; i.e. the genotype consists of chromosomes and the chromosome consists of genes. Particular individuals have a certain characteristic set: a phenotype. According to the theory of evolution, if only the fittest specimen survive then particular specimen strive to fit the best, which is possible by acquiring the best features. Therefore, specimen seek the best features in other specimen, so that – in the case of inheritance – the new specimen would fit better to the environment. Through heredity, there occur mechanisms called genetic operations (Sieja & Wach, 2008):

- mutation, i.e. random variation that leads to the emergence of new genotypes due to perturbation one of the parent specimen,
- crossover, i.e. a recombination of existing genes, which is the reason for the persistence of genetic diversity,
- inversion, which changes a fragment of the chromosome.

These operations appear along with various phenomena, e.g. natural selection, which favours or eliminates certain genotypes; isolation, which hinders the crossover of specimen; genetic drift, or oscillation in gene frequency in small, isolated populations; a sharp change in environmental conditions.

EAs borrow the vocabulary of natural genetics, so the above synthesis of natural phenomena allows us to present the idea of EAs. The concept of evolutionary problem-solving stems from the regularity that a population of individuals (instead of specimens) is subject to subsequent evolutionary steps, as they are also candidates for solving a task. Each individual represents a potential solution to the problem. Each one may receive a numerical value that determines its fit to the environment, i.e. the quality of the individual's solution. The evolutionary process corresponds to the search for a space of potential solutions which, on the one hand, employs the best solutions so far and, on the other hand, broadly explores the searched space (Shvedovsky, Standrik, & Bilan, 2016).

The operation of the EA boils down to an operation loop (Figure 1) that includes reproduction (preselection), genetic operations (crossover, mutation), evaluation, and succession (postselection; Arabas 2004; Goldberg 1989).

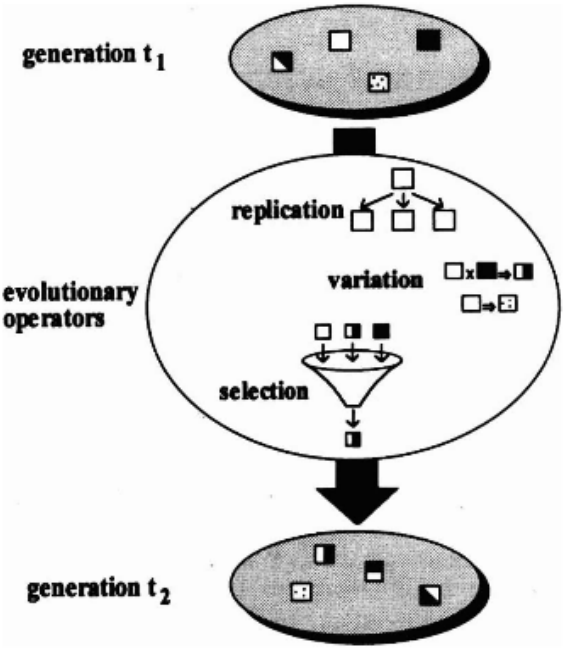

Figure 2. Operational cycle of a basic evolutionary algorithm
Source: Biethahn and Nissen (1994, p. 184).

We randomly select individuals from the base population during reproduction, with the randomness of selection for reproduction accounting for the fitness value of these individuals, which means that better fitting individuals are more likely to reproduce. Some individuals may reproduce many times, while other will not be selected for duplication even once. In this way, a new (temporary) population emerges from the selection of better fitting individuals (Michalewicz & Fogel, 2003).

We then subject copies created as a result of reproduction to genetic operations: crossover and mutation. Some transform under differentiating operators, which creates new solutions. Individuals created as a result of genetic operators constitute the descendant population. Crossover consists of randomly matching strings from the base population in pairs and then crossover them, i.e. swapping places in both elements of the pair, thus creating two new strings that are part of a new generation. In turn, mutation consists of sporadic, accidental change in the value of the code string element.

Next, the descendant population undergoes the assessment of the environment: the fitness indicator plays the target role in this case. Thus, the fitness function is a measurement of profit, utility, or other quantity that we want to maximize (Goldberg, 1989). As a result, there occurs succession, i.e. a new base population emerges that may contain individuals from both the descendant population and the old base population.

Scholars know two varieties of selection: reproduction and succession. The former assumes that the new base population emerges exclusively from the descendant population. The latter chooses from both the descendant population and the best individuals from the

base population. Reproduction can be conducted in many ways: proportional (roulette) reproduction, modified proportional reproduction, tournament reproduction, threshold reproduction. The same applies to succession: elitist succession, succession with complete replacement, succession with partial replacement (Arabas, 2004, pp. 114-134).

The above operations create evolution loops, in which the EA is executed cyclically (in a loop) until the algorithm stop criterion occurs (stop conditions). The algorithm may stop in two situations:

- the adaptation of individuals is large enough, i.e. a certain number of solutions are generated,
- the state of the base population indicates a stagnation of the algorithm, i.e. a certain period of time is exceeded.

There are many types of EAs. However, it is difficult to talk about their classification – only cite some typologies. Currently, we distinguish (Michalewicz & Fogel, 2003; Arabas, 2011):

- genetic algorithms,
- genetic programming,
- evolution strategies,
- evolutionary programming,
- classifier systems,
- differential evolution,
- memetic algorithms.

A recent use and compilation of various multi-objective evolutionary algorithms – especially genetic algorithms – appears in Deb (2001) and Coello (1999).

Genetic algorithms (GAs) are search and optimization algorithms inspired by the principles of natural evolution. According to the specifics of genetic algorithms, searching for the optimal value occurs in three steps (Arabas 2011; Goldberg 1989; Michalewicz, 1996): (1) reproduction, (2) crossing, (3) mutation.

In the first stage of work of GA an initial population, comprised of an even number of chromosomes, is selected (Table 1). Each chromosome comprises of detectors. The number of detectors represents the number of switchings in case of a signal with one constraint, or the number of peaks T of the triangular signal.

Table 1. Population of chromosomes and adaptation coefficient for each chromosome

Chromosome	Detectors					Adaptation coefficient
	1	**2**	**3**	**…**	***r***	
1	n_{11}	n_{12}	n_{13}	…	n_{1r}	$\tilde{I}_1$
2	n_{21}	n_{22}	n_{23}	…	n_{2r}	$\tilde{I}_2$
3	n_{31}	n_{32}	n_{33}	…	n_{3r}	$\tilde{I}_3$
…	…	…	…	…	…	…
m	n_{m1}	n_{m2}	n_{m3}	…	n_{mr}	$\tilde{I}_m$

Source: Tomczyk (2006, p. 97) and Sieja (2010 p. 84).

The value of index (2) is determined for every chromosome and then the so-called adaptation coefficient – the percentage participation of each chromosome in the value

of summarised criterion – is calculated on the basis of the obtained results and on the basis of the relation (1):

$$\begin{gathered} \tilde{I}_s = \tilde{I}_1 + \tilde{I}_2 + \tilde{I}_3 + \ldots + \tilde{I}_m \\ \tilde{I}_1{}' = {\tilde{I}_1}\Big/{\tilde{I}_s} \cdot 100[\%] \\ \ldots \\ \tilde{I}_m{}' = {\tilde{I}_m}\Big/{\tilde{I}_s} \cdot 100[\%] \end{gathered} \tag{1}$$

where:

$\tilde{I}_s$ - is the value of summarised criterion;

$\tilde{I}_1', \tilde{I}_2', \ldots, \tilde{I}_m'$ - represent the percentage participation of the particular adaptation coefficients in the summarised criterion.

The determination of adaptation coefficients for each of the chromosomes leads to estimating their usefulness in the particular population. In case, when the differences between obtained values of the adaptation coefficients are small, it is necessary to conduct a scaling operation of the adaptation coefficient, as the following steps of the work of the genetic algorithm might not give the desired results. In this work, we apply the very popular linear scaling.

In the next step, the reproduction operation was executed, in which – according to the probability calculated from (1) – the chromosomes are selected from the initial population set. Depending on the value of the adaptation coefficient, a particular chromosome has smaller or greater chances of selection to the next generation. There are several methods of calculating those "chances" for particular chromosomes. The most popular method is the roulette wheel method, which means that the sampling process is conducted the number of times equal to the number of chromosomes in the population while the sampling results are transferred to the new, descendant population. All chromosomes are characterised by a different probability of selection, proportional to the value of the adaptation coefficient. Thus, the reproduction procedure creates a new population of chromosomes.

The next stage is crossing. From the fact that detectors assume the form of real positive numbers, one may derive that if one pair of chromosomes takes part in the crossing process then all pairs of detectors are crossed. The chromosomes are paired coincidentally. The number from the [0, 1] interval is sampled for the assumed crossing probability P_c. If the sampled number is from the [0, P_c] interval, then the crossing process occurs. Otherwise, the corresponding detectors of the associated chromosomes are not crossed. The crossing P_c is usually set at a high level, around 0.9.

The crossing process is conducted in accordance to the following formula (Tomczyk, 2006; Layer & Tomczyk, 2010):

$$\begin{gathered} n'_{11} = (1-\alpha)n_{11} + n_{21} \\ n'_{21} = \alpha n_{11} + (1-\alpha)n_{21} \end{gathered} \tag{2}$$

where:

n'_{11} - is a detector of the first descendant chromosome;

n'_{21} - is a detector of the second descendant chromosome.

The α coefficient has to be selected in such a way, that the crossing process does not cause descendant detectors on i-th position to assume values greater than the detectors in position $(i+1)$ and lower than detectors in position $(i-1)$.

The last stage of the GA operation is the process of mutation. In the case of every detector that are part of the descendant chromosomes, we ask whether the mutation process or will not happen. This process is usually conducted with a very low probability; usually at the level of 0.01.

Often encountered variation of the mutation process is linear mutation, conducted with the use of the following formula (Tomczyk, 2006; Layer & Tomczyk, 2010):

$$n_{1r}^{''} = (n_{1r+1} - n_{1r-1})\alpha + n_{1r-1}' \qquad \alpha \in <0,1>, r = 1,2,\ldots,m \tag{3}$$

after completing the mutation process, the genetic algorithm process repeats. The number of populations of the algorithm that realises the search in the space of $x(n)$ signals will be as large as possible. However, one should consider that – for a larger population – the time of work of the algorithm extends significantly.

The Pros and Cons of Using Evolutionary Algorithms (RQ2)

The practical implementation of EAs dates back to the 1950s, while most assume that the use of the evolutionary process model in computational methods begins with the 1975 work of John Holland, *Adaptation in Natural and Artificial Systems* (Holland, 1975). Currently, evolutionary algorithms experience their heyday, which can be demonstrated by the rapid increase in publications in this field.

Jones, Mirrazavi and Tamiz (2002) indicate that the research progress in the implementation of EAs is significant yet partial, because the progress of information technologies we currently face contributes to the development of increasingly advanced solutions based on EAs.

EAs differ from traditional optimization methods due to the following features (Biethanh & Nissan, 1994, p. 185; Goldberg, 1989, p. 23):

- they operate on a vector that represents decision variables (task parameters) as code strings (they do not directly process task parameters, but their encoded form),
- they search the entire space, simultaneously seeking solutions from many vantage points (they conduct searches from a population of individual points),
- they do not require detailed knowledge about the nature of the problem but only information about the quality of solutions (their match; though such knowledge may contribute to faster implementation), because they only use the objective function, not its derivatives or other auxiliary information,
- they intentionally use stochastic processes to narrow down intelligent search space research to the most promising regions of search space (they use probabilistic rather than deterministic selection methods).

The use of EAs as an optimisation technique has many advantages (Table 2). EAs are even referred to as last resort methods (Arabas, 2004, p. 20).

Table 2. Main advantages and disadvantages of EA as an optimisation method

Advantages
- robust, broadly applicable technique; - reliable, well suited for high dimensional, complex search spaces; - relatively easy to develop and implement; - no restrictive assumptions about the objective function; - no prior knowledge about the search topology required; - enables multiple criteria optimisation; - flexible algorithmic design options; - easily combined with other solution methods (initialisation heuristics, local search); - efficient use of parallel hardware (inherently parallel algorithms).
Disadvantages
- heuristic character (no guarantee to reach global optimum in a limited period of time); - comparatively time-consuming (alleviated by rapid progress in hardware); - often ineffective in fine-tuning the end solution (hybridising with local search proved useful); - finding good settings for strategy parameters (e.g. crossover rate) can be difficult;

Source: Biethahn & Nissen (1994, p. 186).

The Application of Evolutionary Algorithms in Economics and Business (RQ3)

In times of knowledge-based economy, knowledge is of key importance, even if it is interpreted broadly. The application of the achievements of modern information technology currently allows the use of previously unavailable optimization techniques. Economic decisions – especially decisions of stock market players, insurers, or even managers – are made in conditions of uncertainty or risk, hence their optimization is one of the most important issues for decision-makers. The possibilities offered by EAs increased the interest in their application for the needs of economic sciences, mainly in pragmatic management and investment decision-making. Currently, we can indicate many typical possibilities of the application of EAs in economic sciences: in economics, finance, management, commodity science, and production engineering (Table 3).

Table 3. The application of evolutionary algorithms in the knowledge-based economy

Field of Use	Examples of use	Reference
Economy	- Development of the world economic model; - Resource allocation.	Johnstone (1993);
Finance and financial services	- Risk management; - Insurance risk estimation; - Credit scoring; - Determining creditworthiness; - Bankruptcy forecasting; - Late payment anticipation; - Time cycle analysis; - Financial fraud detection; - Expenditures allocation for various social programs.	Noble (1990); Margarita (1991, 1992); Burke (1993); Johnstone (1993); Nottola *et al.* (1992).

Field of Use	Examples of use	Reference
Capital markets	- Trading strategy search; - Stock trading; - Speculative stock markets; - Stock market simulation; - Portfolio optimisation; - Shares portfolio optimisation; - Stock market player model; - Financial markets modelling.	Noble (1990); Margarita (1991, 1992); Burke (1993); Johnstone (1993); Nottola *et al.* (1992).
Logistics and transportation	- Freight train routes preparation; - Wheeled vehicle routes preparation; - Aircraft landing order; - Monorail trains order.	Baker and Schaffer (1991); Thangiah *et al.* (1991); Michalewicz (1996).
Organization and management	- Work scheduling; - Telecommunication networks design; - Computer network optimisation; - School plan arrangement; - Water supply system planning.	Bruderer (1992); Biethahn & Nissen (1994).
Marketing	- Distribution of products - Learning models of consumer choice - Optimization of product-market structures - Analysis of product parity, market parity and competitive advantages	Hurley, Moutinho, & Stephens (1995); Hughes (1990).
Sales	- Inventory simulation; - Warehouse transport problems; - First print estimation; - Points of sale distribution; - Self-learning consumer model.	Biethahn and Nissen (1994).
Manufacturing and production	- Production planning - Intelligent manufacturing - Packing problems - Job shop scheduling - Production line balancing; - Lot size determination; - Production sequencing; - Storage; - Load management; - Optimisation of nuclear reactor operations - Flight simulators programming	Vancza and Markus (1991); Stevens (1993); Venugopal and Narendran (1992); Ward *et al.* (1990); Ward *et al.* (1992); Kulkarni and Parasei (1992); Dowsland and Dowsland (1992); Biegel and Davern (1990).
Others	- Facility layout and location planning	Khuri and Batarekh (1990); Tam (1992); Huntley and Brown (1991).
	- Document clustering	Gordon (1991).

Source: own elaboration based on Biethahn and Nissen (1994, p. 184), Hurley, Moutinho, and Stephens (1995, p. 42).

The prospects for applying EAs in management are highly satisfying. Both theorists and practitioners of EAs indicate a promising future of hybrid systems that achieve a synergistic effect by combining at least two EAs. For example, for the purposes of applying

EAs in economics, Biethahn and Nissen (1994, p. 189) indicate six variants of their combination with simulation methods, namely:

- decision variables regulation,
- developing model structures,
- two-step optimisation using evolutionary meta-algorithms,
- meta-model simulation,
- optimisation with an adaptive agent,
- evolutionary modelling.

CONCLUSIONS

We may say with certainty that the future of Big Data and the use of artificial intelligence in industry and business begins right now (Batistic & van der Laken, 2019; Stasik & Wilczynska, 2018). Thanks to their numerous advantages, EAs are used in many research fields; e.g. logistics, transport, finance, insurance, scheduling, sell, marketing, local and global economy. Although the EAs are already often used in economics, we may say that they are only at an early stage of development. The current state of EAs application for the needs of the economy confirms that there has appeared no implementation breakthrough yet. The growing interest in EAs in connection with the dynamic development of information technologies can lead to the use of evolutionary algorithms in hybrid systems, which in turn will contribute to significant progress in optimisation theory.

Like any scientific article, this article is not free from research limitations. It is a report from the initial stage of research, and therefore is only exploratory. We do not overview all journals and matters related to the application of algorithms in economics, finance, and management. Therefore, the next research stage should consider a much broader spectrum in the subject approach. The overview in this article answered three exploratory questions at a general level. Thus, the next research stage should account for the specific results in the literature.

The literature query and the process of logical reasoning based on the collected material allows us to outline several directions of further research. Firstly, future studies should conduct a detailed bibliometric analysis with a map of connections that will allow a classification of research areas within the application of evolutionary algorithms in economics, finance, and management. Secondly, scholars should review the application of evolutionary algorithms in two currently developing research areas: strategic entrepreneurship and international business.

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Student Enrolment and Output Effects in Poland: 2SLS and VAR Estimates

Joanna Żyra

ABSTRACT

Objective: The purpose of this article is to investigate the direct effects of student enrolment on industrial production and GDP while controlling other growth determinants such as physical capital investments and employment.

Research Design & Methods: Educational effects on output, i.e. industrial production and gross domestic product (GDP), are estimated by means of Two-Stage Least Squares (2SLS) model, vector error-correction autoregression (VAR/VEC) model, and with the application of annual data sample for the period of 1992-2017.

Findings: The study proves that there is a significant correlation between the number of students and output in Poland, especially with respect to the industrial sector. Regardless of estimators used, higher output is related to a decline in student enrolment in a long period of time. Investments in physical capital are an important factor responsible for both higher output and stronger student enrolment. Employment appears to influence neither GDP growth nor student enrolment. However, employment negatively impacts changes in industrial production.

Implications & Recommendations: In the presence of an inverse correlation between economic growth and the number of students, the author argues in favour of discreet government policies aimed at boosting student enrolment in alignment with the pattern of investment activities.

Contribution & Value Added: The article contributes to a better understanding of two-way causation between student enrolment and economic growth in Poland, with clear guidelines for educational policies aimed at a better match with demand for high-skilled labour in industry.

Article type: research article

Keywords: higher education; economic growth; 2SLS; VAR; Poland

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INTRODUCTION

The steep increase in the number of university students in Poland from ten to above 50 in the population of 1000 inhabitants in the 1990s and mid-2000s may reflect a new reality of transformation, stronger influence of international markets, or modern approaches to economic development, as earlier experienced by industrialised countries in 1970–1980 (Schofer & Meyer, 2005). However, the higher education system has been diminishing over the last decade, as the number of students has fallen by a third. Among European countries, only Italy and Switzerland have fewer students per 1000 inhabitants (Abankina & Filatova, 2015). Such a situation can be caused by an overburdening of the labour market with high-skilled workers. Furthermore, the accumulation of human capital is of concern, especially in the context of the so-called middle-income trap that Poland is approaching (Zaremba, 2018).

Theoretically, higher education contributes to economic growth both directly – as implied by endogenous growth models (Lucas, 1988; Romer, 1990) – or indirectly, as it creates better opportunities for applying new technologies (Nelson & Phelps, 1966). Moreover, economic growth can be stimulated by positive externalities, such as technology and productivity spillovers in the labour market (Hermannsson, Lisenkova, Lecca, McGregor, & Kim, 2017).

Numerous empirical studies analysed the causal correlation between higher education and economic growth only to produce conflicting results. Likewise, it is unclear what factors contribute to the worldwide expansion of higher education. Earlier studies show that economic development positively influences enrolment, but the effect is not significant if scholars control secondary enrolments (Schofer & Meyer, 2005). A study in the expansion of higher education in five countries – Germany, Italy, France, the USA, and Japan – in 1870-1985 does not support the human capital theory while favouring the 'status competition,' which implies an particularly fast increase in the number of students during economic recession (Windolf, 1992). Regardless of possible explanations, there is evidence that the correlation between investments in education and economic growth results from reverse causality (Bils & Klenow, 2000).

The aim of this article is to estimate direct effects of student enrolment on industrial production and GDP, while controlling other growth determinants, such as physical capital investments, employment, and the likely reverse causality between the number of students and growth. Despite thorough discussion of the topic – especially in the context of the higher education reform in Poland – for example by Marklund *et al.* (2017) or Kot and Slusarczyk (2014), empirical studies of educational effects on output (GDP and industrial production) are still in short supply. Compared to earlier studies by Shevchuk and Zyra (2012), Nowak (2016), Simionescu, Lazányi, Sopková, Dobeš, and Balcerzak (2017), or Gradzewicz, Growiec, Kolasa, Postek, and Strzelecki (2018), our present study is distinguished by the use of both Two-Stage Least Squares (2SLS) and vector error-correction autoregression (VAR/VEC) models in a comparative context in order to empirically estimate the two-way causality between economic growth and the number of students in Poland. Our key results show that there is a positive role of higher education in the economic growth in Poland, while there is a negative lagged link between economic growth and the number of students. The rest of the article is

organized as follows. Section 2 reviews relevant literature. Section 3 presents description of the data and methodology applied. In Section 4, the empirical results are discussed. The final Section 5 provides conclusions.

LITERATURE REVIEW

Most empirical studies indicate that higher education is one of the components of human capital that leads to economic growth, even though particular mechanisms may be considerably heterogeneous.

A recent study of growth determinants in the euro-area countries for the period of 1950–2011 by Barcenilla-Visús and López-Pueyo (2018) provides reliable evidence for significant direct and indirect effects of human capital on the process of total factor productivity (TFP) growth. The number of unskilled workers boosts imitation-led activities in the EU countries while highly qualified employees are essential for growth through innovation. Such findings seem to contradict arguments proposed by Benhabib and Spiegel (1994), who state that positive human capital growth effects are much stronger in the richest countries, while the effect of catching up dominates in poorer countries. Similar conclusions appear in several other studies, for example, Petrakis and Stamatakis (2002) or Vandenbussche, Aghion, and Meghir (2006). However, Krueger and Lindahl (2001) claim that education is statistically significant and positively related to growth only for countries with low levels of education. Based on a dataset of European regions for 2001-2010, Cuaresma, Doppelhofer, Huber, and Pitibauer (2018) recently come to the conclusion that both human capital and income convergence act as important factors and stimuli of income growth not only today but also for the decades to come. With reference to the experience of several CEE countries, some argue that only the quality of higher education and innovation activities can be considered as incentives of economic growth (Fotea & Guțu, 2016).

Although the majority of empirical studies favours positive correlation between education and economic growth (Mankiw, Romer, & Weil, 1992; Barro & Sala-i-Martin, 1995; Cuaresma *et al.,* 2018; Barcenilla-Visús & López-Pueyo, 2018), many studies indicate the insignificant effect of higher education on GDP growth (Benhabib & Spiegel, 1994; Islam, 1995; Pritchett, 2001; Yardimcioğlu, Gürdal, & ltundemir, 2014; Bulman, Eden, & Nguen, 2017), or even a negative effect (Lenkei, 2017). For example, country-specific studies indicate that higher education contributes to economic growth in Argentina and Brazil (Boldin, Morote, & McMullenm, 1996), Greece (Pegkas & Tsamadias, 2014), Sweden (Obradović & Lojanica, 2016), and the United Kingdom (Madsen & Martin, 2017). No positive effects of higher education growth appear for Greece (Asteriou & Agiomirgianakis, 2001) and Portugal (Pereira & Aubyn, 2009).

Eckstein, Sarid, and Tamir (2017) state that education influences economic growth in levels, in accordance with the Nelson-Phelps approach. Hanushek and Woessmann (2008) argue that the cognitive skills of a population – rather than mere school accomplishment – strongly relate to individual earnings and economic growth. Delgado, Henderson, and Parmeter (2014) obtained similar results. Although in South Africa higher education does not have any impact on economic growth, it is not the case with doctoral studies (Bhorat, Cassim, & Tseng, 2016). Besides choosing an educational variable, empirical results depend on such heterogeneous factors as data sample, types of data (cross-section, panel or

time series), which specify the statistical model or even publishing bias (for example, Benos & Zotou, 2014). Nevertheless, there are numerous studies that attempt to explain the negative correlation between higher education and economic growth.

Scholars found for a sample of 14 Asian countries in 1960-2013 that tertiary education has a negative long-run impact due to the low proportion of people educated at the tertiary level. What may explain this result are insufficient labour market opportunities for highly educated workers and the brain drain phenomenon (Lenkei 2017). Another reason may be related to the long-term nature of education in general and higher education in particular. As established by Marconi (2018), the positive relationship between education and economic growth is noticed with respect to individuals 45-64 years old, while the education level of younger cohorts (ages 25-44) is not significantly related to economic growth.

The role of higher education is particularly important in countries with the middle-income trap. There are 12 East Asian countries in which the stock of human capital plays an important role in economic growth, even after controlling for convergence factors (Otsuka, Higuchi, & Sonobe, 2017). As education became a significant factor in the period of 1985-2010, many argued that technology could be easily imitated with low GDP per capita. However, when the technological gap narrows, the countries that invest in human capital have the ability to use the existing technology gap. In the case of high technology availability, even the population without higher education can imitate advanced technology. Although Bulman *et al.* (2017) do not perceive a clear connection between education, innovation, and growth in middle- and low-income countries, they still confirm that the growth in middle-income countries is positively related to industrialization, along with openness and equality.

It is likely that the effectiveness of higher education is dependent upon specialization in high-tech and knowledge-intensive activities. With respect to the OECD countries, Teixeira, and Queiros (2016) indicate that a lack of industrial structures to enable proper integration of highly educated individuals into the production system leads to disappointing economic returns on education. An important role of industry in education is supported by the experience of Asian middle-income countries (Su & Yao, 2016). A two-way causality between education and economic growth is confirmed empirically for 25 OECD countries in 1990-2008 (Yardimcioğlu *et al.,* 2014) and for 86 countries in 1960-1990 (Podrecca & Carmeci, 2002).

Among Central and Eastern European (CEE) countries, positive effects of higher education appear in the Czech Republic and Romania (Dragoescu, 2015; Oancea, Pospíšil, & Drăgoescu, 2017). The same lack of favourable mutually reinforcing causality that runs from economic growth to higher education can be seen in Sweden (Obradović & Lojanica, 2016), Japan, the UK, France (De Meulemeester & Rochat, 1995), and Greece (Pegkas & Tsamadias, 2014). Although the majority of empirical research conducted on a number of students or with respect to the years of study supports positive higher education growth effects, the expenditure on education generates economic growth only in the Czech Republic, without similar growth effects in the Slovak Republic, Hungary, Poland, and Romania (Simionescu *et al.*, 2017).

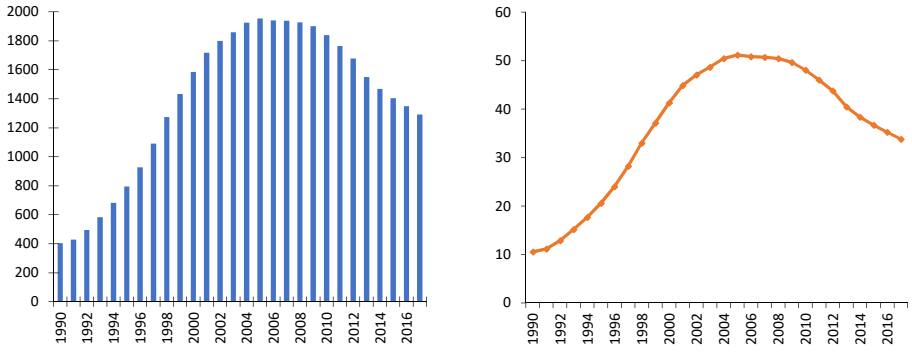
Earlier estimates for Poland in 1988-2009 suggest that the number of students (graduates) has positive growth effects, in line with the Nelson-Phelps approach (Shevchuk &

Zyra, 2012). Gradzewicz *et al*. (2016) indicate a positive link between the share of persons with tertiary educational attainment and Poland's economic growth. Another study for Poland relates the positive growth effects of higher education to the development of entrepreneurship among young people (Nowak, 2016).

Our main hypothesis is that an increase in the number of students contributes to output growth, while there is a higher demand for education in line with output gains. Moreover, we cannot rule out that both relationships have a specific intertemporal pattern, with substantial differences between short- and long-term effects.

MATERIAL AND METHODS

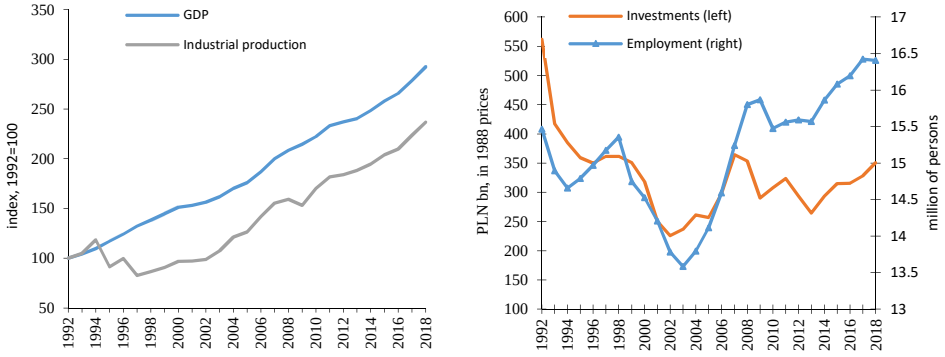
Our empirical study utilizes annual time series for 1992-2017. Besides the number of students per 1000 of the population as the educational variable (Figure 1), I employed several other macroeconomic variables (Figure 2). The study obtained data for real GDP, industrial production, and employment from the IMF *International Financial Statistics* online database. Except for employment, all other variables reveal a similar upward trend throughout the period under consideration, with no sign of any structural breaks. The industry gains are well below those of the GDP. Employment has been recovering ever since a decline in 1998-2003, with a local stagnation in 2010–2013. Investments in physical capital seem to follow the pattern of employment since the beginning of the last decade.



a) total number (in thousands) b) per population of 1000

Figure 1. The number of students in Poland in 1990-2017
Source: own elaboration based on Statistics Poland data retrieved from https://bdl.stat.gov.pl/BDL/dane/podgrup/temat on September 5, 2019.

Table 1 summarizes descriptive statistics of the data series, with a split into two samples. As the year 2000 marks a symbolic end of the transition process combined with a turnaround in employment, it is interesting to compare empirical estimates for longer and shorter data samples. Furthermore, the comparison serves the purpose of checking the robustness of our results. The comparison of the two samples indicates that the standard deviation is lower for most of the variables in the shorter sample of 2000-2016. Natural logs of these variables are used in all empirical work.



a) output b) investments and employment

Figure 2. Selected macroeconomic indicators for Poland in 1992-2018

Source: own elaboration based on IMF International Financial Statistics data retrieved from http://data.imf.org/?sk=4C514D48-B6BA-49ED-8AB9-52B0C1A0179B&sId=1390030341854 on September 5, 2019.

Table 1. Descriptive statistics of macroeconomic indicators for Poland in 1992-2017

Variable	Average	Median	Max. value	Min. value	Std. deviation
The number of students per 1000 of population, S_t	38.5	41.4	51.2	12.9	12.20
Industrial production (index, 2010=100), IND_t	74.4	71.7	124.2	30.6	29.70
Gross domestic product (index, 2010=100), Y_t	102.9	93.6	156.4	51.6	31.50
Real investment expenditure (bn of zlotys, in 1988 prices), INV_t	241.9	241.2	340.7	100.2	76.20
Employment (in millions), $LABOUR_t$	15.0	15.2	16.2	13.6	0.74

Source: own elaboration based on the Statistics Poland data retrieved from https://stat.gov.pl/; IMF International Financial Statistics retrieved from http://data.imf.org/ on September 5, 2019.

In order to verify the order of variables integration, I applied Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) statistics. The appropriate lags for the tests were selected with the Akaike Information Criterion (AIC) and Schwartz Bayesian Criterion (SBC). Both unit root tests show that the logarithms of the series (in lowercase) are integrated of order one, while their first differences are stationary (Table 2). The evidence of I(1) is somewhat weaker for s_t and inv_t (ADF), but in other cases, the series seems to have a unit root for both samples.

Table 3 presents the results of the Granger test, which demonstrate that there runs a bidirectional causality from the number of students to economic growth and vice versa, though with a different time pattern. Today it looks like student enrolment is influenced by either industrial production or GDP. Past values of s_t impact both ind_t and y_t, with the effect on the latter looking more persistently.

Table 2. The ADF and Phillips-Perron tests of selected macroeconomic indicators for Poland in 1992-2017

Variable	ADF		Phillips-Perron	
	Levels	First differences	Levels	First differences
s_t	-2.13 (0.03**)	-2.18 (0.03**)	0.95 (0.90)	-1.95 (0.05**)
ind_t	-1.59 (0.76)	-4.32 (0.01**)	-1.34 (0.85)	-5.06 (0.0***)
y_t	-3.19 (0.11)	-3.83 (0.03**)	-1.97 (0.58)	-4.14 (0.01**)
inv_t	-1.09 (0.59)	-4.85 (0.0***)	-2.26 (0.18)	-3.08 (0.04**)
$labour_t$	-1.64 (0.44)	-2.75 (0.0***)	0.30 (0.76)	-2.82 (0.0***)

Note: all variables are in logarithms.
Source: own elaboration based on Statistics Poland data retrieved from https://stat.gov.pl/ on September 5, 2019); IMF International Financial Statistics data retrieved from http://data.imf.org/ on September 5, 2019.

Table 3. Granger test for causality between student enrolment and output in Poland in 1992-2017

Lags	Null hypothesis			
	s_t does not cause ind_t	ind_t does not cause s_t	s_t does not cause y_t	y_t does not cause s_t
1	3.358 (0.08*)	141.73 (0.0***)	0.087 (0.77)	59.721 (0.0***)
2	8.540 (0.0***)	1.599 (0.22)	0.845 (0.44)	1.510 (0.44)
3	1.310 (0.30)	2.300 (0.11)	0.747 (0.54)	4.077 (0.02**)

Note: ***, **, and * mean statistical significance at the level of 1%, 5%, and 10%, respectively; p-values are in brackets.
Source: own calculations in EViews 10 (2017).

As there is bidirectional causality between the educational and output variables, I employed both 2SLS and VAR methods. They allowed me to assess the robustness of the estimates, but also identify possible differences. The VAR model is especially useful for describing the dynamic behaviour of economic time series and forecasting. However, the 2SLS estimates appeared as more stable with respect to the length of the sample and the choice of endogenous variables.

My 2SLS two-equations model is as follows (in first differences):

$$\Delta y_t = \alpha_0 + \alpha_i \Delta y_{t-i} + \beta_i \Delta s_{t-i} + \delta_i s_{t-i} + \gamma_1 \Delta labor_t + \gamma_2 \Delta inv_{t-j} + \varepsilon_t \quad (1)$$

$$\Delta s_t = \emptyset_0 + \emptyset_1 \Delta s_t + \theta_i \Delta y_{t-i} + \rho \Delta inv_t + \epsilon_t \quad (2)$$

where:

y_t - output (industrial production or GDP);
s_t - the number of students per 1000 of population;
$labor_t$ - employment (a million people);
inv_t - investments (bn of zlotys, in 1988 prices);
$\varepsilon_t, \epsilon_t$ - stochastic factors;
Δ - first difference operator.

Equation (1) assumes that output growth is influenced by both human and physical capital, but also employment. Following Krueger and Lindahl (2000), educational variable enters growth regression simultaneously in both *levels* and *first differences*. Such a specification allows for the identification of two mechanisms of higher education growth effects, i.e. accumulation of knowledge (the Phelps-Nelson approach) and investments in human capital (the neoclassical model). In case of the former, higher education influences

economic growth in levels, while the latter impacts growth effects in first differences. Equation (2) implies that changes in the number of students are influenced separately by output and investments. The relationship between the number of students and output reflects the demand for labour and wage expectations. In the presence of control for the general economic situation by the output variable, the effects of investments in physical capital are supposed to reflect the likely impact of innovations.

Although VAR analysis rarely appears in the empirical literature on education and growth (Pereira & Aubyn, 2009), it can nevertheless provide additional insight into the relationship between both variables, especially in the presence of a two-way causality between them. As the series are integrated of order one As the series are nonstationary in levels and stationary in first differences, i.e. I(1), it is necessary to test for a cointegration relationship between the number of students and both industrial production and GDP. As Table 4 shows, both trace and eigenvalue statistics indicate the presence of one cointegration equation between educational variable and industrial production/GDP.

Table 4. The results of the Johansen cointegration test for student enrolment and output in Poland in 1992-2017

Null hypothesis	**Specification with ind_t and s_t**		**Specification with y_t and s_t**	
H_0: $r = r_0$	Trace statistic	Max Eigen statistic	Trace statistic	Max Eigen statistic
$r = 0$	18.26 (0.0***)	15.82 (0.00***)	14.75 (0.02**)	12.24 (0.03**)
$r = 1$	2.39 (0.14)	2.39 (0.14)	2.51 (0.14)	2.51 (0.14)

Note: as indicated by the specification tests (normality and autocorrelation of errors), specification with no intercept or trend is used for testing cointegration between ind_t and s_t, while specification with intercept and linear trend is used in cointegration test with y_t and s_t.
Source: own calculations in EViews 10 (2017).

Since the series of the number of students and output are integrated with rank *r* $(0 < r < n)$, the VAR/VEC model should be used:

$$A(L)\Delta z_t = -\alpha\beta_i z_{t-1} + \varepsilon_t \tag{3}$$

where:

$A(L)$ - a polynomial matrix of rank *k*;
α, β - matrices of dimension $n \times r$;
$z_t = (y_t, s_t)$ - a vector of endogenous variables;
ε_i - a vector of stochastic shocks.

In accordance with the Granger test and 2SLS estimates, our assumption is that the number of students is affected by innovations to output contemporaneously, but innovations in education do not influence the industrial production/GDP, with a two-way causality between both endogenous variables observed for future periods. Similar ordering is chosen by Pereira and Aubyn (2009), who argue that the economic benefits of better-educated workers appear with a lag while innovations in output may immediately affect the education sector through labour market conditions.

RESULTS AND DISCUSSION

2SLS Estimates

The 2SLS estimates for determinants of output growth and student enrolment appear in Tables 5-6. As indicated by the coefficient of determination R^2, independent variables explain 73-86% of changes in industrial production and 32-96% of changes in GDP. The explanatory power is higher for the number of students, as the R^2 coefficient here is above 90%. For all specifications, the ADF test reports stationarity of residuals.

Estimates for a specification with industrial production reveal a positive educational effect in levels and first differences, with a three-year lag (Table 4). Estimates for samples of 1992-2016 and 2000-2016 are rather similar, which implies a stability of educational effects over time. The same positive effect of the students' number is obtained in a specification with the GDP, but this time the coefficients for Δs_{t-3} and s_{t-3} are much smaller for a shorter sample of 2000-2016 (Table 5). Compared with earlier results by Shevchuk and Zyra (2012), this specification confirms a positive effect of the educational variable in levels while its effect in first differences becomes much more favourable.

Table 5. Determinants of industrial production and student enrolment in Poland in 1992-2017

Variable	Dependent variable Δind_t		Dependent variable Δs_t	
	1992-2017	2000-017	1992-2017	2000-2017
Δind_t	–	–	-0.196 (-5.11***)	-0.271 (-4.34***)
Δind_{t-1}	-0.688 (-6.44***)	0.027 (0.19)	-0.051 (-1.86*)	0.022 (0.49)
Δs_{t-1}	–	–	0.894 (34.73***)	0.935 (21.56***)
Δs_{t-3}	-0.723 (-2.19**)	0.118 (1.90*)	–	–
s_{t-3}	0.022 (2.36**)	0.010 (6.45***)	–	–
$\Delta labour_t$	-1.396 (-1.63*)	-0.610 (-1.93*)	–	–
Δinv_t	0.389 (2.80***)	0.409 (9.46***)	0.107 (3.79***)	0.148 (4.51***)
R^2	0.24	0.79	0.96	0.95
ADF	-4.10***	-5.37***	-4.69***	-3.67***

Source: own calculations in EViews 10 (2017).

Regardless of the sample, an increase in industrial production is associated with lower student enrolment, while this is the case with GDP specification only for the 2000-2016 sample. Our results contrast with international studies that imply a positive correlation between industry and student enrolment, for example, Teixeira and Queiros (2016). However, a strong positive link between investments in physical capital and the number of students has been established over the period of 2000-2016. It may mean that the demand for higher education is created not so much by economic growth *per se* as by investment-driven innovations.

The lagged coefficient on Δind_{t-1} becomes statistically insignificant in the estimates for the shorter 2000-2016 sample, while the statistically significant autoregressive coefficient on Δy_{t-1} changes its sign. As for GDP, a strong impact of the past growth on the current growth rate has been established over the recent time span. Industrial production still lacks this favourable feature. Another difference between estimates for industrial production and

GDP is that a stimulating effect on the GDP growth by investments in physical capital becomes significantly weaker in the 2000-2016 sample, while it is slightly stronger with respect to the industrial production growth. Such an outcome can be explained by the rapid expansion of the service sector, but it is questionable whether it would be possible to keep a sufficiently high GDP growth rate with substantially weaker human capital and physical capital effects, at least according to the 2SLS estimates. It is common for both regression specifications that employment does not influence economic growth, regardless of the data sample length. Such a feature emphasizes the lack of opportunities for extensive economic growth based upon a larger labour stock while strengthening arguments for human capital accumulation and better innovativeness (Table 6).

Table 6. Determinants of GDP and student enrolment in Poland in 1992-2017

Variable	Dependent variable Δy_t		Dependent variable Δs_t	
	1992-2017	**2000-2017**	**1992-2017**	**2000-2017**
Δy_t	–	–	-0.349 (-1.34)	-0.472 (-1.99*)
Δy_{t-1}	0.202 (1.98*)	0.213 (1.70*)	0.085 (0.40)	0.196 (0.94)
Δs_{t-1}	–	–	0.958 (26.06***)	0.869 (10.74***)
Δs_{t-3}	0.048 (2.18**)	0.034 (1.17)	–	–
s_{t-3}	0.007 (6.77***)	0.007 (5.78***)	–	–
$\Delta labour_t$	0.058 (0.64)	0.039 (0.33)	–	–
Δinv_t	0.116 (8.87***)	0.117 (7.75***)	0.107 (2.83**)	0.099 (2.58**)
R^2	0.82	0.77	0.82	0.94
ADF	-4.78***	-4.85***	-4.47***	-3.43**

Source: own calculations in EViews 10 (2017).

VAR/VEC Estimates

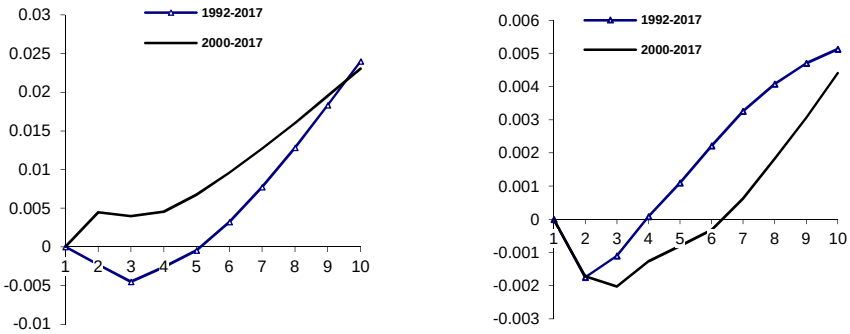
The cointegration coefficients imply a positive and stable long-term relationship for output (Table 7). Long-term coefficients do not reveal any differences across samples for the VAR/VEC model with industrial production. The estimated coefficient is of the same magnitude for the VAR/VEC model with GDP in the shorter 2000-2017 sample, but it is much smaller for the longer 1992-2017 sample.

Figure 3 presents the impulse response function of output to a one standard deviation shock in the number of students. Similar to long-term coefficients (Table 7), impulse response functions do not differ much across specifications and data samples. Except for the short-term response of ind_t to s_t, the higher student enrolment initially leads to a drop in industrial production followed by an increase in industrial output in the long term. If compared with the 2SLS estimates, the VAR/VEC estimates imply only a slightly weaker positive educational effect on GDP in 2000–2016, while outcomes seem to be somewhat asymmetrical for the specification with industrial production. Responses of ind_t and y_t to innovations in s_t in our estimates for Poland are very similar to those obtained by Oancea, Pospíšil, and Drăgoescu (2017) for the Czech Republic, although a short-lived negative effect on impact is somewhat similar to estimates for Romania.

Table 7. VAR/VEC estimates of the long-term coefficients of educational effect on output in 1992-2017

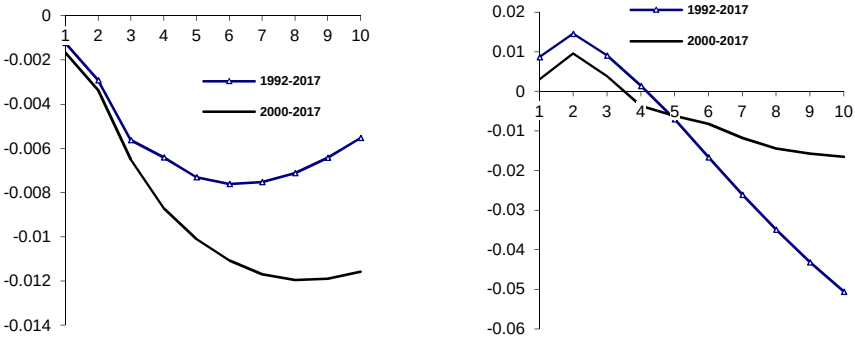
Coefficient	Specification with ind_t and s_t		Specification with y_t and s_t	
	1992-2017	2000-2017	1992-2017	2000-2017
The coefficient on s_t	1.456 (0.08)	1.545 (0.11)	0.452 (0.15)	1.417 (0.11)

Note: standard deviation in brackets.
Source: own calculations in EViews 10 (2017).



a) industrial production b) GDP

Figure 3. The impulse response function of output to the number of students output in Poland in 1992-2017
Source: own calculations in EViews 10 (2017).



a) industrial production b) GDP

Figure 4. The impulse response function of the number of students to output in Poland in 1992-2017
Source: own calculations in EViews 10 (2017).

Following the argument of Otsuka *et al.* (2017), among others, a growing role of higher education in the 2000-2017 period in respect to industrial production in the VAR/VEC estimates could indicate the ability to better utilise the existing technology gap. On the other hand, the weakening of higher education's impact on GDP in 2000-

2017 seems to contradict the assumption that positive human capital effects gain in agreement with the increase of income, as argued by Benhabib and Spiegel (1994). If we consider educational effects on industrial production, a decrease in the number of students since the middle of the 2000s provides some credibility to the argument by Krueger and Lindahl (2001) that education effects are higher in the economies with low levels of education. Moreover, this observation does not contradict Marconi's (2018) findings on the long-term nature of higher education.

Similar to 2SLS estimates, there appears a clear negative relationship between industrial production and the number of students, with no significant differences across data samples (Figure 4). However, impulse response functions are quite different with respect to the short-term reaction of student enrolment to GDP. As estimates for both samples imply, an increase in GDP produces an inverted U-shape response function: following an increase in the GDP, student enrolment increases on impact but then falls below the initial level over a decade. Fortunately, we may argue that the causality running from output to student enrolment weakened over the last few years; a positive feature that is likely to only gain in strength by an investment-driven demand for higher education, as reported by the 2SLS estimates.

Table 8. The forecast error variance decomposition of the number of students and output in Poland in 1992-2017 (in %)

Response of	Sample	Forecast horizons					
		1	2	3	5	7	10
ind_t to innovations in s_t	1992-2017	0	0	1	1	2	24
	2000-2017	0	4	6	11	28	60
y_t to innovations in s_t	1992-2017	0	0	0	0	1	2
	2000-2017	0	0	1	1	1	2
s_t to innovations in ind_t	1992-2017	1	1	2	2	2	1
	2000-2017	2	2	3	4	4	4
s_t to innovations in y_t	1992-2017	30	30	17	6	9	17
	2000-2017	13	26	14	6	6	9

Source: own calculations in EViews 10 (2017).

Regardless of the sample, the analysis of the forecast error variance decomposition (FEVD) supports the marginal role of the educational variable in the changes in GDP (Table 8). On the other hand, the number of students seems to be an important factor behind the developments in the industry, with the fraction of s_t in FEVD of ind_t at the maximum of 24% in the 1992-2017 sample and even 60% in the shorter 2000-2017 sample. While the causality running from s_t to y_t is weak, innovations in GDP are a very important factor supporting student enrolment, with the fraction of y_t in FEVD of s_t gradually declining from 30% to 6% and from 26% to 6% in estimates for the 1992-2017 and the 2000-2017 sample, respectively. Industrial output simultaneously does not exert any significant impact on the number of students. This fact means that the pattern of favourable causality running from industrial production to student enrolment – as shown by the impulse response function (Fig. 4a) – signifies potential correlation that is yet to be realized.

CONCLUSIONS

Empirical results reveal that there is a very robust causal relationship between the number of students and output in Poland, especially in the industrial sector. In this context, a significant decrease in the number of students – almost by a third since the middle of the 2000s – cannot but raise serious concerns. Both 2SLS and VAR/VEC estimates are in firm support of the stock version (the Nelson-Phelps approach) of the higher education effects on output, while the evidence of the investment version (neoclassical model) are ambiguous. For an economy at risk of the middle-income trap, unpleasant long-term effects of insufficient human capital stock are especially worrisome. As there is a decrease in the number of students in response to both industrial production and GDP growth – except for the latter effects on impact (VAR/VEC estimates) – it is an argument in favour of discreet measures aimed at boosting student enrolment. Other findings indicate that investments in physical capital are significant factors behind output, with a strong positive impact on the number of students as well. The employment seems to have no influence on either output or student enrolment. However, this study does not account for business cycle properties of the labour market. Other research limitations are the lack of control for structural shifts and the inability to trace relationships at longer lags due to a relatively short annual time series.

I recommend that the feedback from industrial output to demand higher education should be strengthened with a focus on closer cooperation between industrial firms and universities. Admittedly, the relatively short sample of annual data does not allow for control of several important independent variables, such as output abroad, trade openness, capital flows, or unemployment rate. Moreover, further research should consider studying causal links between education and output with disaggregated data across fields of study in order to explain the likely mismatch between demand for university graduates and their supply.

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Internationalisation Patterns of Polish Family High-Tech Firms

Nelly Daszkiewicz

ABSTRACT

Objective: The objective of the article is to explore internationalisation patterns of family high-tech firms, especially their internationalisation motives, intensity, speed, and entry modes.

Research Design & Methods: The empirical part adopts a quantitative approach. The results of the survey are presented on the sample of 263 high-tech production firms from Poland, including 101 family firms. The survey was conducted in all 16 Polish regions. The calculations from obtained survey results were made using Statistica PL 10.

Findings: The research results show that the intensity of internationalisation of family firms is lower than that of non-family enterprises and that family businesses are less likely to internationalise early than in the case of non-family enterprises. On the other hand, the study found no differences between family and non-family businesses in their entry modes choice and internationalisation motives.

Implications & Recommendations: Familiness is one of the key factors that explain the internationalisation of firms. However, various research findings still differ on how international behaviour of family firms may be different than in the case of non-family firms. Thus, the impact of familiness on internationalisation patterns requires further, deeper investigations.

Contribution & Value Added: The main contribution of this article is that it investigates Polish family firms, which are relatively young in comparison to the Western European ones. Moreover, the Polish firms belong to high-tech industries that often behave differently in the foreign markets than firms from traditional branches. The study indicates that familiness is an important aspect relevant in explaining the internationalisation patterns of firms.

Article type:	research article
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INTRODUCTION

Despite research interest in family firm international expansion has been growing for the last two decades, it still remains a young field of study that seeks a consistent framework. The decision of a family firm to begin international expansion depends on many factors and motives. Unlike non-family firms, family firms are influenced by family relationships that bind family members both to each other and to their business (Daszkiewicz & Wach, 2014; Lušňáková, Juríčková, Šajbidorová, Lenčéšová, & Lence, 2019). On the other hand, the main value and competitive advantage of family firms results from family ties (Labaki, 2011; Weclawski & Zukowska, 2019). Marjański and Sułkowski (2019) explain that family businesses operate on the border between two qualitatively different social institutions: family and business. These two systems overlap in a family firm to form a specific business system that significantly differs from firms which are not controlled by a family.

Thus, the functioning of family firms in many areas differs from non-family firms, including their international expansion. However, there is much evidence in the extant literature that family firms engage in activities that lead them towards foreign markets and that internationalisation is an important strategic element in achieving growth (Stieg, Cesinger, Apfelthaler, Kraus, & Cheng, 2018; Głodowska, Pera, & Wach, 2019).

On the other hand, the literature review shows that family firms are more likely to choose a traditional path of internationalisation, which is consistent with the concept of the Uppsala model of internationalisation (Johanson, & Vahlne, 1977). The stepwise approach of family firms is connected with their long-term orientation to both business and family (Stieg *et al.*, 2018; Brigham, Lumpkin, Payne, & Zachary, 2014).

However, various research shows mixed results of internationalisation processes of family businesses compared to non-family businesses (Arregle, Duran, Hitt, & Van Essen 2017; O'Boyle, Pollack, & Rutherford, 2012).

Verbeke, Yuan, and Kano (2018) also provide arguments that different empirical research produces ambiguous results, ranging from positive to negative to non-linear relationships between the familiness of firms and their internationalisation.

The objective of this article is to explore internationalisation patterns of family firms, especially their motives to go international along with their internationalisation intensity, speed, and entry modes. The main research question is whether family firms internationalise more or less than non-family firms in terms of different aspects of their international behaviour.

The theoretical framework is built on literature review. The empirical part adopts the quantitative approach. The results of the survey are presented on the sample of 263 high-tech production firms from Poland, including 101 family firms.

The article contributes to the research on family firm internationalisation by investigating family firms from high-tech industries. There is much evidence in literature that these firms are more internationalised than traditional (low-tech) ones. Moreover, high-tech firms more often begin internationalisation processes from the inception or soon after, and they are more likely to use advanced market entry modes to enter new markets (Daszkiewicz, 2019). Moreover, Polish family firms are relatively young in comparison to their Western European counterparts and, thus, may behave differently on foreign markets (Hadryś-Nowak, 2018).

The article consists of literature review of theoretical concepts of family firms internationalization, description of the used research methods and presentation of the research results and discussion. In conclusions directions of further research and implications for practice are included.

LITERATURE REVIEW

Internationalization is a worldwide process affecting the global economy and society (Hallova *et al.*, 2019; Chalupova *et al.*, 2019). Various research shows different results on how different factors facilitate or constrain the internationalisation of family firms (Arregle *et al.* 2017). The reason for these mixed results may be because the studies focus on different types of family firms, which are heterogeneous. Thus, their strategic behaviours may differ not only between family and non-family firms but also within family businesses due to their heterogeneity.

Stieg *et al.* (2018) foreground that several studies find no differences in levels of international behaviour in the case of family firms in comparison with non-family firms (Crick, Bradshaw, & Chaudhry, 2006), but some others indicate at higher (Graves & Shan, 2014; Tsao & Lien, 2013) or lower levels of international performance of family firms (Thomas & Graves, 2005; Zahra 2003). Moreover, international business research indicates a variety of factors positively associated with international behaviour of family firms, such as education, international experience, commitment, risk propensity, perceived benefits, or market knowledge (Stieg *et al.*, 2018).

Graves and Thomas (2008) state that family firms face unique barriers of internationalisation. They define three particular determinants of internationalisation pathways, which are the degree to which the owning family is committed to internationalisation, the amount of financial resources available for internationalisation, and a firm's ability to develop its potential.

Moreover, family businesses usually do not have sufficient international market knowledge, in particular in the pre-internationalisation phase, as they accumulate knowledge incrementally and slowly and remain reluctant to enter new networks and form new relationships (Stieg *et al.*, 2018). Sciascia*,* Mazzola, Astrachan, and Pieper (2012) indicate the inverted U-shaped relationship between familiness and internationalisation intensity. In turn, Zahra (2003) states that family involvement in the board of directors positively influences international sales due to the stewardship effect. The effect causes family members want to create conditions for the firm that would last long for the current and future generations.

Kontinen and Ojala (2010, 2012) state that familiness may cause cautiousness in a firm's internationalisation process. Hence, family firms are more likely to choose a traditional path of internationalisation. International expansion of family businesses is more often gradual and – in comparison with non-family firms – consistent with the internationalisation process described in the Uppsala model. Moreover, family firms tend to choose psychically close markets and rather indirect than direct entry modes. Furthermore, their behaviour in a foreign direct investment process is less formal than in the case of non-family firms. They also tend to rely on familiar sources about foreign markets information, thus they rely on well-established, lasting, and identity-based network ties (Kontinen & Ojala, 2011).

Pukall and Calbro (2014) conducted a very wide survey, which reviews 72 articles on various aspects of the internationalisation of family businesses published in 1980–2012. The review shows that the impact of familiness on different aspects of internationalisation (e.g. type of market entry, speed of internationalisation, or degree of international sales) among the articles is highly inconsistent. However, most studies on the internationalisation of family businesses also support the thesis that they are more likely to follow the traditional path of internationalisation. This means that family firms begin international activity from neighbouring markets, that is, where the psychic and geographic distance is small (Daszkiewicz, 2014; Daszkiewicz & Olczyk, 2015). Next, along with the accumulation of knowledge and resources, family firms gradually expand their activities to more distant markets (Claver, Rienda, & Quer, 2009; Kontinen & Ojala, 2010; Pukall & Calabro, 2014; Poór, Juhasz, Machova, Bencsik, & Bilan, 2018). Moreover, Pukall and Calabro (2014) show that family businesses are generally internationalised according to the suggestions contained in the Dunning eclectic paradigm (Erdener & Shapiro, 2005). Depending on the existence of differentiated advantages of ownership, internalisation, and location advantages, family firms select various types of entry modes, mainly foreign direct investment. Generally, family businesses choose those forms of entry to foreign markets that do not limit their independence.

In turn, Arregle *et al.* (2017) meta-analysis of 76 studies from 41 countries shows differences between countries in the family firms' relationship with internationalisation may be explained by the roles of family control, internationalisation types, and home country institutional conditions, such as minority shareholder protection.

Moreover, Sougata, Mondal, and Ramachandran (2018) claim that family ownership must exercise control over the firm's decisions and actions. Family often has the power and authority to impose noneconomic goals on the firm. On the other hand, families differ in their ability to control their firms, because concentration and involvement in management vary among families.

However, as in the case of non-family enterprises, exports are the most popular form of entry for family firms.

On the basis of literature and research review, De Massis Frattini, Majocchi, and Piscitello (2018) reveal that family firms are more likely to remain in their domestic markets and adopt conservative behaviours because of their strong connection to home regions and local roots. Moreover, family firms may have an aversion to risky behaviours in international markets. On the other hand, other scholars recently recognized family firms as the "important protagonist" of international entrepreneurship. De Massis De Massis, Frattini, Majocchi, and Piscitello indicate as the main incentives to embark on global initiatives the following: family involvement, emotional attachment to the firm, low-term orientation, lower agency costs, and higher endowment of social capital.

Moreover, the literature on international entrepreneurship suggests that some family businesses experience rapid growth caused by new generations of entrepreneurs (successors; Bell, McNaughton, Young, & Crick, 2003; Graves & Thomas, 2008). Such enterprises are referred to as born-again-global, and they represent various patterns of internationalisation. However, research in this area is still quite rare (Graves & Thomas, 2004; Calabro & Mussolino, 2013; Pukall & Calabro, 2014; Sikora & Baranowska-Prokop, 2018; Abidi, Antoun, Habibniya, & Dzenopoljac, 2018).

The majority of Polish researchers argue that family firms are less internationalised than other firms. However, some show that family firms listed on the stock exchange are more internationalised (Wach & Wojciechowski, 2014; Wach, 2017). Daszkiewicz and Wach (2014) investigate 216 Polish firms, including 88 family businesses, to highlight that family firms in their expansion into foreign markets are mainly market seekers. Moreover, family firms much less frequently than non-family firms use advanced entry modes in their international expansion.

MATERIAL AND METHODS

This study conducted Empirical research on the internationalisation of high-tech firms operating in Poland at the end of 2015 with the use of Computer Assisted Telephone Interviewing (CATI) (see: Kobylińska, Rollnik-Sadowska, & Samul, 2017). Random sampling was selected according to the following criteria about a firm (Daszkiewicz, 2019: (i) conducts international activity, (ii) belongs to one of the classes of activity (PKD; Polish Classification of Activities), namely "high-tech" or "medium-high-tech," (iii) fulfils at least one of the three following criteria:

- obtains patents or signs licensing agreements in areas considered high-tech,
- employs personnel with high scientific and technical qualifications,
- conducts industrial research or developmental works.

The survey obtained 263 fully completed questionnaires (the return rate was 8.2%) relevant for further statistical processing.

The survey respondents were usually employees with managerial positions. In few cases, these were employees appointed by managers to give an interview as persons with adequate knowledge about the R&D and international activities of the firm.

Calculations from the obtained survey results were made using Statistica® PL v. 10 software. In the survey, the level of statistical significance (*alpha* or α) for testing the hypotheses was established at the level of $\alpha = 0.05$, while the level $p < 0.1$ was adopted as the acceptable level of non-rejection of the null hypothesis. Based on the obtained statistics, level p was doubled to obtain a significant level α (Creswell, 2014, p. 169).

The following statistics were used to verify the formulated research hypotheses: Pearson's χ^2 to examine the statistical significance of two-dimensional relationships between variables of qualitative character – non-rankable and rankable – Cramer's V contingency coefficient to examine the statistical strength of the relationship between qualitative variables for the cases, in which the relationships turned out to be significant, Spearman's rank correlation coefficient to examine the strength and the direction of the relationships between qualitative rankable variables, and T-test to compare two averages.

The literature studies resulted in the formulation of the following four hypothesis to be tested.

H1: Internationalisation intensity measured by the Transnationality Index is negatively correlated with firm familiness.

Various research findings differ on how the internationalisation of family firms may differ from that of non-family firms. For example, De Massis *et al.* (2018) shows that family

firms are more likely to remain in their domestic markets and adopt conservative behaviours than non-family firms. Moreover, Kontinen and Ojala (2010, 2012) prove that the impact of familiness on different aspects of the internationalisation – including the degree of international sales – is highly inconsistent. However, most studies support the thesis that family firms are more likely to adopt traditional behaviours.

H2: Family firms are mainly market seekers when going international, as they are much more reactive on international markets.

H3: Family firms' rare comparison to non-family firms uses advanced investment modes of entry into international markets.

Family businesses usually choose those forms of entry to foreign markets that do not limit their independence, export remains the most popular form of entry of family firms as in the case of non-family enterprises (Pukall & Calabro, 2014). Moreover, the research conducted in Poland by Daszkiewicz and Wach (2014) shows that family firms are mainly market seekers in their expansion into foreign markets and that they much less frequently use advanced entry modes in their international expansion than non-family firms.

H4: Internationalisation speed of a firm is negatively correlated with familiness.

Kontinen and Ojala (2010) claim that family firms are more likely to take a traditional path of internationalisation. They find evidence that internationalisation processes of family firms are more often gradual than in the case of non-family firms. Moreover, family firms tend to choose psychically close countries. The stepwise approach of family firms results from their long-term orientation to both business and family (Stieg *et al.,* 2018; Brigham *et al.*, 2014).

RESULTS AND DISCUSSION

The research sample includes firms of all size classes: micro, small, medium, and large. The share of SMEs among the surveyed firms is 82% (216 firms), while the share of large enterprises is 18% (47 firms). The survey was conducted in the whole territory of Poland.

Family enterprises account for 38.4% of surveyed enterprises while non-family enterprises for 61.6%. Respondents received an explanation that family businesses are those that are mostly owned by the same family and in which family members are employed or the firm is at least supported by family members (Table 1).

Table 1. The size of surveyed firms

Size Class	Family Firms		Nom-Family Firms		Total	
	Obs.	%	Obs.	%	Obs.	%
Micro: (1– 9 employees)	9	8.9	15	9.3	24	9.1
Small: (10–49 employees)	33	32.7	35	21.6	68	25.9
Medium: (50–249 employees)	45	44.6	79	48.8	124	47.1
Large: (250+ employees)	14	13.9	33	20.4	47	17.9
Total	101	100.0	162	100.0	263	100.0

Source: own study based on the survey (n = 263).

The survey included all industries, i.e. firms representing each industry are present in the research sample. The largest number of enterprises manufactures computers

along with electronic and optical products (NACE 26), i.e. 13% of all the surveyed firms, while among the industries classified as medium high tech (MHT) most enterprises operate in the machinery and equipment industry, not classified elsewhere (NACE 28). The production of electrical equipment (NACE 27) amounts to 17% and the production of chemicals and chemical products (NACE 20) to 14% (see Table 2).

Table 2. Industries according to NACE

Business activities/industries	Obs.	%
High technologies (High-Tech, HT)		
NACE 21: Manufacturing of basic pharmaceutical substances and other pharmaceutical products	5	1.90
NACE 26: Manufacturing of computers, electronic and optical components	34	12.93
NACE 30.3: Manufacturing of air and spacecraft and related machinery	3	1.14
Medium technologies (Medium-High Tech, MHT)		
NACE 20: Manufacturing of chemicals and chemical products	37	14.07
NACE 25.4: Manufacturing of weapons and ammunition	3	1.14
NACE 27: Manufacturing of other electrical equipment	44	16.73
NACE 28: Manufacturing of special-purpose machinery not elsewhere classified	111	42.21
NACE 29: Manufacturing of motor vehicles, trailers and semi-trailers excluding motorcycles	16	6.08
NACE 30.2: Manufacturing of railway locomotives and rolling stock	2	0.76
NACE 30.4: Manufacturing of military fighting vehicles	1	0.38
NACE 30.9: Manufacturing of transport equipment not elsewhere classified	10	3.80
NACE 32.5: Manufacturing of medical and dental instruments and supplies	11	4.18

Note: respondents could select more than 1 answer.
Source: own calculations (n=263).

According to the SITC product classification (Standard International Trade Classification), most of the firms inclined towards the production of electrical machines (34%), non-electrical machines (27%), electronics and telecommunications (17%), and chemicals (14%; Table 3).

Table 3. Activity according to SITC (product) classification

Business activity	Observations	%
Space equipment	2	0.76
Computer equipment	3	1.14
Electronic-telecommunication	46	17.49
Pharmaceuticals	8	3.04
Scientific instruments	9	3.42
Combustion vehicles	16	6.08
Electrical machines	89	33.84
Chemicals	37	14.07
Non-electrical machines	71	27.00
Ammunition and weapons	2	0.76
Other	7	2.66

Note: respondents could select more than 1 answer.
Source: own calculations (n=263).

Internationalisation Intensity

The transnationality index (TNI) was calculated as the average of foreign foreign assets, foreign sales, and foreign employment to the total ones.

The average value of the TNI for the whole research sample (*n* = 263) is 20.6, while the median is 13.33, and the standard deviation equals 19.48. It means that, on average, in a continuum from 0 to 100, the level of the internationalisation of firms in the sample is low.

Furthermore, the analysis of the TNI index value indicates that over 42% of firms in the sample has an internationalisation rate of less than 0.1 and nearly 75% less than 0.3, which means that 75% of the surveyed enterprises are poorly internationalised.

The distribution of index values of the internationalisation index is extremely right-handedly asymmetric, as shown in the histogram below (Figure 1).

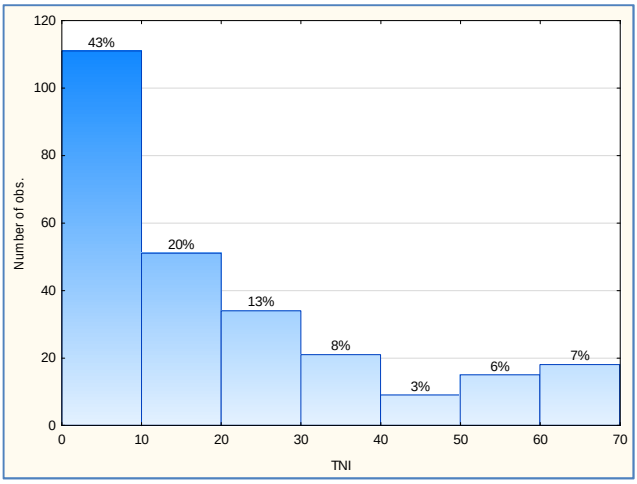

Figure 1. Distribution of TNI among the survey firms
Source: own study based on the survey (n = 259).

Analysis showed that there is a statistically significant correlation of moderate force between the TNI and firm size ($\chi 2 = 25.948$, df = 6, p = 0.00023, Spearman R = 0. 254, Cramer's V contingency coefficient = 0. 224). This means that the size of the business increases as TNI grows.

For family businesses, the average value of the TNI is 17.23, the median is 13.33, and the standard deviation is 15.33 (Figure 2).

For non-family firms, the average value of the TNI index is 22.76, the median is 15.17, and the standard deviation is 21.50 (Figure 3).

The analysis showed that there is a statistically significant relationship of a weak strength between the TNI and firm familiness ($\chi 2 = 8.226387$, df = 2, p = 0.01636, R-Spearman = 0.174 V-Cramer's contingency coefficient = 0.1772193). This means that the intensity of the internationalisation of family firms is lower than that of non-family enterprises. Thus, the first hypothesis is confirmed.

Internationalisation Motives

To identify internationalisation motives, the study used a tool developed by Hansson and Hedin (2007). This tool consists of 28 questions that reflect the five main motivations for internationalisation in the extended Dunning concept: market seeking, resources seeking, efficiency seeking, strategic assets seeking, networks and co-operation seeking (Wach, 2016).

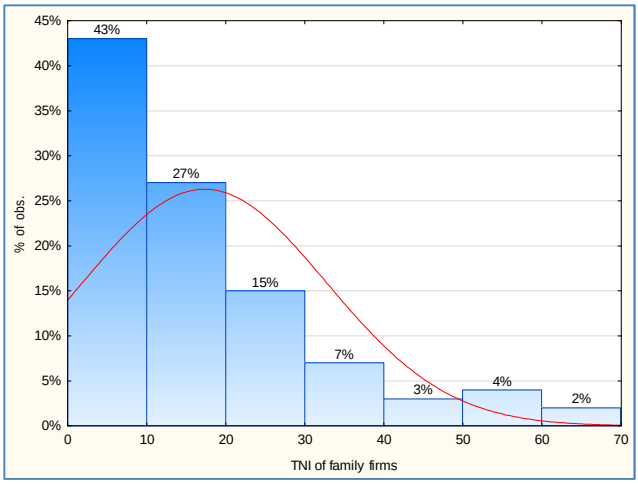

Figure 2. Distribution of the TNI index of the internationalisation of the family firms (n=101)
Source: own study based on the survey (n = 101).

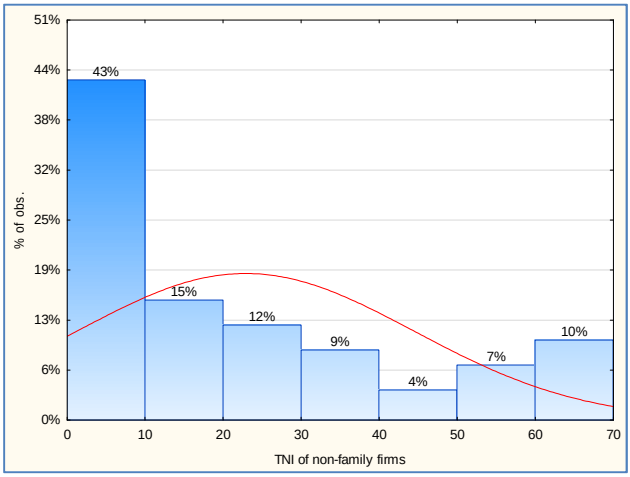

Figure 3. Distribution of the TNI index of the internationalisation of non-family firms (n=162)
Source: own study based on the survey.

Respondents were to assess the importance of the statements indicated on a five-point scale, in which 1 meant an unimportant motive and 5 a very important motive.

Therefore, the survey results could be submitted in the form averaged for all surveyed enterprises with the use of a simple arithmetic mean tool (Table 4).

Table 4. Motives for internationalising according to Dunning's typology (on a five-point Likert scale)

Factors	Family	Non-family	Total
MARKET SEEKING			
Protection / development of existing markets or market share	4.5	4.4	4.4
Exploitation or entering new markets	4.3	4.3	4.3
Better adaptation of products to foreign markets through physical presence	3.8	3.8	3.8
First mover advantage	3.5	3.3	3.5
Reduction of costs (transport, production) through presence on the local market	3.5	3.2	3.4
The host country encourages FDI	2.3	2.2	2.5
Avoiding barriers in trade (e.g. duties, quotas)	2.8	2.6	2.9
Limited domestic market	3.1	3.1	3.2
RESOURCE SEEKING			
Better access to natural resources in the host country	1.9	2.0	2.1
Better access to cheap and /or unqualified workforce in the host country	1.9	1.8	2.0
Better infrastructure in the host country	2.3	2.2	2.4
Better energy and water supply in the host country	2.0	2.1	2.3
A more appropriate institutional and legal framework in the host country	2.5	2.7	2.8
EFFICIENCY SEEKING			
The possibility of a later profit / benefit from the differences in supply and costs (labour, resources) between countries	2.7	2.9	3.0
The possibility of a future profit / benefit from the differences in consumption patterns between countries	2.5	2.6	2.8
The possibility of subsequent rationalization thanks to a shift in demand among countries	2.4	2.6	2.7
The possibility of future benefit from the economies of scale and scope	2.7	2.9	3.1
Ability to lower the total tax burden while being in more than one country	2.5	2.7	2.8
STRATEGIC ASSETS SEEKING			
Acquisition of another company or part of another company in order to gain knowledge about foreign markets	2.0	1.8	2.1
Acquisition of another company or part of another company in order to acquire technological knowledge (patents, employee skills, systems)	2.1	1.9	2.3
Acquisition of another company or part of another company to limit competition	2.0	1.8	2.2
Acquisition of another company or part of another company to stop competitors from acquiring this company	1.9	1.8	2.1
Better access to qualified and educated workforce	3.1	2.7	3.1
NETWORKS AND CO-OPERATION SEEKING			
Increased opportunity to acquire technology, knowledge in the field of management / or marketing, organizational skills	2.9	2.8	3.0
The ability to follow or stay close to major customers / suppliers	3.4	3.3	2.4
Better use of resources belonging to partners	2.8	2.9	3.0
The exploitation of cluster effects	1.4	1.2	2.4
The beginning of a new cooperation	3.9	4.0	4.0

Source: own study based on the survey (n=263).

In order to check the existence of significant differences between family and non-family firms in their internationalisation motives, a Student's t-test for averages was performed, assuming the independence of attempts and equality of variances in compared groups of firms.

The t-test that compared the variances between groups of family and non-family enterprises showed in each case that $p > \alpha$ ($\alpha = 0.05$), therefore we may assume the equality of variances. This enables a reliable t-test for the average of all types of motives tested. The results of this test show that p-value for all examined motives is greater than the significance level $\alpha = 0.05$, which allows us to assume no differences between family and non-family companies for each motive. Thus, the second hypothesis is rejected.

Entry Modes

Foreign entry mode choice is an important strategic decision for a firm, as it determines the level of its resource commitment along with the risk and the nature of control it has over its foreign activities in the host country (Arregle, Hébert, & Beamish, 2006; Alnassar, 2017).

This article accepts the criteria proposed by Hollensen (2010), who identifies three categories of foreign entry modes according to the level of control criteria (Daszkiewicz, 2017):

1. High control modes: (i) foreign direct investment (FDI) in the form of wholly owned subsidiaries (WOS), (ii) direct selling to big customers (OEMs). These entry modes are equal to full control with activities in foreign markets.
2. Intermediate modes: (i) strategic alliances (SA), (ii) joint ventures (JV). These entry modes are located in-between high and low control modes; partners usually share resources, technology, profits, and jobs; the local partner usually provides market-specific knowledge.
3. Low control modes: (i) indirect export, (ii) direct export. The level of control is the lowest in the case of indirect export, when a parent company uses independent organizations located in the parent company's own country or third country. In the case of direct export, the parent firm sells directly to an agent, distributor, or importer located in the foreign market, which provides a higher degree of control than indirect export.

In order to check whether there is a significant relationship between entry modes and whether the firm is family or non-family owned, I calculated V-Cramer contingency ratios and R-Spearman correlation coefficients for each type of entry modes χ^2 statistics. For each type of entry modes, it turned out that p-value for χ^2 is greater than the level of significance α ($\alpha = 0.05$). This result allows assuming that there is no significant relationship between familiness and the choice of entry mode. Similar results produced R-Spearman correlation coefficients. In each of the studied cases, correlation coefficients are close to zero, while p-value for each of the calculated coefficients is greater than the level of significance α ($\alpha = 0.05$). This confirms the results presented above. Thus, the third hypothesis is rejected.

Internationalisation Speed

Most of authors define early internationalisation as a number of years from the inception to the beginning of international sales: firms which start exporting (or any other entry mode) in the first three years are classified as early international firms (EIFs). Moreover, this article accepted three years as the borderline separating the traditional from the early

and rapid internationalisation (Knight & Cavusgil, 2004; Zuchella, Palamara, & Denicolai, 2007, Wach, 2015; Pohlova *et al.*, 2018).

In the sample, 45% of the surveyed firms can be classified – according to the classification – as born global, i.e. firms that have taken their first expansion on foreign markets less than three years after establishment. In the case of 55% of the surveyed firms, the first expansion happened more than three years after the establishment of the firm, which was a traditional path (Table 5).

Table 5. The Internationalisation speed of the investigated firms

Type of Firm	Up to Three Years from the Inception	More Than Three Years from the Inception
Family firms	38	63
Non-family firms	79	79
Total	117	142

Source: own study based on the survey (n = 259).

The analysis showed that there is a statistically significant relationship between familiness and internationalisation speed ($\chi 2 = 3.810494$, df = 1, p = 0.05093, Spearman R = -0.121294, Cramer's contingency V = 0.1204119). It is a dependence of weak strength. Therefore, family businesses are less likely to internationalise early than in the case of non-family enterprises. Thus, the fourth hypothesis is confirmed.

Based on the calculations it was possible to accept two hypotheses and reject two other hypotheses (see Table 6).

Table 6. Hypotheses verification

Hypothesis		Verification status	Verification method
H1:	Internationalisation intensity measured by the Transnationality Index is negatively correlated with firm familiness.	confirmed	Pearson's χ^2 Cramer's V contingency coefficient, Spearman R
H2:	Family firms are mainly market seekers while going international, as they are much more reactive on international markets.	rejected	Student's t-test
H3:	Family firms' rare comparison to non-family firms uses advanced investment modes of entry into international markets.	rejected	Pearson's χ^2 Cramer's V contingency coefficient, Spearman R
H4:	Internationalisation speed is negatively correlated with firm familiness.	confirmed	Pearson's χ^2 Cramer's V contingency coefficient, Spearman R

Source: own elaboration.

CONCLUSIONS

The main aim of this study was to present internationalisation patterns of family firms, especially their intensity, motives, speed, and entry modes.

The key results of the empirical research show that the intensity of the internationalisation of family firms was lower than that of non-family enterprises and that family businesses are less likely than non-family enterprises to internationalise early. On the other

hand, I found no differences between family and non-family businesses in their entry modes choice and internationalisation motives. Thus, the study supports the thesis that family firms are more likely to choose a traditional, stepwise path of internationalisation, which is slower than that of non-family firms.

Despite confirming only two out of four hypotheses, the research results support others studies that claim the internationalisation of family firms may differ from that of non-family firms, especially because family firms are more likely than non-family firms to adopt conservative behaviours and to follow a traditional path of internationalisation (Kontinen & Ojala, 2010; De Massis *et al.*, 2018).

The research was conducted on a sample of 263 enterprises operating in high-tech and medium high-tech industries, including 101 family businesses. The main limitation of this study is the lack of representativeness of the research sample. Thus, the research results cannot be generalized to other high-tech family businesses in Poland.

However, the research sample is acceptable for Polish conditions, comparing to similar empirical research. Moreover, the research covered firms that operate throughout the country in all high-tech and medium high-tech industries, which means that enterprises from every industry are present in the research sample.

Furthermore, the obtained results indicate possible further research directions. In regard to the examination of differences in internationalisation factors between family and non-family high-tech firms, I believe that further research should address family firms from the perspective of international entrepreneurship. International entrepreneurship literature calls some family firms born-again globals, who represent various patterns of internationalisation, so the role of the family in international entrepreneurship is not sufficiently recognized and requires further research (Wach, 2017).

Taking into account that this research concerns high-tech firms, which often use knowledge as their core competence, further research could also focus on the role of knowledge in the internationalisation processes of family firms. Moreover, knowledge is crucial for the development of not only businesses but also economies. Furthermore, knowledge is also used as an important variable to explain the process of firm internationalisation (Daszkiewicz & Olczyk, 2015).

The article may be valuable for students and PhD students who explore the field of international business and entrepreneurship. It may also support entrepreneurs, in particular owners and managers of family firms.

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What Drives Consumers in Poland and the Czech Republic When Choosing Engine Oil Brand?

Artur Wolak, Kamil Fijorek, Grzegorz Zając, Vojtěch Kumbár

ABSTRACT

Objective: The objective of the research was to study consumer decision-making and purchasing preferences when buying engine oils to reveal the presence of consumer preference heterogeneity.

Research Design & Methods: Survey data were collected from Polish and Czech consumers by using a self-administered questionnaire. The main data analysis tools used in the study were the finite mixture models and semantic differential.

Findings: Consumers do not constitute a single homogenous group. They cluster into four segments with differing importance profiles. The study found that the largest consumer segment, over one-third of consumers, consider the quality classification, viscosity classification, and OEM specification as the most important criteria during the decision-making process.

Implications & Recommendations: As the largest extracted consumer segment includes drivers who are mainly guided by technical specification in the purchasing process, we recommend producers to put additional efforts to provide clearly visible technical specifications on the product label.

Contribution & Value Added: The study fills an important gap regarding the lack of empirical research in the context of buying engine oils. The undertaken research indicates that the attention of future consumer research into brand attachment should be shifted from brand loyalty studies towards the study of brand familiarity. The paper presents very valuable model-based consumer segmentation.

Article type: research article

Keywords: engine oil; consumer behaviour; choice heterogeneity; consumer segmentation; model-based clustering

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INTRODUCTION

In recent years, scholarship devoted considerable effort to understanding the processes behind customers' purchase decisions. A large portion of this research focused on two basic aspects: information acquisition and information integration. Pre-purchase information search is a critical step in the buying process of consumers, especially in the case of highly involving products and services. Over the years, marketing researchers allocated much work to investigating consumer information-seeking behaviour (Mourali, Laroche, & Pons, 2005). Knowing what the consumer preferences are is the Holy Grail for almost all manufacturers and retailers that are subjected to the market competition. Each product and each market have their own challenges in that regard. There is a much different decision process when a consumer considers buying inexpensive and frequently purchased products than when the opposite is the case. The complexity is still multiplied by the other dimensions, e.g. whether the consumer is equipped with enough knowledge to make an informed decision, whether there are any time constrains, or whether the decision will have any long-lasting impact on the consumer's well-being. As a result, research outcomes obtained for a particular product and market may not be directly transferable to the different product on the same market or even the same product but on a different market. This is a highly undesirable observation, as it causes the need for considerable expenditures towards marketing research. The same holds true even for infrequently purchased products, as in the case of our research: consumer car engine oils. The producers of engine oils, as any other producers, need to know what the main drivers of consumer choices are in order to successfully compete and increase their market share and profitability. Moreover, consumers are rarely a homogenous group with strongly focused preferences. More frequently consumers are heterogeneous with regard to their preferences, with a number of segments and their sizes typically unknown *a priori*. Unfortunately, the petrochemical literature is rather scarce in this regard. That is the main reason why we selected this particular research topic and conducted a study on 200 respondents from Poland and the Czech Republic.

Before moving to the literature review, a necessary context regarding the current shape of oil markets in Poland and the Czech Republic needs to be provided. Poland is the eleventh state in Europe in terms of area (over 310 thousand km^2). As of the beginning of 2018, the population of Poland amounts to nearly 38.5 million people. According to the Central Register of Vehicles (CRV), as of June 2017, the number of vehicles registered in Poland amounts to nearly 29 million (m); including over 22 m cars and over 3.2 m lorries; the remaining part includes buses, motorcycles, and mopeds (http://cepik.gov.pl). The Czech Republic is the twenty-first in Europe in terms of area (80 thousand km^2). As of January 2019, the population of the Czech Republic amounts to nearly 11 million people. According to the Czech CRV, as of June 2019, the number of vehicles registered in the Czech Republic amounts to over 8 m; including nearly 6 m passenger cars, over 0.5 m lorries, nearly 22 thousand buses; the remaining part includes trucks, motorcycles, mopeds, and tractors (SDA: Car Importers Association).

According to the report of the POPiHN (Polish Organisation of Oil Industry and Trade), the lubricants market in Poland is stable in terms of its sales volume. Since the end of 2010, annual fluctuations of the market remain within the range of no more than 5% with its average size of 225 thousand tonnes in the said period. Of this amount, 55-60% are automotive

oils. A similar situation is observed on the Czech market; yet, with an upward trend in recent years. According to the report of the Czech Statistical Office, in 2018 the lubricants and lubricant oils consumption was 216 thousand tonnes, which is more than in previous years: 202 thousand tonnes in 2017 and 195 thousand tonnes in 2016 (Cesky Statisticky Urad).

When looking at the long-term perspective of the oil market, an increase in the share of motor oils for passenger cars is noteworthy, as it comprises about 46.5% of all lubricating oils sold, and within the automotive oils segment they constitute about 80%; in 2018 it was almost 110 thousand tonnes. The dominant group of lubricant oils used in the automotive industry – in the segment of passenger cars and light commercial vehicles – are 0W-X and 5W-X oils. Noteworthy, there appeared a marked increase in sales of synthetic oils for passenger cars and in terms of the whole lubricants market, this share grew from 5.5% in 2007 to 18.3% in 2018. Consequently, the sales of this group of products remains the largest on the market, ahead of industrial hydraulic oils, and – due to this fact – the present research focuses on drivers who use fully synthetic engine oils (POPiHN, 2018). At the same time (2007-2018), mineral oils for passenger cars and trucks saw the largest decline in sales. This is related to the ongoing process of modernisation of vehicle fleets in Poland and the Czech Republic. Similar trends are also observed in more advanced markets, e.g. French or German.

This paper is divided into several sections. Firstly, a thorough literature review is presented. Then, we outline the survey design and – as the main aim of the study was to investigate the possible presence of consumer preference heterogeneity – provide an appropriate statistical methodology. The main part of the paper focuses on the research results. Finally, practical recommendations for marketers who operate in the oil markets are given, the limitations of the research are critically assessed and the outlook for the future research in this area is provided.

LITERATURE REVIEW

Prior to conducting the research, we prepared a careful review of existing international and domestic scientific literature. Several studies from the Asian and African oil markets were found. Zakir (2011) studies the oil market in Pakistan. The author explores consumer attitude towards buying a PSO lubricant (Pakistan State Oil) and is mainly interested in finding out the reasons behind PSO's low market share, but he also identifies and investigates the key areas that drive consumers towards purchasing a lubricant: viscosity/thickness, prior experience, improved durability, and mileage. A sample of 120 subjects was analysed through a questionnaire which revolved around a few basic attributes of consumer purchase decision. Zakir (2011) states that advertisement and promotional campaigns play a role as a short-term strategy, increasing sales for just a limited period of time.

Alavijeh, Fattahi, and Moshfegh (2019) study the oil market in Iran. In total, they use 74 questionnaires (industrial lubricants buyer organisations) for data analysis. The authors compare the effects of price and brand on the industrial customers' buying choices and their results indicate that there appear significant effects of both. The effects of customer complementary information – with no precise specification – were not significant. Let us indicate that the authors analyse industrial buyers and as such their results may not be fully applicable for individual customer markets. Thereby, their results have limited usefulness in the context of this research.

Another study was conducted by researchers who analysed the Nigerian oil market. A research questionnaire was administered to 1890 vehicle owners, randomly selected from the national register maintained by Lagos State Motor Vehicle Administration Agency in 2003-2013. The correlation and regression analysis were used to test the hypothesis that there is no significant relationship between brand recognition and customer impulse buying behaviour. The authors reveal that there is a significant relationship between the examined factors (Olanipekun, Rasheed, & Sydney, 2015). The study recommends that marketers of lubricants should develop innovative packaging strategies that will appeal to and attract consumers in an exceptional way to trigger impulse buying.

Researchers in India were interested in finding attributes of oil brand positioning (Srivastava, 2016). They applied multiple regression analysis to find out the relationship between independent variables – price, quality, availability, customer satisfaction – and the dependent variable of purchase decision. A positive correlation between the purchasing decision and price, consumer satisfaction and a negative correlation between the purchasing decision and quality/availability were found. The authors also construct an interesting two-dimensional (price and quality) perceptual map for the major brands of lubricant oils available in India.

Pawar and Khandelwal (2011) analysed the dynamics within competitive automotive lubricants markets with large powers of the intermediaries on the supply side. The authors underline that the analysis of consumer buying behaviour shows that there is a need to spread the awareness amongst the consumers regarding product differentiation.

Srivastava (2018) conducted an empirical study in Delhi region to find the perception of consumers towards the automotive lubricants. In her research four factors have been identified. The first factor is product trustworthiness, which combines credibility, reputation, innovativeness, and commitment. The second factor is product quality, which links superiority and reliability. The third factor is marketing strategy, which mixes advertising, packaging, and promotion. The fourth factor is accessibility, which blends price, availability, and purchasing location.

Unfortunately, it was impossible to retrieve from scientific databases any previous studies concerned with investigating consumer decision-making and purchasing preferences in the specific context of engine oils purchases in European markets, especially Poland and the Czech Republic. One possible reason for this scarcity of articles may be that such research is conducted mainly or even solely by the private companies, which have little incentive to make their research public. The goal of this paper is to at least partially fill the existing knowledge gap.

MATERIAL AND METHODS

Survey Design

The statistical research covered a group of 100 drivers from Poland and 100 drivers from the Czech Republic. We assumed that 200 drivers would be a study sample large enough to obtain reliable analysis results that would give grounds to draw substantive conclusions. The empirical part of the research was conducted by means of a survey. Questionnaires were delivered to respondents electronically. The respondents were invited to participate in this study through snowball sampling (chain-referral sampling). This is a non-probability

sampling technique, in which a pool of initial respondents nominated other participants – through virtual and non-virtual social networks – who met the eligibility criteria and could potentially contribute to the study. This sampling technique is often used in hidden populations, which are difficult to access for researchers due to the fact that there are no lists or other obvious sources for locating the members of the population.

The full questionnaire consisted of 21 questions, including 15 closed questions and 6 open questions. The design of the questionnaire was preceded by an in-depth analysis of the available literature in order to create such survey questions that would correctly reflect the multi-faceted construction of the studied phenomenon. A detailed discussion of this aspect of the study is provided in Appendix A. Out of 21 survey questions, the one whose answers became the subject of the closest analysis was formulated as follows: "Please indicate the significance of the criteria determining the choice of the engine oil brand." The respondents evaluated individual criteria on a five-point scale (unimportant, not very important, quite important, important, very important) with a possibility to select an option "no opinion." The respondents assessed the subjectively perceived importance of 13 different criteria: oil price, brand loyalty, OEM specification (e.g. VW, MB, GM), the scope of information provided on the oil label, qualitative classification (e.g. API, ACEA), viscosity grade (SAE J300, e.g. 5W-30), brand familiarity, radio and TV ads, recommendations of the supplier, recommendations of the car manufacturer, recommendations of the authorised service station, recommendations of the local garage/car service, and recommendations provided by the family and friends.

Research Objective

The objective is twofold: (1) to identify/examine factors behind consumer choices when buying engine oils and (2) to examine the degree of heterogeneity between purchasers of engine oils.

Research Hypotheses

Before conducting data analysis, we formulated the following scientific hypotheses. Hypothesis A (HA): "Consumers from Poland and the Czech Republic have noticeably different decision-making processes when faced with engine oil purchase." This hypothesis will be investigated by comparing importance profiles among groups of survey respondents from both countries. We should indicate that there is no strong prior evidence to support this hypothesis. As a result, the acceptance or rejection of this hypothesis is equally probable. Hypothesis B (HB): "Consumers do not constitute a single homogenous group. They cluster into *a priori* unknown number of segments with differing importance profiles." This hypothesis will be investigated using a model-based clustering algorithm. This method will be applied to the respondents from both countries separately, if the HA is not rejected, and also the number of segments will be allowed to differ between countries. In the case when the HA does not hold conclusively, the model-based clustering will be applied to both groups merged together.

Data Analysis Methods

The main tool used in the research is the finite mixture model. Finite mixture models have been used for more than 100 years but have seen a significant boost in popularity over the last decades mainly due to the tremendous increase in the available computing

power. The areas of application of mixture models range from biology and medicine to physics, economics, and marketing. These models can be applied to data, in which observations originate from various groups and group memberships are unknown (Peel & McLachlan, 2000). An important area of application of mixture models is market segmentation, in which finite mixture models replace more traditional cluster analysis (Leisch, 2004). This is precisely the case considered in this paper.

Finite mixture models with a fixed number of components are usually estimated with the expectation-maximization (EM) algorithm within a maximum likelihood framework or with MCMC sampling within a Bayesian framework (Wedel & Kamakura, 2001). For the purposes of this research, the EM method has been applied and thus the mathematical model for latent classes has been introduced and parameter estimation briefly discussed. The finite mixture models with K components are of the following formula:

$$h(y|x,\psi) = \sum_{k=1}^{K} \pi_k f(y|x,\theta_k),\ \pi_k \geq 0, \sum_{k=1}^{K} \pi_k = 1 \tag{1}$$

in which y is an univariate or multivariate dependent variable with conditional density h, x is an optional vector of independent variables, π_k is the prior probability of component k, θ_k is the component specific parameter vector for the density function f, and $\psi = (\pi_1, \ldots, \pi_K, \theta'_1, \ldots, \theta'_K)'$ is the vector of all parameters. For example, for multivariate normal f and x ≡ 1, a mixture of Gaussians, also known as Gaussian model-based clustering is obtained. The posterior probability that observation belongs to class j is given by:

$$P(j|x,y,\psi) = \frac{\pi_j f(y|x,\theta_j)}{\sum_{k=1}^{K} \pi_k f(y|x,\theta_k)} \tag{2}$$

The posterior probabilities can be used to segment data by assigning each observation to the class with maximum posterior probability. In the above formula $f(\cdot|\cdot, \theta_k)$ is referred to as mixture components or classes, while the groups in the data are induced by these components as clusters.

Parameter estimation of finite mixture models is considered next. The mixture is assumed to consist of K components, in which each component follows a parametric distribution. Each component has a weight assigned, which indicates the *a priori* probability for an observation to come from this component, while the mixture distribution is given by the weighted sum over the K components (Leisch, 2008). The log-likelihood of a sample of N observations $\{(x_1, y_1), \ldots, (x_N, y_N)\}$ is given by:

$$log\ L = \sum_{n=1}^{N} log\ h(y_n|x_n,\psi) = \sum_{n=1}^{N} log\ (\sum_{k=1}^{K} \pi_k f(y_n|x_n,\theta_k)) \tag{3}$$

and it usually cannot be maximized directly. The most popular method for maximum likelihood estimation of the parameter vector ψ is the iterative EM algorithm (Dempster, Laird, & Rubin, 1977). In the E-part, the posterior class probabilities for each observation is estimated: $\hat{p}_{nk} = P(k|x_n, y_n, \hat{\psi})$ using Equation (2) and derive the prior class probabilities as $\hat{\pi}_k = \frac{1}{N}\sum_{n=1}^{N} \hat{p}_{nk}$ and in the M-part, the log-likelihood for each component is maximised separately using the posterior probabilities as weights:

$$max_{\theta_k} \sum_{n=1}^{N} \hat{p}_{nk} log f(y_n|x_n,\theta_k) \tag{4}$$

The E and M-steps are repeated until the likelihood improvement falls under a small prespecified threshold. During the described process, as the EM algorithm converges only to the local maximum of the likelihood, it should be run repeatedly using different starting values (Leisch, 2004). In real applications, the number of components is unknown and has to be

estimated. This can be achieved by fitting models with an increasing number of components and then comparing them using the widely known BIC (Bayesian Information Criterion).

RESULTS AND DISCUSSION

Characteristics of the Sample

The survey was addressed to both women and men; however, a vast majority of women gave a negative answer ("no") to the control question "Do you make decisions or participate in the decision-making process when it comes to changing the engine oil?" Hence, we decided that the analysis would be conducted solely on men, so the sample size of 200 represents only men.

The basic characteristics of the sample are presented in Table 1. As is typical for the vast majority of survey research presented in the literature, the survey sample was mildly skewed towards younger persons.[1] As many as 90% of respondents were in the age between 18 and 50 years old, with the range of 31-40 years (37%) dominating in Poland and the range of 21-30 (33%) dominating in the Czech Republic. As visible in Table 1, the age of the respondents is not particularly concentrated within a narrow range; however, the data analysis results may not fully represent older drivers (60 y.o. and above). The majority of the respondents (72% in Poland, 52% in the Czech Republic) held a Bachelor's or Master's degree. As many as 55% of Polish respondents live in a city of over 250,000 inhabitants, whereas in the group from the Czech Republic such respondents constituted 36% while the most numerous was the group consisting of inhabitants of rural areas (43%).

Table 1. The basic characteristics of the sample (n=200)

Place of residence	Poland	Czech Republic	Age	Poland	Czech Republic
Rural area	23%	43%	20 and below	3%	18%
City up to 50,000 residents	11%	10%	21-30	32%	33%
City up to 100,000 residents	6%	7%	31-40	37%	28%
City up to 250,000 residents	5%	4%	41-50	18%	12%
City above 250,000 residents	55%	36%	51 and over	10%	9%
Education					
Basic education /vocational education and lower secondary education	1%	4%	Secondary education	12%	27%
In college	15%	27%	Higher education	72%	52%

Source: own study.

Over 50% of the cars used by respondents had the overall mileage above 150,000 km, with the range of 200,000-249,999 km (24%) being dominant in Poland and with the range of 150,000-199,999 km (19%) being the most common in the Czech Republic (Table 2). Approximately 30% of the cars had a mileage below 100,000 km, both in Poland and in the Czech Republic. 47% of the respondents had cars with a diesel engine, while

[1] For further examples of this phenomenon, see another research conducted in the Polish context (Smol, Avdiushchenko, Kulczycka, & Nowaczek, 2018).

53% of the respondents had cars with a gasoline engine. Over 60% of the cars were manufactured after 2005, with the range of 2000-2004 (33.7%) being dominant in Poland and with the range of 2005-2009 (31%) being dominant in the Czech Republic. Approximately 10% of the respondents used cars that were over 18 years old, i.e. produced before 2000. Over 80% (Poland) and 90% (Czech Republic) of the cars were equipped with engine capacity below 2.00 dm3, with the range of 1.51-2.00 (64% in Poland and 58% in the Czech Republic) being the most frequent.

Table 2. Characteristics of the respondents' cars (n=200)

Car mileage [km]	Poland	Czech Republic	Engine	Poland	Czech Republic
<50,000	13%	16%	Diesel	47%	47%
50,000-99,999	17%	15%	Gasoline	53%	53%
100,000-149,999	12%	13%			
150,000-199,999	11%	19%	**Year of car production**		
200,000-249,999	24%	14%	<1994	1%	0%
250,000-300,000	15%	10%	1995-1999	8%	10%
>300,000	8%	13%	2000-2004	31%	23%
Engine capacity			2005-2009	25%	31%
Below 1.0 dm^3	2%	2%	2010-2014	23%	21%
1.00-1.50 dm^3	16%	30%	>2015	12%	15%
1.51-2.00 dm^3	64%	58%			
2.01-2.50 dm^3	12%	5%			
2.51-3.00 dm^3	3%	3%			
Above 3.00 dm^3	3%	2%			

Source: own study.

It is clearly visible that the data represent a broad variety of cars. There are various mileages and "years of production" present. Furthermore, the engine type and engine capacity are realistically represented in the data sample. We may conclude that from this technical viewpoint that the data give a strong foundation for further analysis.

The Semantic Differential

The collected data allows us to elaborate graphical profiles (semantic differentials) of the examined criteria, broken down by the nationality of respondents. The semantic differential (SD) is a multidimensional scale for testing attitudes towards specific objects – in this case engine oils – which allow for a quantitative assessment of differences in terms of specific concepts (here: criteria) for the indicated groups[2]. Semantic differentials enable the assessment of the intensity of separate components of tested attitudes. Thus, the semantic differential was used to analyse such responses of surveyed subjects that were related to the significance of 13 criteria determining the choice of oil brand. As mentioned in the "Materials and Methods" section, the questionnaire included a five-point scale with the option of a "no opinion" answer. Figure 1 contains the average values of the answers obtained, resulting from converting the scale expressed in words to

[2] Chráska and Chrásková (2016) provide more detailed information regarding this method.

a numerical scale with values from 1 to 5 points. Furthermore, we assumed that the answer "no opinion" would be combined with the answer "unimportant" and would also receive the value 1. In the case of consumer surveys, the lack of any opinion regarding the level of importance of a given criterion may mean a state other than answering "unimportant;" however, in the collected material, the "no opinion" answer constituted a small percentage of the total answers. Therefore, it could be assumed that such approach would not lead to the distortion of the results of the data analysis.

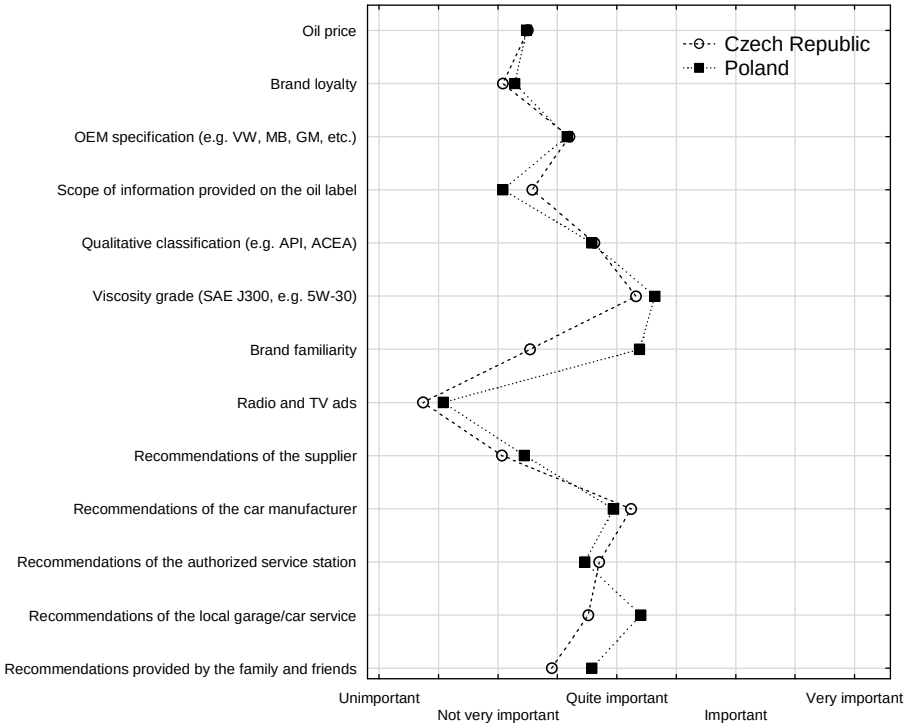

Figure 1. Semantic differential for the importance of the analysed criteria as indicated by respondents from Poland and the Czech Republic
Source: own elaboration.

After analysing the results presented in Figure 1, we see that the surveyed drivers in Poland indicate the importance of the "brand familiarity" criterion more than drivers in the Czech Republic. The average calculated on the basis of the respondents' answers was 3.2 for Poland and 2.3 for the Czech Republic. In fact, this is the only noticeable difference between the respondents from both countries. The level of importance of all other criteria can be considered to be practically the same. The most important criterion based on which drivers of both countries make the purchase of engine oils is the viscosity classification and the recommendations of car service providers. On the opposite side of the differential the respondents deemed the "radio and TV ads" criterion to be the least important selection factor. Of the five types of recommendations analysed – oil

seller, car manufacturer, ASO, car service, and family and friends – recommendations obtained from oil sellers turned out to be the least important.

Overall, the data analysis strongly rejects Hypothesis A: "Consumers from Poland and the Czech Republic have noticeably different decision-making processes when faced with engine oil purchase." We may say with confidence that – somewhat surprisingly – consumers from both countries show a similar pattern of criteria importance. As a result, the segmentation of consumers was performed on the merged data set.

Model-Based Clustering Results

As explained in the methods section, one of the research goals was to fit a mixture model to the data. The input data was binarized ("important or very important" versus the rest). To avoid a local maximum in the EM algorithm, the optimisation was restarted 100 times with random initialization. A number of components K from 1 to 7 has been investigated. The best solution with respect to the log-likelihood for each of the different numbers of components was obtained (Grün & Leisch, 2007) and the model selection was made using the information criteria (BIC; Fraley & Raftery, 1998). Noteworthy, among the checked values of parameter K, there was a special one K=1. If selected by the BIC, it would mean that the data favours the hypothesis of one homogenous group. However, for the present dataset, the BIC very strongly indicates a mixture model with 4 components (segments) as the best one. This finding directly leads to the acceptance of Hypothesis B (HB): "Consumers do not constitute a single homogenous group."

Figure 2 graphically represents the results of the model-based consumer segmentation. Each panel depicts one segment. Each header of the panel provides the size of a given segment. Each row represents one of 13 criteria. The red markings are the same in each panel and serve as a benchmark profile, since this is an importance profile constructed under the assumption of no segmentation. Grey bars represent the probability of choosing given criteria as important or very important by a member of a segment.

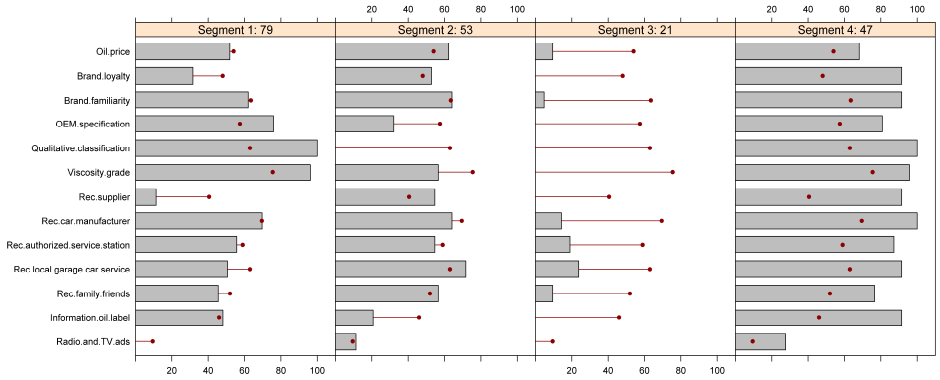

Figure 2. Results of model-based clustering
Source: own elaboration.

Figure 2 shows that segment 1 is the largest one and contains 79 drivers (39.5% of the respondents), for whom the most important in the choice of engine oil were: information about the quality classification (100% probability that members of this segment consider the

indicated criterion as important or very important), viscosity level (96%), OEM specification (75%), and to a lesser extent "brand familiarity" (62%) and manufacturer's recommendation (69%). This group includes drivers that can be described as "rational users" who pay attention to technical parameters (viscosity, quality, OEM specifications), follow their knowledge, and – importantly – do not trust the recommendations of sellers (12%) or radio and television advertisements (0%). Moreover, they do not show any clear brand attachment (33%). These findings are not particularly surprising as according to Arndt and May (1981), some consumers view commercial sources of information as problematic due to the unavailability of the perceived motives of the communicator. In a commercial setting, the communicator is perceived as not altogether independent and the recommendations may be deemed biased or exaggerated. Noteworthy, in this group there is approximately the same number of respondents from Poland (35 drivers) as from the Czech Republic (44).

The respondents from segment 2 (53 drivers, 26.5% of all respondents) pay little attention to the technical aspects of engine oils, such as quality classification (0%), OEM specifications (31%), or information on the oil packaging label (20%). What counts for them in the first place is the recommendation given by the garage service they return the car to (72%), assigning the decision-making burden to those who perform the services. As indicated by (Sherif, 1963), less knowledgeable consumers have lower confidence levels in their beliefs than more knowledgeable consumers. Therefore, less knowledgeable consumers are more likely to have a strong reliance on any type of endorsement. Moreover, we should note that respondents in this group have the strongest tendency to rely on the opinions of their family and friends (56%). The presence of this type of segment for other types of products was also identified by Gil, Andrés, and Salinas (2007), who state that "individuals frequently consider family as a reliable reference in relation to the purchase of certain products." This observation is particularly important for oil producers, since a large number of drivers strongly depend on the recommendations of car mechanics in their choices of engine oil. Therefore, strengthening commercial cooperation with them may translate into increased sales results. However, we should remember that oil price (61%) and brand awareness (63%) are also an important factor for this group of drivers. In other words, such strategy would only make sense if "endorsed" engine oils were not overly expensive or coming from relatively new producers on the market. In the discussed segment there was approximately the same number of respondents from Poland (30 drivers) as well as from the Czech Republic (23).

The third segment is a small group of drivers; about 10% of all respondents: 12 from Poland and 9 from the Czech Republic. These are respondents for whom all of the assessed criteria are of little or no importance. The presence of such a segment of drivers is not surprising, since similar trends are observed for other types of products. For example, Mourali *et al.* (2005) claim that – while it is commonly accepted that consumers may engage in pre-purchase information search before making a buying decision – it is suggested that the amount of external search will be limited rather than extensive. In turn, Olshavsky and Granbois (1980) conclude that consumers' behaviour suggests a substantial proportion of purchases does not involve decision-making, not even on the first purchase. Similarly, Hoyer (1984) states that some consumers are not motivated to engage in a great deal of decision-making at the time of purchase, when the product is purchased repeatedly and is relatively unimportant. Thus, we may assume that – for some drivers – the

purchase of engine oil is of no particular importance. This segment of drivers is potentially prospective for engine oil producers, as it is possible that there are still undiscovered non-standard features of oils that may convince these people to buy. Moreover, there is no reason to believe that this segment of respondents is a group that approached the survey carelessly or thoughtlessly. These people gave reliable answers to the remaining questions in the survey, which are of no interest to the current study. Therefore, we may assume that such type of drivers represents a small yet present segment.

The fourth segment is similar in number to the second one and includes 47 respondents (26 from Poland, 21 from the Czech Republic). This is the most "unusual" segment among the four analysed. Apart from one criterion (radio and television advertising), the respondents considered all of the other criteria to be very important in the purchasing process without explicitly indicating the most significant ones. The literature on consumer choices suggests the existence of such segments, in which consumers' statements of behaviour do not necessarily coincide with their actual behaviour (Rokka & Uusitalo, 2008; Moisander, 2007).

CONCLUSIONS

Summary of Findings

The research results suggest that the importance of all tested criteria (except one) affecting the choice of engine oil brand is practically at the same level for both Polish and Czech drivers. The exception is "brand familiarity." Apparently, Polish drivers indicate the importance of this criterion to a greater extent than drivers from the Czech Republic; however, the difference in numbers is not very striking. We may say that the most important criteria followed by drivers from both countries to purchase engine oils, are the viscosity classification and car manufacturer's recommendations. Radio and TV ads and recommendations of oil sellers turned out to be the least important criteria.

Using model-based clustering, we revealed that consumers do not constitute a single homogenous group. They cluster into four segments with differing importance profiles. We found that the largest consumer segment, over one-third of consumers (39.5%), consider the quality classification – viscosity classification and OEM specification – to be the most important criteria in the decision-making process. Furthermore, the attention of any future consumer research into brand attachment should shift from brand loyalty studies towards the study of brand familiarity.

For drivers in the second segment, the recommendations given by car service providers and the opinion of family and friends play the key role in the decision-making process. The third segment consists of a small group of drivers (10%). These are the respondents for whom all of the assessed criteria are of little or no importance. The last segment is the most "unusual" one because – apart from radio and television advertising – the surveyed drivers consider almost all of the tested criteria as very important in the purchasing process without a clear indication of the most important criteria.

Main Implications for Practice

The analysis of consumer buying decision-making revealed that there is a need of additional efforts to provide clearly visible technical specifications on the product label. The

largest extracted segment includes drivers who are mainly guided by these specific data in the purchasing process. In turn, the majority of drivers in segment 2 tend to select their engine oil based on the recommendations of car mechanics. Therefore, closer commercial cooperation with them may translate into increased sales of engine oils. Moreover, all of the respondents are characterised by quite low price-sensitivity.

Research Limitations

Just as any research, especially empirical, the above analysis has its limitations. These are mainly conditioned by the method of the sample selection and the sample size. The population was limited to engine oil buying men in Poland and the Czech Republic. Female participants of the survey generally gave a negative answer ("no") to the control question "Do you make decisions or participate in the decision-making process when it comes to changing the engine oil?" Another potential limitation of the research, which affects the correctness of its results, are slight deviations in the composition of the studied group from the typical driver population. There is a minor overrepresentation of drivers from cities and drivers with higher education. However, the age structure did not raise any particular concerns. For the above reasons, it is not possible to generalise the results. Thus, further in-depth research on this topic in other countries is still needed.

Suggestions for Future Research

An interesting direction of future research may be respondents similar to those belonging to the fourth segment presented in the section "Model-based clustering results." Perhaps this type of respondents only seemingly think that all of the decision criteria are very important. These doubts can potentially be resolved with the use of – besides Likert scales – survey questions that require respondents to directly identify e.g. three most important oil features. Economics and cognitive psychology traditionally assume that consumer behaviour is rational in the sense that consumers act consistently according to their preferences and beliefs (Rokka & Uusitalo, 2008). In the case of the consumer segment in question, it is possible that their actions may deviate from their declarations.

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Appendix

From a purely technical point of view, there are two important aspects that have to be taken into account when it comes to engine oil change. Firstly, one must provide proper engine protection and, secondly, one should address environmental concerns. An optimal oil change time is when it is possible to maintain a balance between the two aspects, i.e. when the oil is changed before it loses its properties but not too early, so as not to have an unnecessary negative impact on the environment. In ideal circumstances, consumers should prioritise these two aspects. However, practice shows that wholly different aspects can be more important to the majority of consumers. The impact of the product attributes (in this study: synthetic oils) on consumer choices may vary depending on their knowledge about the product, but also on their personal preferences. Below, we list, describe, and justify product attributes that were assessed by respondents. The selection of the indicated list of attributes was preceded by literature studies and consultations with industry experts to select a group of attributes that realistically reflect the respondents' decision-making process.

A.1 Price

According to Foster and Cadogan (2000), price is probably the most important consideration for a typical consumer. Price consciousness is defined as finding the best value, buying at sale prices or the lowest price choice (Sprotles & Kendall, 1986). Literature analysis provides information that enables the assumption that the price of engine oil should be one of the most important attributes in the respondents' opinion. However, one should be aware that price is often an insufficient criterion for choosing a product – including engine oils – if many goods from the same category are characterised by a similar price level. Moreover, oil change is not a frequent activity, so differences in prices cannot be reinforced by frequent purchases.

A.2 Brand Loyalty and Brand Identification

It is a common view that prestigious brands and their logotypes attract consumers, thus increasing the probability of first-time and frequent buying of the products that boast a well-known label (Foster & Cadogan, 2000). Many consumers assign high quality to prestigious brands. Therefore, such brands enjoy greater credibility and, ultimately, greater value (Erdem, Swait, & Louviere, 2002). Furthermore, brand personality provides links to the brand's emotional and self-expressive benefits for differentiation. This is particularly important for the brands whose products have only slight physical differences, and such include lubricating oils. That is why well-known brands can make products more recognisable for potential consumers (Keller, 2008). However, alongside well-known and global brands, there are many less-known brands on the oil market.

Brand identification is a fundamental antecedent of brand loyalty and, thus, plays a crucial role in the consumer's brand choice and buying behaviour (Ahearne, Bhattacharya, & Gruen, 2005). Brand loyalty is defined as "a deeply held commitment to rebuy a preferred product consistently in the future, thereby causing repetitive same-brand purchasing despite situational influences" (Oliver, 2014). Aaker and Keller (1990) believe that loyalty is closely related to many factors; one of the most important ones being the former experience of use. Customers can also be loyal to the brand due to psychological or economic barriers that make changing the product brand difficult. On the other hand, customers can be loyal to a brand, because they are satisfied with the quality and, as a result, they want to keep buying the products of this particular brand (Fornell, 1992).

A.3 Engine Oil Classifications and Specifications

From a technical point of view, oil classifications and specifications provided by manufacturers are the most reliable criterion for their selection. However, they require considerable knowledge and interest on the part of consumers to correctly navigate in the large number of symbols and pictograms used by producers. The commonly used viscosity classification of engine oils is SAE J300. The Society of Automotive Engineers (SAE) developed a viscosity classification, which is a set of requirements, which divides oils into 11 classes in terms of their viscosity at various temperatures. In addition to viscosity, qualitative classifications are equally important. In Europe, the oil quality testing system of the European Automobile Manufacturers' Association (ACEA) is widely applicable. However, in practice, it is the car manufacturer that determines what parameters the oil must meet in order to be applied to a given engine model. Producers can formulate the requirements in two ways: by providing their own specific standards (e.g. VW505.00) or by using the general ACEA system (e.g. ACEA A4/B3). The qualitative classification elaborated by the American Petroleum Institute (API) in cooperation with the Society of Automotive Engineers (SAE) and the American Society for Testing and Materials (ASTM) is also used around the world. It divides engine oils into two groups, marked as S (Service, for spark ignited engines) and C (Commercial, for compression ignited engines).

A.4 Information Presented on the Oil Label

One of the most readily available sources of information about a product is its label. The label serves as a carrier of information about the product, the manufacturer and the product's purpose. Part of the information contained on the label may be represented by symbols, i.e. pictograms. The effectiveness of labels as a source of information is based on the assumption that consumers will want to obtain some information before buying the good and they will use it when making their purchasing decision (Davis, 1987). Depending on the type of product, the amount of information presented on the products will vary, and in many cases these issues are legally regulated, as is the case with foodstuffs. Although consumers often claim that information on labels is an important element of their purchasing decisions, research into the use of such information by consumers when they make actual buying decisions does not provide conclusive evidence. The research conducted among Polish consumers regarding food products shows that over 40% of consumers rely on the information given on labels (Nieżurawski & Sobków, 2015). However, a much smaller proportion of respondents (20%) declare the full understanding of the information placed on product labels (Krasnowska & Salejda, 2011). In turn, the research

conducted by Kim and Lennon (2008) shows that consumers may require more detailed information about a product when shopping online in comparison to traditional shopping, because they are then inclined to a more meticulous analysis of the product label.

The amount of information presented on engine oil labels varies greatly. Most often, it is simply indicates the fact of meeting particular standards and specifications. However, as in the case of oil classifications or specifications, such information is understandable only by those who have sufficient knowledge in the field of engine oils. Similarly to the previously described role of the brand in the decision-making process, the quantity and form of presentation of information on the product label can play an important role. Consumers driven by the desire to minimise their mental effort may be willing to transfer responsibility for decision-making to external entities, which in the respondents' opinion may have greater knowledge and competences. This role can be played by industry laboratories or certifying institutions, which can be indicated on the product label.

A.5 Recommendations

Consumers, who need to make a purchasing decision and simultaneously feel the lack of sufficient knowledge, may want to use the recommendations of other people, who in their opinion are experts in a given field or at least seem to have more knowledge than they do. In particular, these may be recommendations of family members or friends, employees of authorised vehicle service centres, vehicle manufacturers, industry experts or engine oil sellers. This is confirmed by studies (Zakir, 2011), which observe that about 70% of respondents show a positive attitude towards the opinions of family members regarding engine oil selection. A visible impact of family recommendations was also noticed by Gil *et al.* (2007). The authors state that family has been considered as a powerful influencer in consumer behaviour and repetitive consumption of a brand in the family may generate a habit in the individual that may explain a subsequent loyalty to that brand. Besides family, servicing car mechanics are often entrusted with the choice of engine oil.

A.6 Radio and Television Advertising

Morden (1991) is of the opinion that advertising is used to establish the basic awareness of a product or service for a potential customer and it serves as an opportunity for the customer to gain more knowledge about it. The advertiser's primary mission is to reach potential customers and influence their awareness, attitudes, and shopping behaviour (Adelaar, CHang, Lancendorfer, Lee, & Morimoto 2003; Ayanwale, Alimi, & Ayanbimipe, 2005). Among the various possible marketing activities, advertising is known for its long-term impact on the consumer (Kuksov, Shachar, & Wang, 2013). A particular type of advertisement was the subject of the study conducted by Biswas, Biswas, and Das (2006). They find that the advertising involving experts enhances the believability of an advertisement, primarily due to an increased source of credibility. However, most oil advertisements are not product specific. In fact, they are brand advertisements that focus on the level of technological advancement. As a result, consumers find it difficult to select a specific product based on advertising alone. Nevertheless, we may conclude that such advertising strategies strongly affect the overall brand awareness. Research by Zakir (2011) shows that – despite the fact that car users have a positive attitude towards advertised engine oils (about 70% of respondents) – advertising itself is not the main reason why they choose a particular engine oil.

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Predictors of Return on Assets and Return on Equity for Banking and Insurance Companies on Vietnam Stock Exchange

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ABSTRACT

Objective: The objective of the article is to empirically examine the predictors of ROA and ROE for banks and insurance firms listed on the Vietnamese stock market.

Research Design & Methods: The authors applied a quantitative approach. A basic OLS regression model is used to investigate key proposed predicators of ROA and ROE.

Findings: Internal variables are statistically significant predictors for both ROA and ROE in the study, including firm size, book value, return on equity, years in business, and earnings per share. The direction of causality is not consistent across the ratios. Capital structure was significant and negative for ROE. Banks earned lower return on their assets and higher return on their equity than insurance companies.

Implications & Recommendations: Given the significance of internal variables such as firm size, return on equity, book value, years in business and earnings per share as predictors of ROA and ROE, management must focus on improving its internal organizational structure which affects these variables. Years in business is significant for both ROA and ROE which may reflect managers' tacit knowledge. Firms should cultivate stability within its managerial staff. To aid future growth, management must secure the proper combination of debt to equity funding.

Contribution & Value Added: This article confirms past findings of internal predictors of ROA and ROE in banking. It is one of the first studies to examine predictors of ROA and ROE for firms in the insurance industry.

Article type:	research article
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INTRODUCTION

Return on Assets (ROA) and Return on Equity (ROE) are two useful analytical measures to assess the financial performance of companies. ROA refers to how efficient an organization is with the use of its assets. ROE shows how effective a firm is in utilizing its equity. Both can assess a firm's efficiency in generating earnings from investment, but they do not represent the exact same thing. Moreover, they may generate conflicting information about the financial health of a firm (McClure, 2018). Hannagan (2008) indicates that while ROA is still in use, ROE is a better tool due to its applicability across industries and firms of varying sizes within industries. Hence, McClure (2018) indicates that ROE is one of the most important of all the essential financial ratios. These ratios are also related to the capital structure of various organizations. Capital structure of a firm is a composite of the total mix of debt and equity held by the firm (Bokpin, 2009). Nor, Haron, Ibrahim, Ibrahim, and Alias (2011) indicate that even this mix is different in nature, as debt and equity complement each other, but the problem remains how to determine the best ratio of the two to efficiently operate a business. Kumar, Colombage, and Rao (2017) suggest that capital structure determinants serve as robust pillars that give competitive advantage to organizations. Accordingly, these factors jointly shape the financial mix of an organization and are dynamic in nature. These measures were often used in assessing the financial performance of firms in industries both in developed nations and emerging markets. Vietnam is considered one of the strongest emerging markets with many developing industries.

Vietnam transformed around 1986 into a market economy managed by the central government to create a favourable business environment for both domestic and foreign enterprises. The country became a model nation for implementing economic reforms. Its GDP rose to 245.2 billion USD in 2018 and averaged 6.3% increase each year between 2005 and 2018 (CEIC data, 2019). Thus, Vietnam is one of the fastest growing economies in Southeast Asia (Nikkei Asian Review, 2019). As an emerging nation with a transitional economy, the country adopted many capitalist business traits since the early 1990s (Wang & Lai, 2013). Many corporate financial decisions – especially capital structure – are based not only on the characteristics of the company but also on the volatility of macroeconomic factors. In other words, scholars theorize that business environment – like most market economies – plays a crucial role in many Vietnamese firms' performance.

Banking and insurance industries became vital components of the Vietnamese economy. The banking industry provides financial support for other promising industries, and is a requirement for sustainable growth in any economy (Almatqtari, Al-Homaidi, Tabash, & Farhan, 2019; Menicucci & Paolucci, 2016). The Vietnamese banking industry is dominated by state-owned commercial banks. The commercial banks account for close to 90% of deposits and, thus, are more influenced by political rather than market forces. Therefore, state-operated enterprises receive preferential treatment over private enterprises. State entities can often borrow monies with little collateral insurance or loans with subsidized interest rates. Bokpin (2009) shows that bank credit is a more significant factor than macroeconomic factors in predicting the capital structure in emerging economies. The growth of foreign banks was restricted because the Vietnamese government was focused on protecting its domestic industries prior to 1990s (McLaughlin & Russell, 2002). Therefore, the financial performance and capital structure in the banking industry may be less

affected by the normal macroeconomic variables as in other free market countries. The Vietnamese insurance industry developed into a significant market and is expected to continue to grow strongly in the near future. The insurance industry is not as regulated as the banking industry, so it is attractive to foreign investors.

Globalization has driven economic growth for many Vietnamese companies and the economy overall. This is reflected in the country's strong equity indices, which list many progressive firms. The Vietnamese Equity Index, (VnIndex) is a weighted index of all the companies listed on the Ho Chi Minh Stock Exchange.

The objective of the article is to empirically examine the predictors of Return on Assets (ROA) and Return on Equity (ROE) for banks and insurance firms listed on the Vietnamese stock market. The objective of this study is to use data from a representative sample of Vietnamese firms in the banking and insurance industries listed on the Ho Chi Minh Stock Exchange to investigate factors that influence the ROA and ROE. Our study adds to the literature on the factors that predict key financial ratios. This is one of the first studies to investigate the determinants of profitability of selected firms in both banking and insurance industries.

The article starts from the review of the literature on determinants of return on assets and return on equity of banking firms in different countries. The next section of the article covers the data and methodology; which is followed by an overview of the Vietnamese banking and insurance industries. The last section of this article discusses the empirical results; and Section 6 provides the conclusions, research limitations and recommendations.

LITERATURE REVIEW

When investigating the financial strength of firms, studies mainly focus on capital structure and specific financial ratios, such as return on assets (ROA) and return on equity (ROE) (see Nguyen, 2019; Chowdhury & Rasid, 2017; Irfan & Zaman, 2014; Menicucci & Paolucci, 2016). ROA represents the net profits generated by banks' total assets while ROE represents the net profit on the capital invested by shareholders. Some researchers propose ROA as a better measure of profitability (Athanasoglou, Brissimi, & Delis 2008; Staikouras & Wood, 2004) while some indicate that ROE is a better measure (Mbekomize & Mapharing, 2017; Goddard, Wilson, & Molyneux 2004). Capital structure refers to the source of funds used by a firm to finance its business operations. Research on the variables related to capital structure and the financial ratios use very similar predictors.

Among the major predictors of ROA and ROE identified in the literature are GDP growth rate, interest rate, strength of the legal system, strength of creditor/shareholder protection/rights, stock market development, bond market development, country governance, size of firm, profitability, liquidity, competition, and business ownership (Batten & Vo, 2019; Nguyen, Hoang, & Biger 2008; Bokpin, 2009; Chowdhury & Rasid, 2016; Menicucci & Paolucci, 2016; Singh & Sharma, 2016; Almaqtari, Homaidi, Tabash, & Farhan,2019; Pacheco, 2019). These variables can be considered as either external or internal factors. External factors relate to the macroeconomic environment, which includes variables such as interest rates, GDP, the Consumer Price Index, money supply, and even the competitive structure of the market. Internal factors are the variables that reflect the internal capabilities and decisions of the organization and its managerial staff, such as years in business, firm size, capital structure, earnings, bank

ownership, and book value. Macro environmental variables describe external market conditions, in which a firm must operate.

Using ten years of data from 69 commercial Indian banks, Almaqtari *et al.*(2019) finds that bank size, assets management ratios, and financial leverage ratio affect both ROA and ROE. In this study, the macroeconomic factors that have a significant effect on ROA and ROE include inflation rate, exchange rate, and interest rate. They also report that demonization had a significant impact on ROE but not ROA. When investigating the liquidity of banks in the Indian market, Singh and Sharma (2016) identify several macroeconomic factors that affect the banking industry, including GDP and inflation rate. Their study shows that more internal factors affect a bank's liquidity, including bank size, profitability, capital adequacy, and deposits. Menicucci and Paolucci (2016) find that bank deposit level has a significant positive affect on ROE and ROA in a study of European commercial banks.

Recent studies identify several key predictors of bank profitability in the Vietnamese banking market. Assessing the effects of market competition in the Vietnam banking market, Nguyen (2019) identifies three macroeconomic variables – competition, GDP, and inflation – as significant but negative predictors of ROA and ROE. Most of the internal variables are not key predictors of bank profitability, including bank size, liquidity, equity capital, nonperforming debt, and mergers and acquisitions. Since the findings show a nonlinear relationship between competition and profitability, Nguyen (2019) theorizes that the penetration of foreign banks undermines the marketing power of Vietnam banks. He calls for stronger protectionist policies. His findings do not show a consistent relationship between several key internal variables, including bank size, liquidity, equity capital, non-performing debt, and bank profitability. Nguyen *et al.*, (2019) investigation of the financial soundness of Vietnamese commercial banks finds that overheads, deposits, ownership, and non-interest earning ratios negatively impact banks' financial soundness, whereas capital structure and bank reserves have a positive effect on banks' performance. Cuong and Ha (2018) examined factors that affect the financial management of 320 non-financial firms listed on the Vietnamese stock exchange. They identify seven financial factors – including ROA – as significant predictors of firms' success. Batten and Vo (2019) discover that both internal factors and macroeconomic variables affect bank profitability in the Vietnamese banking industry. Their findings identify bank size, capital adequacy, risk, expenses, and productivity as important predictors of ROE and ROA. Similarly, the direction of causality of predictors were not consistent across neither ROE nor ROA.

Research on the profitability of firms in the insurance market is limited. Using a panel data set from 41 insurance companies, Rahman, Jan, and Iqbal (2018) examine the profitability in this industry to reveal both endogenous and exogenous factors that influence profitability in Pakistan. Their findings show that business risk, leverage, and inflation significantly yet negatively affect profitability. Meanwhile, firm size and GDP rate affect profitability significantly and positively. Although their study does not specifically address ROA and ROE, it still provides insightful information about the market. Similar studies investigate variables related to firm efficiency measures – not specifically ROA and ROE –in the insurance industry in other countries (Hussels & Ward, 2005; Luhnen, 2009; Afza & Kauser, 2012; Akhtar, 2018).

There is a rich history of empirical literature on the nature and effects of factors related to financial ratios in developed economies, but the research on ROA and ROE in

emerging economies – and insurance industry specifically – remains limited but developing (Kumar Colombage, & Rao, 2017). Vietnam is considered one of the strongest emerging economies in Southeast Asia (Nikkei Asian Review, 2019), and its banking and insurance industries are vital to the country's continued economic development. Although several recent studies scrutinize the predictors of profitability in the banking industry (Batten & Vo, 2019; Nguyen, 2019), their findings are mixed and limited. To date, there is very little empirical data on the predictors of ROA and ROE among firms in the insurance market. Given the importance of both these sectors to the Vietnamese economy, scholarship requires more research to examine these factors, as they affect key financial ratios, such as return on assets and return on equity of firms. Based on the literature review, we propose the following hypotheses.

Hypotheses for Return on Assets, specified equation (1):

H0: Independent variables have no effect on Vietnamese banking and insurance companies' Return on Assets ($\beta i = 0$).

H1: Independent variables have an effect on Vietnamese banking and insurance companies' Return on Assets ($\beta i \neq 0$).

Hypotheses for Return on Equity, specified equation (2):

H0: Independent variables have no effect on Vietnamese banking and insurance companies' Return on Equity ($\beta i = 0$).

H1: Independent variables have an effect on Vietnamese banking and insurance companies' Return on Equity ($\beta i \neq 0$).

MATERIAL AND METHODS

Research Methods and Econometric Model

Several prior studies show that the ordinary least square linear regression model is acceptable for this form of analysis (Athanasoglou *et al.*, 2008; Tiberiu, 2015; Menicucci & Paolucci, 2016; Saona, 2016; Hoang, Nguyen, & Hu, 2017; Almaqtari *et al.*, 2019). The hypotheses were tested by estimating the following regression equations:

For the return on assets:

$$\begin{aligned} roa_{i,t} = \beta_0 + \beta_1 roe_{i,t} + \beta_2 cps_{i,t} + \beta_3 lta_{i,t} + \beta_4 age_{i,t} + \beta_5 bvs_{i,t} + \beta_6 lep_{i,t} + \beta_7 stp_{i,t} \\ + \beta_8 cpi_t + \beta_9 gdp_t + \beta_{10} per_t + \beta_{11} bms_t + \beta_{12} crs_t + \beta_{13} dum_t + \varepsilon_{i,t} \end{aligned} \quad (1)$$

And for return on equity:

$$\begin{aligned} roe_{i,t} = \beta_0 + \beta_1 roa_{i,t} + \beta_2 cps_{i,t} + \beta_3 lta_{i,t} + \beta_4 age_{i,t} + \beta_5 bvs_{i,t} + \beta_6 lep_{i,t} + \beta_7 stp_{i,t} \\ + \beta_8 cpi_t + \beta_9 gdp_t + \beta_{10} per_t + \beta_{11} bms_t + \beta_{12} crs_t + \beta_{13} dum_t + \varepsilon_{i,t} \end{aligned} \quad (2)$$

where:

stp - stock price;
cps - capital structure – total debt to total asset ratio;
roa - return on asset;
roe - return on equity;
lta - natural log of total assets;
age - number of years in business;
bvs - book value per share;

lep - natural log of earnings per share;
per - price to earnings ratio;
cpi - annual percentage change in consumer price index;
gdp - annual growth of the GDP;
bms - annual change in Broad money supply M_2;
crs - annual percentage change in credit extended to the economy by the central bank;
dum - dummy variable with the value of 1 if the company is a bank or 0 if the company is an insurance corporation;
β_j - $j = 0, 1, 2, 3, \dots, 13$ are coefficients to be estimated;
$\varepsilon_{i,t}$ - is the error term of the regression model.

Data

Annual data from 16 Vietnamese banks and ten insurance companies listed on the Ho Chi Minh Stock Exchange were extracted from consolidated financial reports of the listed banks and insurance companies on the Stock Exchange. The data on the % changes in broad money supply M_2 and in credit to the economy were collected from different IMF annual reports on Vietnam under Article IV of the IMF's Articles of Agreement. The IMF holds bilateral discussions with members, usually every year.

To scale down the different values in the data, the earnings per share and the total assets are the natural logarithms of actual values. Table 1 summarises the descriptive statistics for these variables of the model.

Table 1. Descriptive statistics of variables (annual data: 2008-2017)

Variable	Mean	Median	Max.	Min.	Std. Dev.	Skew.	Kurt.	Obs.
ROA	0.80	0.03	8.10	-5.99	1.65	2.11	9.46	251
ROE	3.87	0.13	25.20	-56.33	7.15	-1.49	21.75	256
LTA	6.41	6.25	9.08	3.38	1.50	-0.06	1.92	257
AGE	21.76	20.00	61.00	1.00	12.99	1.33	4.56	246
CPS	30.16	11.34	558.06	-55.91	54.26	6.77	58.24	257
BVS	2.05	1.23	4.50	0.30	1.41	0.74	1.64	253
LEP	2.75	3.01	3.92	-3.66	0.96	-3.44	19.05	252
STP	17.41	13.80	64.50	2.10	11.70	1.49	5.45	153
CPI	8.38	6.60	22.97	0.63	6.76	1.05	2.93	257
GDP	6.03	5.98	6.81	5.03	0.60	-0.21	1.79	257
PER	21.65	8.60	350.00	1.33	50.53	4.78	26.54	151
BMS	19.84	18.40	33.30	12.10	6.06	1.12	3.23	257
CRS	20.05	17.40	39.60	8.70	9.05	0.94	2.82	257

Source: cophieu68.vn and IMF Reports and calculations by the authors.

Overview of Vietnamese Banking and Insurance Industries

Over the past three decades, the Vietnamese government undertook a series of reforms to modernize the banking sector as part of the country's move towards a more open and market-oriented economy. Many of these reforms were motivated by Vietnam's growing participation in international agreements and its ongoing efforts to adopt international standards, such as the Basel capital framework (Nguyen, Stewart, & Matousek 2018). The

main objectives of the reforms include a restructuring of the banking system, gradual opening to foreign direct investments, partial privatization of state-owned banking institutions, and measures to strengthen the capitalization of Vietnamese banks. A part of the reform included transforming the Vietnamese banking industry from a mono system to a two tier banking system with the State Bank of Vietnam (SBV) as the first tier and four lower specialized state-owned banks serving as the second tier in 1986–2009 (Nguyen *et al.*, 2018). In 1990, banking rules were changed and the banking system opened to non-state-owned and foreign banks. The non-state-owned commercial bank sector consists of joint stock commercial banks, branches of foreign banks, joint venture commercial banks, and foreign commercial banks. State-owned commercial banks still maintain a competitive edge over other banks. Stewart, Matousek, and Nguyen (2016) indicate that, "three of the five state owned commercial banks held 45% of customer deposits, 41% of total assets and 51% of customer loans." Although state-owned banks issue the majority of loans, it is not a favourable financial situation, because state-owned banks hold a disproportionate number of non-performing loans compared to non-state-owned commercial banks (Nguyen *et al.*, 2018). Many of the Vietnamese commercial banks focus on granting more short-term, loans which also affects their profitability (Nguyen *et al.*, 2008), and most of these loans are granted to state-owned enterprises (Nguyen & Ramachandran, 2006). Nguyen *et al*. (2018) comprehensively investigate the Vietnamese banking industry to find that the five state-owned commercial banks still dominate the whole banking system, but non-state-owned commercial bank are more efficient. One of the conclusions of their report is that – given the market structure – the Vietnamese banking system still operates as a monopoly. According to Van-Thep and Day-Yang (2019), the Vietnamese banking industry faces many difficulties, including credit risk, liquidity risk, lack of competiveness, and low governance capacity which results in poor performance.

The Vietnam insurance industry is very dynamic and expanding with growth expected in all sectors of the industry (Trang, 2018). The industry is fragmented but the two largest segments are life insurance and non-life. The life insurance segment is the largest, accounting for 45.6% of the insurance industry's gross written premium in 2013. Insurance companies and brokers are governed by a specific Insurance Business law established in 2009, administered by the Ministry of Finance. Insurance companies may be entirely foreign own entities or joint venture organizations. They may be licensed for up to 50 years, but they are prohibited from providing insurance to state-owned enterprises (McLaughlin & Russell, 2002).

In 2016, the Association of Vietnam Insurers (AVI) listed a total 63 companies in the insurance industry, including 31 non-life, 17 life insurance, two reinsurance companies, one foreign life insurance branch, and 12 insurance brokers. The number of insurers in the market is projected to increase by over 50% within two to three years. The Vietnamese insurance market total revenue was estimated to be worth over 100,000 billion VND in 2016. The insurance industry revenue represented 2% of the country's GDP in 2016 and is forecasted to more than double its share of GDP in five years, according to the Association of Vietnam Insurers. Tiwari (2018) indicates that, "Vietnam has one of the world's most dynamic and rapidly expanding insurance industries."

Unlike the banking industry, the Vietnamese insurance industry is not dominated by state-owned firms. Market growth and development is attributed to foreign companies,

which dominate the market either by direct investment or joint ventures. Foreign companies bring experience and training to a young underdeveloped market, which is ripe for growth. The Vietnamese market is very attractive, because the *per capita* income increases while the population ages (World Bank, 2019). Older Vietnamese are becoming more sensitive to the need for insurance, especially life insurance (Trang, 2018). The percentage of people in the middle class grew from 21% to 39% in 2012-2016. Although the majority of the population is considered young, the percentage of 45 years and older grew from 26% to 31% in 2014–2016, which indicates an aging population.

Vietnamese insurance agencies are predicted to expand distribution channels through banks, joint ventures, and foreign direct investments, as more international firms come into the market (Trang, 2018). Several large USA-based insurance companies or brokers entered the Vietnamese markets with offices in both Hanoi and Ho Chi Minh City. The largest segment of the market is life insurance, which experienced the fastest growth between 2012–2017. In this period, the life segment grew by 28% compared to only 12% for the non-life insurance segment. The non-life insurance segment provides coverage for homes, cars, and businesses. Large foreign insurance companies dominate the life insurance segment with 78% share of the market. The segment is predicted to grow by nearly 30% (Li, 2018). American insurance firms, such as Prudential, AIG, and Chubb, compete in this segment. Domestic insurance firms are more dominant in the non-life insurance segment with Bao Viet as the largest domestically-owned company. Bao Viet competes in both segments of the insurance market (Trang, 2018).

RESULTS AND DISCUSSION

Theoretically, a panel data set with 16 banks and ten insurance companies over a ten-year sample period should have 26x10 = 260 observations. As is always the case with emerging economies, missing data is a formidable challenge in empirical studies. Our investigation faced a similar challenge. The missing data reduced the data set to only 145 complete data points out of possible 260 observations and rendered the observations to an unbalanced panel data set.

In this analysis, the robustness of models is tested with two estimation methods and the above data set. A few available methods may be used to estimate equation (1) using unbalanced panel data. Given the relatively few observations with 145 complete data points and a model with 13 independent variables, this analysis uses the Panel Least Squares and Generalized Linear Model (Newton-Raphson/Marquardt steps) to estimate the model.

Interestingly, the results from the two estimation methods are identical in terms of statistical significance of the estimated coefficients. Table 2 summarizes the estimation results from the Panel Least Squares method for both equation (1) and (2). We provide the estimation results from Generalized Linear Model (Newton-Raphson / Marquardt steps).

The analysis of estimation results for the return on assets in equation (1) reveals that the model fits the data set very well, as evidenced by the F-statistic = 38.2954, which is significant at the 1% level. The adjusted $\overline{R}^2 = 0.77$ is also very good for panel data. For the sample companies, factors which were statistically positive and significant at the 1%

level for ROA included, the estimated coefficient for the return on equity, $roe_{i,t}$, firm size, measured with the natural logarithm of the total assets of the company, $lta_{i,t}$, in Vietnamese "dong," and the book value per share. Since the natural logarithmic function cannot operate on a negative number, we take its natural log of absolute value and then assign a negative sign to the result so as to transform the negative number into a natural algorithmic value. These findings suggest that return on equity, firm size, years in business, book value, and earnings per share affect return on assets of companies. The estimated coefficients of the years that the companies were in business and the natural log of earnings per share are negative and significant at the 1% level, which is counterintuitive.

Table 2. The estimation of results for Equation (1) and Equation (2) for 2008-2017 annual data

Variable	Return on Asset (ROA)			Return on Equity (ROE)		
	Coeff.	t-stat.	Prob.	Coeff.	t-stat.	Prob.
Return on Assets	–	–	–	1.991	9.0245	0.000
Return on Equity	0.193	9.025	0.000	–	–	–
Firm size	0.286	3.264	0.001	-2.461	-12.403	0.000
Years in business	-0.044	-5.686	0.000	0.166	7.0197	0.000
Capital Structure	0.001	0.542	0.589	-0.012	-3.226	0.002
Book value per share	0.558	7.194	0.000	-1.018	-3.621	0.000
Earnings per share	-0.513	-5.682	0.000	1.022	3.281	0.001
Stock price	0.006	0.719	0.474	0.026	0.946	0.346
Percentage change in CPI	0.013	0.950	0.344	0.041	0.937	0.350
GDP growth	-0.091	-0.657	0.512	-0.066	-0.147	0.884
Price to earnings ratio	-0.001	-0.841	0.402	-0.001	-0.412	0.681
Percentage Change in M2	0.008	0.364	0.717	-0.024	-0.352	0.725
Credit to the economy	0.006	0.340	0.735	0.015	0.296	0.768
Dummy	-1.146	-6.430	0.000	4.467	8.446	0.000
Constant	0.552	0.494	0.622	10.995	3.173	0.002
Diagnostic Statistics	$\overline{R}^2 = 0.7710$ F – statistic $= 38.2954$* Log likelihood $= -167.3973$ Akaike info criterion $= 2.5020$			$\overline{R}^2 = 0.8031$ F – statistic $= 46.18209$* Log likelihood $= -336.745$ Akaike info criterion $= 4.8379$		

Source: Data from Annual reports of banks and insurance companies listed in Ho Chi Minh Stock Exchange. * indicates the significance level at the 1%.

Finally, the dummy variable in equation (1), dum_t, was assigned the value of zero if the data was from an insurance company and one if the information was from a bank. This value assignment to dum_t and its estimated coefficient is negative and significant at the 1% level, which suggests that banks and insurance companies listed in the Ho Chi Minh Stock Exchange have different levels of return on assets. The findings suggest that ROE, the years firms were in business, the book value of firms, and earnings per share influence the insurance industry stronger than the banking industry. More specifically, the estimated coefficient of the dummy variable is negative and significant, which suggests that banks earned lower return on their assets than insurance institutions.

A closer look at the estimation results for the return on equity, equation (2), reveals that the model fits the data set very well, as evidenced by the F-statistic = 46.182, which is significant at the 1% level. The adjusted $\overline{R}^2 = 0.80$ is also very good for panel data. Regarding factors

that influence the return on equity of sample companies, the estimated coefficients for the return on assets, $roa_{i,t}$, years in business, and the natural log of earnings per share size are positive and statistically significant at the 1% level. The estimated coefficients of firm size, measured by the natural logarithm of the company's total assets, book value per share, and capital structure are negative and significant at the 1% level. These findings indicate that all these elements negatively affect the return on equity of the companies.

Finally, the dummy variable in equation (2), dum_t, was also assigned the value of zero if the data is from an insurance company and one if the information is from a bank. The estimated coefficient for this dum_t is positive and statistically significant at the 1% level. Again, this suggests that banks and insurance companies listed in the Ho Chi Minh Stock Exchange have different equity structures. More specifically, this finding suggests that Vietnamese banks earned higher return on their equity than insurance institutions.

The results corroborate the mixed findings regarding the effects of macroeconomic and internal variables reported in many studies on ROA and ROE. In our study, none of the macroeconomic variables were predictors of either ROA or ROE. However, previous studies do find both types of variables as predictors of these financial measures; namely, Batten and Vo (2019) and Nguyen (2019), who specifically study the Vietnam banking market and report both macroeconomic and firm-specific factors to predict bank profitability. Nguyen (2019) reports a non-linear relationship between bank profits and competitive factors in the Vietnamese banking market. Almaqtari *et al.* (2019) and Singh and Sharma (2016) report that internal variables predict both financial measures in a study of the Indian banking market. Almaqtari *et al.* (2019) find no external variables to predict ROA but several to predict ROE. Singh and Sharma (2016) show that GDP and inflation are significant predictors of bank liquidity. In this study, the majority of the factors that influence bank liquidity are internal variables, such as bank size, profitability, capital adequacy, deposits, and years in business.

While specific research on factors that predict the profitability of insurance firms is unavailable, related research by Trang, Thai, Tuan, and Tho (2017) seems to corroborate the importance of internal factors on the financial behaviour of insurance firms. Trang *et al.* (2017) show that internal variables ROS (earnings before tax on sales) and ETA (measure of owners' equity to assets) are positively related to stock trading efforts of insurance firms.

CONCLUSIONS

Empirical results show that the major predictors of key financial ratios – the Return on Assets and the Return on Equity – are the internal variables affected by firms' financial management decisions. Significant predictors of Return on Assets are return on equity, firm size, years in business, book value, and earnings per share. For Return on Equity, the key predictors are return on assets, firm size, years in business, capital structure, book value, and earnings per share. A closer review of our findings reveals that – while these key predictors are significant – the causality is not consistent across both ROA and ROE, similar to the findings of Batten and Vo (2019) and Almaqtari *et al.* (2019). Capital structure is normally an important factor for many firms, but in our study it appeared only as a significant but negative predictor of return on equity and not a predictor for return on assets. Furthermore, the results show that banks earn lower return on assets and higher return on equity than insurance companies. The findings about banks may be indicative of what

Nguyen *et al.* (2018) reported about Vietnamese banks which operate in a monopoly market structure. The insurance market is regulated but does not appear to be as controlled by the government as the banking industry, which may mean that insurance companies are less restricted in pursuing business opportunities. As mentioned above, state-owned banks account for a sizeable amount of bank loans, and many of these loans are underperforming loans to state-owned enterprises.

Since internal variables are significant predictors of these key variables, management must focus efforts on improving its internal structure. Since years in business is significant for both ROA and ROE, it may be a reflection of the tacit knowledge and decision-making ability of managers, especially in the insurance industry. Tacit knowledge is gained through experience, which is difficult to transfer but could be a major contributor to effective managerial and financial decisions. Therefore, firms should cultivate stability among their management staff. Book value is a gauge that investors use to evaluate a stock's value, which is significant and positive for ROA, though significant and negative for ROE. Thus, management must work to secure the proper combination of debt to equity funding. Both ratios – along with capital structure – are important and can improve a firm's ability to attract new funding for future growth in both industries.

Research Limitations and Suggestions for Further Studies

This study used data from only 26 firms, mostly banks, over a ten-year sample period. To increase the reliability of our generalizations, the sample size should be increased according to the projected changes in the Vietnamese economy. As mentioned above, the Vietnam economy is expected to continue its rapid growth. Therefore, the number of firms trading on the stock market should increase, because it is an attractive mechanism to raise capital. Additionally, the mix of government owned to private own banks is changing because more banks are being converted to private ownership. This could affect the competitive market structure which Nguyen (2019) shows can affect performance of the banks in the industry. Since major macroeconomic variables were significant predictors of both ROA and ROE in other studies but not his study, future research is needed to see if this is still the case because of the changing market structures. The insurance market in Vietnam is expected to continue its growth and will become an even more attractive investment opportunity for local and international firms. As the insurance market expands and matures, industry specific research will be needed to explore factors that affect profitability and other market issues.

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Talent Management in SMEs: An Exploratory Study of Polish Companies

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ABSTRACT

Objective: The main goal of the study is to identify and map practices of TM in SMEs and search for common patterns. The main questions during the design of the research were: How do SMEs define talent and what are its indicators? What is the approach to TM in SMEs? What kind of activities relating to TM do SMEs undertake? Is it possible to link activities undertaken by SMEs in coherent patterns?

Research Design & Methods: This exploratory study was conducted on a randomly selected 200 Polish SMEs. After collecting the sample, we employed the CAPI technique. Most of the questions were open-ended and multiple-choice. In the analysis, we used data clustering and descriptive statistics.

Findings: The research confirms that talent management in SMEs occurs in various ways, while particular approaches differ significantly. However, taking into account such categories as talent indicators, main activities undertaken, talents' tasks and roles, we can identify some common patterns.

Implications & Recommendations: The main implication is that a variety of approaches to TM in SMEs requires the application of a contextual framework, which should include the specificity of both internal and external factors. We recommend SMEs' owners and managers define the main aim of introducing TM practices and shape them in a way that allows fulfilling expected outcomes.

Contribution & Value Added: This paper addresses three main research gaps. By presenting data gathered from 200 SMEs we refer to a call for empirically grounded studies. By conducting cluster analysis and developing a model, we refer to the lack of conceptual frameworks of TM in SMEs. Finally, we address a call for more context-specific research by presenting data on TM practices in Polish SMEs.

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INTRODUCTION

Talent management (TM) is a dynamically developing field of research, proven by a number of publications and findings that describe the current understanding of this area (Al Ariss, Cascio, & Paauwe, 2014; Collings, 2014; Morley, Scullion, Collings, & Schuler, 2015; McDonnell, Collings, Mellahi, & Schuler, 2017). Most literature that reviews articles continuously raises two issues. The first refers to the underrepresentation of empirically grounded research (McDonnell *et al.*, 2017); the second indicates the insufficient consideration of contextual issues (Lewis & Hackman, 2006; Collings & Mellahi, 2009; Dries, 2013a; Dries, 2013b; Al Ariss *et al*., 2014). The application of a contextual framework can be of the highest importance when analysing TM processes in small and medium-sized enterprises (SMEs). According to Krishnan and Scullion (2017), "the notion of talent management is not replicable to SMEs and the conceptualisation of TM as proposed for large firms needs adaptation in the SME context. SMEs experience a greater degree of instability in their structural forms and management processes" (p. 432). Moreover, as Festing Harsch, Schäfer, and Scullion (2017) indicate, "there is need for theoretical perspectives and conceptual developments to increase understanding in TM area, and more generally to explain why talent management in SMEs differs from that in large organizations" (p. 488). Festing *et al*. (2017) attend to three issues: the challenges of TM in SMEs in the context of the labour market, the understanding of talent in SMEs, and the differences in the TM system with regard to cultural differences in particular countries. Despite the fact that they identify such research gaps, the majority of research concerning TM studies large or multinational enterprises (MNEs), leaving TM practices in SMEs insufficiently investigated.

This paper contributes to the debate on TM by addressing three main research gaps raised in the literature. Firstly, by presenting data gathered from 200 SMEs, we provide more detailed information concerning talent management practices in SMEs. Secondly, by conducting cluster analysis and developing a theoretical model of TM in SMEs, we refer to the lack of conceptual frameworks of TM in SMEs. Our findings are grounded in empirical research and are built on the basis of identified actions undertaken by SMEs. Thirdly, by presenting data of TM practices in Polish SMEs – the sixth largest country in the EU population-wise (Eurostat, 2018) – we respond to the call for more context specific research. Moreover, this paper discusses alternative approaches to TM – those developed in SMEs – and presents a conceptual framework of talent management approaches in SMEs, which may widen the theoretical discussion about the boundaries of the phenomenon. Moreover, we present the SME owner/manager perspective while mapping talent management practices. Such a viewpoint is rarely investigated, as most research assumes the perspective of the HR manager or specialist.

In our research, we assume that SMEs do not implement solutions and best practices developed in large companies (often MNEs). The rationale for such an assumption stems from three predictors. Firstly, SMEs in general do not have HR departments responsible for executing HR functions. Secondly, SMEs suffer from limited resources, which results in reducing or optimising supportive functions, also HR departments (Price, 2004; Patel & Cardon, 2010; Razouk, 2011; Pocztowski & Pauli, 2013). Thirdly, HR activities in many SMEs are executed by owners or managers, who may not have developed the required level of competence required for designing TM. As a result,

such enterprises may develop different TM practices, which are highly related to the context in which they operate and to resources they have.

This article is divided into three sections. The first consists of a literature review referring to TM, TM in the context of Poland and TM in SMEs. In the second section, the methodology and results of our research are presented; this is followed by a discussion of the findings with regard to previous research and theory.

LITERATURE REVIEW

Talent Management in Organisations

Although there are many papers about TM, the definition of talent is still an issue that needs consideration. Talent definition is constantly discussed whether talent is innate or acquired and whether the designation of talent should be based on potential or performance (Thunnissen, Boselie, & Fruytier, 2013; Morley *et al*., 2015). The complexity of these issues is coherently presented by Dries (2013b), who indicates that the definition of talent can include six perspectives: talent as capital, talent as individual difference, talent as giftedness, talent as identity, talent as strength, and talent as the perception of talent. Moreover, according to Gallardo-Gallardo, Dries, and Gonzalez-Cruz (2013), talent is often equated to excellent performance or to unique or above-average skills and abilities. On the basis of the literature review, they identify approaches to talent that refer to talent as a natural ability, mastery of systematically developed skills, commitment and motivation, fit between an individual's 'talent' and the work context (Gallardo-Gallardo *et al*., 2013).

Recent studies mostly concentrate on referring to strategic positions, jobs, or roles. These studies analyse talent in reference to positions that have a direct and explicit impact on a firm's performance and can, thus, be regarded as pivotal (Collings, 2014). Due to such an understanding, Cappelli and Keller (2014) suggest including high performing (HP) and high potential (HiPo) candidates in the group of those that fulfil *strategic jobs*. A similar understanding of talent appears in Becker and Huselid (2006), they argue that the value of talented employees depends on the position they occupy. The consideration of roles that these talented employees occupy enables the classification of all employees with regard to the effects a particular employee or job can produce (Huselid & Becker, 2011). Thus, it is very important to identify pivotal positions within the organisation. Such an approach agrees with the findings of Collings and Mellahi (2009), who argue that organisations should differentiate employees regarding tasks they fulfil or positions they occupy. They indicate that pivotal positions or jobs should be filled by high performers with high potential. According to Cappelli and Keller (2014), such a differentiation refers to the historical view of TM, which assumes that strategic jobs are related to executive positions. Due to changes in the business environment and the flattening of organisational structures or their organisation around processes, pivotal jobs and managerial positions no longer have to be mutually inclusive.

Despite the fact that talent management can be classified with the use of different criteria, the findings of Collings and Mellahi (2009) outline four different approaches to talent management – people, practices, position, and strategic pools approach – which highly reflects the scope and aims of the research conducted in the field. On the basis of these approaches, Iles, Chuai, and Preece (2010) propose a four-square model. They divide

TM programmes implemented in MNEs by taking into account two dimensions: orientation on people (PE) versus position (PO); exclusiveness (E) versus inclusiveness (I). The developed model consists of four approaches: (1) key individuals or 'stars' (PE-E); (2) everyone has a talent and potential (PE-I); (3) social capital development in pivotal positions (PO-I); (4) the right people to fill key positions (PO-E).

Collings and Mellahi's (2009, p. 304) research results led to the development of a coherent definition of TM as:

> "activities and processes that involve the systematic identification of key positions which differentially contribute to the organisation's sustainable competitive advantage, the development of a talent pool of high potential and high performing incumbents to fill these roles, and the development of a differentiated human resource architecture to facilitate filling these positions with competent incumbents and to ensure their continued commitment to the organization".

Activities and processes indicated in the definition should concern talent acquisition, identification, selection, development, remuneration, retention, and career planning (Boxall & Macky, 2009; Nijs, Gallardo-Gallardo, Dries, & Sels 2014; Morley *et al.*, 2015). According to Collings and Mellahi (2009) the identification of pivotal positions should be the first step in the design and implementation of talent management systems, because it enables the identification of HPs and HiPos who are the potential participants of such TM programmes. Moreover, Boudreau and Ramstad (2004) state that actions connected with TM should be considered in terms of three elements: impact, effectiveness, and efficiency.

We may conclude that TM consist of advanced schemes and practices aimed at building employer branding, attracting candidates, selecting those with the highest potential – or identifying them within the organisation – creating appropriate working conditions that enhance creativity (Ingram, 2016), providing developmental programmes, and motivating and remunerating talented employees in accordance with the added value that they create. TM programmes not only enable the use of competences that employees already have but also focus organisations on creating new knowledge, developing skills, and building attitudes that are (or may be) crucial for achieving strategic goals.

The Polish Context of Talent Management

Talent management in Poland is a rapidly growing field of scientific research, but also a central interest of many HR managers and specialists. Approaches to TM in Polish companies are mainly determined by two factors. The first refers to the change in HRM, which started three decades ago, while the second to the labour market dynamics.

After the collapse of command economy, the HR approach in Polish companies significantly changed. Undoubtedly, MNEs played a crucial role in the transformation of HR in Poland. The shift occurred due to both FDI and the arrival of foreign managers in leadership positions, which resulted in the implementation of Western European and North American business models. The new situation caused the inclusion of strategic HRM in companies and the removal of egalitarianism, which implies the implementation of more diversified reward systems. Thus, high performers started to play an important role in assuring business outcomes (Morley, Poor, Heraty, Alas, & Pocztowski 2016). This change increased the interest in managing particular groups of employees, one of which is tal-

ented workers (Miś, 2011). TM programmes implemented at the initial stage of HR development in Poland were strongly based on foreign solutions, as there previously were no Polish approaches, models, and processes in this regard. Foreign solutions partly corresponded to the Polish context, in which employees are generally characterised as having a "high level of uncertainty avoidance, a middle level of power distance, individualism, masculinity, inner control, are traditionalists rather than secular-rationalists, and mostly survival-oriented, emphasising economic and physical security rather than focusing on self-expression and quality of life" (Listwan, Pocztowski, & Stor, 2009, p. 103). Moreover, in the 1990s and the early 2000s, the attitude of Polish workers to work was influenced by the expectation of high development and achievements, which was raised on the basis of new opportunities offered by the political transition and, later, the accession to the European Union. Such a change in attitudes was a perfect foundation for the implementation of TM programmes. As for now, HR practices are still strongly influenced by solutions developed in other countries, as Poland is at third place in the world rank "a new place for SSC" (Deloitte, 2017), and new SSC branches open every year.

The second factor that impacts approaches to TM refers to labour market dynamics. After the transition and implementation of new regulations in the 1990s, the proportion of unemployed people in Poland was rising. In 2001, the unemployment rate reached 17.4%, which was the highest in Europe. In 2003, unemployment stood at 20.1%. The share of Poles with higher education simultaneously increased from 2% in 1990 to 12% in 2004 (Listwan *et al*., 2009). As a result of these factors, many companies were able to hire employees with high levels of competence and motivation. Thus, HR managers and specialists focused on implementing detailed multistage practices for selecting candidates, because the number of applications allowed them to choose the highest potentials. However, in many cases, employees were overeducated with regard to the tasks they were to fulfil.

After the accession to the EU in 2004, many international employment agencies were set up in western countries to serve companies that wished to hire Poles, as they were perceived as professional, responsible, creative, and hard-working (Listwan *et al*., 2009). However, many Polish companies simultaneously complained that Poland suffers from brain drain, as many workers migrated to Western countries (the unemployment rate decreased from 20% in 2004 to 9.5% in 2008). This caused companies to start paying more attention to talent development and retention in order to prevent turnover.

Currently, Polish companies face many difficulties with hiring employees. The unemployment rate in June 2018 was at 5.9%, but in large cities the shortage of candidates – especially those highly qualified – is starkly noticeable; the situation effects SMEs in particular. Their share in the total employment is at 30% and – according to Statistics Poland – they have recently increased investments in talent development. This causes SMEs to seek new employees, but they spend less on employer branding and are perceived as offering worse working conditions than larger companies. This makes SMEs pay more attention to attracting valuable candidates and retain those who are already employed.

The emerging and rapidly growing interest of Polish companies in TM is reflected in the number of scientific research and publications. In 2006, a report on TM in Poland was published by The Conference Board with results of empirical research. Until now, numerous articles and some textbooks appeared that present approaches and practices of TM in Poland (e.g. Borkowska, 2005; Pocztowski, 2008; Ingram, 2011; Miś, 2011; Tabor, 2013;

Skuza, 2018), some of them with the cooperation of foreign researchers (e.g. Skuza, Scullion, & McDonnell, 2013; Waters-Sobkowiak, Kowalski, & Smits, 2018). However, there are no publications that directly refer to TM in SMEs.

Talent Management in SMEs

The results of Rauch and Hatak's (2016) research may be used as the starting point for analysing HRM practices in SMEs. They find a positive cause and effect relationship between HRM activities and performance. Moreover, they argue that such a relationship can be stronger in SMEs than in larger companies. Similar conclusions were raised by Vlachos (2009) who compares HR practices at consecutive stages of SMEs growth. Vlachos finds that HR activities are correlated with sales growth, performance, and market share. Moreover, the positive relationship between HR practices and SME performance finds support in other studies (Patel & Cardon, 2010; Razouk, 2011; Sheehan, 2014). Thus, we may conclude that the potential of SMEs to achieve a sustainable and competitive advantage depends on the quality of HR processes. Such a relationship stems from the importance of human capital, which can be characterised by the VRIN attributes: valuable, rare, inimitable, nonsubstitutable (Barney, 1991).

Although scholars traced the relationship between HR and SME performance, there are difficulties in developing a common approach to HRM activities in SMEs, which may stem from four factors. Firstly, most of these companies apply different and unique patterns of executing personnel functions as their business models and the environment in which they operate differ. Secondly, according to Cardon and Stevens (2004), SMEs suffer from limited resources, which results in optimising or even reducing HR processes. Thirdly, implementing HR practices for large companies may require changes in organisational structures, which can be considered too expensive for many SMEs (Patel & Cardon, 2010). Lastly, solutions developed in large companies are not suitable for SMEs, because there are no HR departments in such organisations. SMEs run standard HR processes by referring to recruitment, appraisal, training, and remuneration (Cardon & Stevens, 2004), but they are organised in a different way. These processes are executed mostly by managers and owners who are not prepared to run them due to the lack of required competences. They are specialists in the main field of the firm's business, but they frequently suffer from insufficient managerial skills (Price, 2004; Razouk, 2011; Pocztowski & Pauli, 2013). Thus, according to Westhead and Storey (1996), we may conclude that SMEs are not a "scaled-down" version of a large company, so processes implemented in SMEs are designed in a different manner to meet their specific needs and operating models.

Although scholars investigate TM for three decades already, their research mainly focuses on large companies, without enough attention to the characteristics of SMEs (Boudreau & Ramstad, 2004; Scullion, Collings, & Caliguiri, 2010; Tarique & Schuler, 2010; Vaiman & Holden, 2011; Festing, Schafer, & Scullion, 2013; Valverde, Scullion, & Ryan, 2013; Collings, 2014; Festing *et al*., 2017; Sparrow & Makram, 2015). Due to the variety of approaches to HR management that SMEs apply, they may implement TM processes that significantly differ from those suitable for large companies. Although the scope of TM activities and processes in SMEs may be similar to those implemented in MNEs, this seems to be all they have in common. It would be difficult or even impossible to replicate already developed models (Festing *et al*., 2013; Krishnan & Scullion, 2017). Thus, mapping TM patterns in SMEs requires the inclusion of the environmental context, which consists of both

internal and external factors (Gallardo-Gallardo, Thunnissen, & Scullion, 2017; Krishnan & Scullion, 2017). Moreover, as Festing *et al*. (2013), Skuza *et al*. (2013), and Valverde *et al*. (2013) indicate, the approach to TM in SMEs may differ with regard to country-specific cultural context. While designing TM in SMEs, we should account for some specified practices by referring to the uniqueness of undertaken actions and initiatives (Joyce & Slocum, 2012; Krishnan & Scullion, 2017). Moreover, the approach to TM may vary in accordance with the stage of SME growth (Krishnan & Scullion, 2017). The importance of particular resources at consecutive stages can change, which means that the share of investments in human capital can differ (Pauli, 2015). Moreover, as concluded by Valverde *et al*. (2013), many SME owners are unaware of the concept of TM, even though they undertake actions that can be regarded as part of TM programmes. The authors observe a tendency among SMEs to defer the formalisation of the concept of TM (Valverde *et al*., 2013).

Taking into account the complexity of such programmes, we should state that these programmes can be structured in various ways in SMEs. We may draw some general findings concerning the TM approach in SMEs on the basis of the research conducted by Valverde *et al*. (2013): (1) there is a greater emphasis on performance rather than potential while defining talent; (2) employees identified as talents can occupy managerial, key, or standard positions; (3) the key features of talents refer not only to knowledge and skills but also to attitudes that present personal allegiance to the company; (4) both the inclusive and exclusive approach to talents is applied; (5) in general, the same HR systems are used for talented and non-talented personnel, but some distinction can be made with regard to the scope of training, decision-making and access to information; (6) talents occupy key positions or are perceived as successors. Such a finding confirms that the approaches to TM in SMEs may vary, and there are significant difficulties in creating a coherent model to describe actions undertaken in such organisations. However, on the basis of the research conducted on German SMEs, Festing *et al*. (2013) identify three clusters that refer to TM approach in SMEs: "highly engaged talent management" means companies that apply a variety of TM practices continuously; "reactive talent management" indicates companies that focus on HR planning with little investment in training and employee retention; "retention-based talent management" defines companies that focus on training, development, succession, and career planning to prevent the turnover of valuable employees.

Therefore, we may conclude that the approaches and patterns of SMEs to TM received insufficient scholarly attention. Moreover, the results of the above studies show that the complexity of actions undertaken in SMEs can lead to the development of more than one model, as the context of SMEs operations makes them vary. In our research, we assumed that a talented person in SMEs can be defined in a broader sense, as an employee who occupies either managerial or non-managerial positions and (1) achieves above-average performance in a certain domain, (2) has high potential, (3) presents a willingness to develop, and (4) is eager to take on responsibilities for pivotal tasks and roles. When defining the potential, we consider employee competences, which consist of knowledge, skills, attitudes, and abilities (Boyatzis, 1982; Spencer & Spencer, 1993). Such an approach agrees with Luna-Arocas and Morley (2015) who conclude that TM is associated with competency-based management. Moreover, they argue that talent competences should be appropriate to a work context, which directly refers to the contextual-related competency framework (Sandberg & Pinnington, 2009).

MATERIAL AND METHODS

Research Goals and Questions

The main goal of the study was to identify and map TM practices in SMEs and seek their common patterns. As highlighted in the literature review section, SMEs may undertake different actions aimed at maximising the use of human capital. These actions depend on the characteristics of SMEs, the context in which they operate, and the resources they have. Moreover, in contrast to larger companies, SMEs very often have no HR departments (or even positions) responsible for executing HR tasks, especially those which are not comprehensive enough to be involved in activities such as TM. This means that in many SMEs, TM may not run systematically and the scope of actions significantly differs from those implemented in large companies. Thus, the main questions we asked when designing our research were: How do SMEs define talent and with what indicators? What is the approach to TM in SMEs? What kind of activities relating to TM do SMEs undertake? Is it possible to link activities undertaken by SMEs into coherent patterns? In our research, we assumed that – although there are significant differences in approaches to TM among SMEs – there appear some commonalities. These features can form the foundations for developing a model for defining TM in SMEs.

Measures Applied

Talent indicators describe the way owners or managers perceive talent. It may refer to: above-average performance, specific knowledge, skills, abilities, attitudes, unique experience in a particular field, or impact/influence of a talent on other employees. Such understanding refers to approaches discussed by Dries (2013b), Gallardo-Gallardo *et al*. (2013), Valverde *et al*. (2013).

Approaches to TM refer to the way SMEs organise TM, particularly whether it is executed systematically or occasionally, and whether it is exclusive or inclusive (Iles *et al*., 2010; Festing *et al*., 2013; Al Ariss *et al*., 2014).

The scope of TM describes SMEs' actions to manage talent. On the basis of the literature review, we included the following activities: talent acquisition, identification, selection, development, appraisal, remuneration, and career planning (Boxall & Macky, 2009; Valverde *et al*., 2013; Nijs *et al*., 2014; Morley *et al*., 2015).

The scope of talent tasks and roles refers to talents' positions and their duties. It enables the identification whether a talent is hired on managerial or non-managerial positions, and whether they have responsibilities for (1) tasks directly connected with their post, (2) tasks related to owned competences, (3) specialised tasks in a particular domain, (4) coordination, or (5) support of managerial decisions (Collings & Mellahi, 2009; Becker & Huselid, 2006; Valverde *et al*., 2013; Cappelli & Keller, 2014; Collings, 2014).

Methods and Analytical Procedure

Our research used the database of Statistics Poland. The first step in sampling was to verify whether TM is introduced in a particular SME. This is why the selected number of companies was contacted via telephone and asked if they run actions aimed at talent management. Those who confirmed were asked if they would take part in the research.

Such an approach made it possible to investigate only the companies aware of TM, who applied specific actions. However, according to Valverde *et al*. (2013), such sampling excludes the companies who may run TM but are unaware of it or defer from formalising the concept. After collecting the sample, we employed the CAPI technique in research and interviewed owners or managers. Interviewers used a questionnaire comprising three main sections. The first section covered issues connected with the context in which SMEs operate. The second section aimed at collecting information about actions undertaken to manage talents. The third section asked the interviewees to evaluate trends in performance indicators referring to their business. In this article, we only use the data that referred to the understanding of talent and describing the characteristics of TM. To obtain this data, interviewees were asked the following: (1) Who is talented and what are talent indicators? (2) How do you organise activities referring to TM? (3) Which of the processes are covered by TM: talent identification, acquisition, training and development, remuneration, evaluation, career planning, teambuilding, employer branding? (4) Which of the techniques are used in each of these processes? (5) Which positions do talents occupy, and what is the scope of their activities? (6) To what extent do you account for the talent's expectations concerning working conditions? All questions were open-ended and multiple-choice, which allowed us to evaluate the level of application of theoretically grounded practices and capture distinct actions undertaken by a particular company. The average interview lasted thirty minutes.

In the first step of analysis we used the Ward method, aimed at estimating the number of possible clusters. We used the following raw data in the clustering: *talent indicators, approach to TM, scope of particular TM processes and actions undertaken, talents' tasks and roles, level of talents' expectations (concerning work conditions), inclusion*. All SMEs were divided into six clusters with the use of the *k-means* method (Sokołowski & Czaja, 2014; Hartigan & Wong, 1979). The next stage of the analysis was to calculate descriptive statistics for each variable in particular clusters. A synthesis of the analysis obtained when characterising each cluster appears in the *Results* section and is summarised in Table 2.

RESULTS

Sample Characteristics

The research was conducted on a randomly selected group of 200 SMEs that operate in Poland. Following the definition by the European Commission, we included companies that had 10-250 employees. In the research, only SMEs which reported the introduction of specified actions aimed at managing talents were included. The basic characteristics of the sample are presented in Table 1.

On the basis of *k-means clustering*, we identified six clusters following talent indicators, approach to TM, main activities undertaken by SMEs, and talents' tasks and roles. The features of each cluster with regard to descriptive characteristics are presented in the following section.

Table 1. Sample characteristics (in %)

Criteria						
Activity range	Local	Regional	Domestic	International		
	16.0	36.0	35.0	13.0		
Tenure	3-5 years	5-8 years	9-12 years	13-16 years	over 16 years	
	10.5	17.5	18.0	25.5	28.5	
Sector	Industry	Transport	Retail	Construction	Consulting	Other
	22.0	19.0	17.5	16.5	7.0	18.0
Number of employees	up to 50	51-100	101-250			
	67.0	26.0	7.0			
When TM was introduced	last year	2-5 years ago	over 5 years ago			
	28.5	54.5	17.0			

Source: own study.

Clusters Characteristics

C1: High Performance Manager (N=30)

In most of these companies, talents mean high performers (83%). TM can be both inclusive (in 40% of SMEs in this cluster) or exclusive (30%) while TM actions are run systematically. The main activity undertaken in TM is talent identification (63%) and training (43%). To identify talents, most of these SMEs (65%) analyse long-term performance over a period of a few years; 35% of SMEs only evaluate the achievement of previous yearly goals. In order to acquire talents, most companies publish job advertisements in various media, but they set very high requirements to attract only the best candidates (80%). In the selection process, a standard interview is most commonly used (63%), but case studies directly related to tasks on a given job position are also applied. The talents' roles and tasks can also be directly related to their competences and qualifications (77%). These companies may introduce tailored training programmes for talents (70%) aimed at developing managerial competences (80%). Such programmes mostly consist of internal training conducted by trainers or specialists employed in the firm in 60% of cases, general training (50%), and firm-tailored training conducted by external trainers (47%). SMEs from this cluster implement specific forms of remuneration of talents (87%) including differentiation in rewards, bonuses, and other forms of remuneration; appraisal (80%) including differentiation in criteria and techniques; career planning (77%) including building personalised career paths and enabling the development of one's passions and interests. While designing TM, all of these companies (100%) account for the expectations of talents they refer to: motivational systems, remuneration, training needs, and career paths. Moreover, most companies include demands of promotion (93%), tasks or challenges (97%), and autonomy (93%).

C2: High Performance Specialist (N=31)

In this cluster, performance (55%) and the ability to fulfil a wide scope of tasks (48%) are most frequently highlighted as talent indicators. Companies in this cluster do not introduce a coherent TM system. Some run systematic TM for all employees (26%), but others take differentiated, actions (22%). The main activity is talent acquisition (58%) and identification (45%). To conduct the identification of talent, SMEs must include performance evaluation referring to the previous year (36%) or the previous few years (36%). For the

purposes of talent recruitment, most of these SMEs (90%) use standard job advertisements and hire candidates who may be defined as talents. Moreover, 29% of companies claim to use employee referrals. In the selection process, basic techniques are generally used: 94% run screening and 87% conduct job interviews. Talents are responsible for fulfilling tasks directly related to their qualifications (in 52% of companies in this group). In 87% of cases, there is no specific training offered to talents, they attend the same development programmes as other employees. In 90% of cases, this training is aimed at increasing the level of skills required for tasks fulfilment. The most commonly applied training methods are generally available training (77%), courses that enable granting certificates (68%), and providing conditions for self-learning (61%). There are no specific actions introduced for talents that refer to remuneration, appraisal, or career planning. While designing TM, most of these companies consider employee expectations concerning motivational factors (90%), promotion (87%) and work organisation (84%).

C3: High Potential Internal Consultant / Organisation Development Facilitator (N=30)

In this cluster, a talent can be someone who has above-average skills and abilities (50%) and can have a significant impact on others (43%). In 47% of these companies, there is a tendency to introduce TM sporadically, when the need arises. The most frequently introduced TM activities refer to appraisals (33%) and career planning (33%). To identify a talent among employees, these companies analyse appraisals that result from the previous few years (47%). Moreover, these companies place information with the use of an intra-organisational information system (47%) for the access of all employees. The SMEs that recruit talents place a job advertisement with very high requirements (57% of cases) or use employee referrals (47%). The most commonly used selection techniques are tasks that directly refer to a job position (47%) and those that are not connected with their duties but enable a verification of candidates' potential (43%). In most of these companies, a talented employee is responsible for coordinating tasks and specified functions or managing processes (53%). There are tailored training programmes for talents introduced in most of these companies (83%). These can focus on enhancing knowledge concerning the company as a whole (67%) and developing managerial competences (40%). To develop these competences, training conducted by internal specialists and trainers (50%) or firm-specified training run by external consultants (40%) may be offered. Generally, these companies do not differentiate between remuneration, appraisals, and career planning for talents. While designing TM, these firms usually take into account employee expectations concerning remuneration (93%), motivational factors (80%), and development (80%).

C4: High Potential Specialist / Process Leader (N=49)

In this cluster, a talented employee can be a person with a broad knowledge (57%), above-average skills (57%), or an influence on others (45%). Most companies run systematic TM activities available for all employees (53%). The main activities included in TM are acquisition (65%), identification (51%), and training (49%). To identify talents, SMEs may use previous yearly appraisals (59%) or interviews with managers (59%) aimed at finding employees who stand out. While attracting talents, these firms place advertisements in various media, which may set very high requirements (71%) or use employee referrals (51%). The selection process may use tasks not related to job specification (57%), assessment centres

(55%), and tasks referring to job position (49%). A talented person is responsible for fulfilling tasks that refer to a job position, but sometimes they are asked to take part in other processes (47%). There may be training programmes tailored for talents (57%), including internal trainings run by specialists or trainers (55%) or coaching (49%). These training programmes frequently aim at enhancing managerial competences (94%). These companies introduce specified solutions that refer to remuneration (82%). In comparison to other employees, talents often receive different salaries (47%) or other forms of remuneration (39%). Most SMEs in this cluster introduce specified appraisals (89%), including different criteria (57%) and evaluation tools (31%). Almost all companies (96%) match career paths to talents by introducing individualised plans (59%) or taking into account talents' passions and interests (37%). All of the SMEs (100%) consider talents expectations concerning promotion and reassignment to other roles. Moreover, they may try to match talent expectations in work organisation (80%) and motivational factors (74%).

C5: High Potential Manager (N=38)

In general, these companies perceive a talent as someone who is an above-average skilled (45%) and highly qualified specialist (47%). Most frequently, these companies run an inclusive, planned, and complex TM (47%) that consists of talent acquisition (71%), training (61%), remuneration (47%), appraisals (42%), and career planning (42%). To identify talents among employees, they may conduct interviews with supervisors or managers (aimed at finding employees who stand out; 58%), analyse previous yearly appraisals (53%), or check appraisal results from the previous few years (53%). To attract talents, these SMEs place job advertisements in which they list very high requirements (66%). They publish them in a profession related media (61%). Moreover, half of the companies use employee referrals. In the selection process, they apply a wide range of techniques, such as interviews (76%), job-related tasks (58%), psychological tests (testing abilities; 58%), and analytical tests (50%). In the majority of these SMEs, a talented employee is responsible for managing processes (53%). There may be tailored training programmes introduced (55%) aimed mostly at developing managerial competences. They include courses that grant certificates (61%), firm-specific training conducted by external experts (58%), case studies (55%), training conducted by internal trainers or experts (50%), and coaching (47%). Most of these companies (87%) differentiate the remuneration system for talents. Among 63% of these SMEs, a remuneration system refers to rewards and bonuses while, in 47%, to remuneration forms. Furthermore, these may introduce different appraisal systems (84%), which include some other criteria for evaluating performance (55%), different methods (55%), and parties involved (32%); for example, they apply 360 degree feedback. Companies in this cluster provide talents with tailored career paths (82%) and strive to meet talents' passions and interests (42%). All of these companies take into account talents' expectations concerning reassignment to other roles, promotion, remuneration, and development. Moreover, SMEs gather opinions concerning motivational factors (95%), career paths, and work organisation (87%).

Table 2. Main differences between clusters

Criteria	Clusters					
	1	2	3	4	5	6
	High Performance Manager	**High Performance Specialist**	**High Potential Internal Consultant / OD Facylitator**	**High Potential Specialist / Process Leader**	**High Potential Manager**	**Creator**
Main talent indicator	Results	Results	Skills and knowledge	Skills and knowledge	Skills and knowledge	Creativity
Approach to TM	Systematic and inclusive or exclusive	Systematic and inclusive or exclusive	Sporadically introduced mainly exclusive	Systematic and mainly inclusive	Systematic and inclusive	Sporadically introduced, mainly exclusive
Main activities in TM	Identification and development	Identification and acquisition	Appraisal and development	Identification and development	All activities	Talent identification
Scope of talents tasks and roles	Mainly referring to qualifications but occasionally also other	Strictly connected with tasks on a given position	Managing or coordination of tasks and processes	Mainly referring to qualifications	Managing or coordination of tasks and processes	Strictly connected with tasks on a given position
Dedicated HR activities related to talents	Yes	No	No	Yes	Yes	No
Main area of development	Managerial competences	Competences related to tasks fulfilment	Competences connected with general management and firm functioning	Managerial competences	Managerial competences	Mainly competences related to tasks fulfilment

Source: own elaboration.

C6: Creator (N=22)

In this cluster, a talent is perceived mainly as a creative person able to implement modifications and innovations (46%) or as a high performer (32%). These companies tend to introduce TM sporadically whenever a need arises (36%). They are usually focused on talent identification (64%) mainly in the form of interviews with supervisors or managers (23%). For attracting talents, these SMEs often place standard job advertisements in media (46%) or publish job offers in profession- or branch-related magazines (41%). In the selection procedures, they frequently apply screening (41%) and standard job interviews (77%). A talent is responsible mostly for fulfilling tasks that directly refer to their qualifications. These companies do not apply specific TM. They usually do not differentiate with regard to training programmes (73% have the same for talents and other employees), remuneration (86%), appraisal system (95%), or career planning (96%). Moreover, they do not take into account talent expectations while designing TM, as only 41% declare gathering opinions about remuneration.

The cluster characteristics presented above prove how differentiated TM in SMEs are. Although we identified six clusters, none is coherent enough to describe a common path for all SMEs it includes. A synthesis of TM characteristics in each cluster is presented in Table 2.

DISCUSSION

The research confirms that talent management in SMEs is executed in various ways and particular approaches significantly differ from others. However, on the basis of the data gathered, we may draw some similarities with regard to previous research, including those conducted in small, medium, and large enterprises.

According to Gallardo-Gallardo *et al*. (2013), talent is often equated to excellent performance or to unique or above-average skills and abilities, which refers to the idea of including high performers and high potentials into talent pool (Cappelli & Keller, 2014). In our sample, only 5% of SMEs identify talents solely on the basis of performance, 31.5% on the basis of performance and competences, and 63.5% on the basis of above-average knowledge, skills, abilities, and attitudes. Such an approach may refer to the importance of human capital in building SMEs' competitive advantage (Patel & Cardon, 2010; Razouk, 2011; Sheehan, 2014). Moreover, in companies that hire more than 250 employees, it is much easier to identify someone who stands out. Moreover, 27.5% of SMEs claim that talents can be engaged in fulfilling various tasks in organisations, and they are in general creative workers who introduce many improvements. This may refer to the findings of Valverde *et al*. (2013), who conclude that commitment and personal allegiance to the company plays an important role in SMEs.

Taking into account to whom TM is addressed, 34.5% of the companies take an exclusive and 33% an inclusive approach, which refers to the model of Iles *et al*. (2010) and confirms the findings of Valverde *et al*. (2013) who argue that both approaches appear among SMEs. Other companies claim that they introduce some actions when a need arises, without assuming whether all or only the chosen employees will be included. The majority of investigated SMEs (67.5%) run TM continuously. This agrees with the findings of Festing *et al*. (2013), who distinguished approaches to TM in German SMEs into three

clusters: "highly engaged talent management," "reactive talent management," and "retention-based talent management."

Employees to whom TM in SMEs is addressed occupy both managerial (45%) and non-managerial (55%) positions. Regardless of their position, 45% of companies claimed that talents coordinate the execution of specialised processes, act as experts in particular fields, or make use of their wide range of competences while performing diverse tasks. This may support the existence of a "position approach" to TM in SMEs (Collings & Mellahi, 2009; Huselid & Becker, 2011; Collings, 2014), according to which talents occupy pivotal positions.

By analysing the gathered data with the use of the "practices approach" – which perceives TM as the presence of key HR management practices (Collings & Mellahi, 2009) – we may conclude that the investigated SMEs apply a diverse combination of activities. None of the companies introduced all of the practices referring to TM; that is, acquisition, identification, development, appraisal, remuneration, and career planning. Merely one out of four SMEs focus solely on talent acquisition and identification, 4.5% solely on development and career planning, while others apply a mix of practices aimed at retaining key employees. Thus, our findings confirm those of Festing *et al*. (2013) on clustering. Such a diversification in the scope of practices executed in SMEs, may stem from the lack of HR departments or specialists in SMEs. TM practices are developed and executed by managers or owners who frequently suffer from insufficient managerial skills (Price, 2004; Razouk, 2011; Pocztowski & Pauli, 2013).

Valverde *et al*. (2013), on the basis of the research conducted in Spanish SMEs, concluded that, in general, SMEs apply the same HR systems to talented and non-talented personnel, although some distinction can be made. Our research confirms that more than half of the companies introduce some modifications in existing systems with regard to talented employees. 61.5% of SMEs apply development and remuneration systems crafted for talents, 59.5% evaluate talents in a different way, and 57.5% create distinct career plans. On the basis of these findings, we conclude that SMEs pay attention to managing their talented employees and perceive them as those who can significantly contribute to a firm's performance and outcomes.

The comparison between our findings and those presented by other researchers implies that most of the concepts that refer to TM can be traced in small and medium enterprises. However, due to the variety of their business models, their operational contexts, and the level of professional HR knowledge of managers or owners, they introduce unique approaches to TM based on combinations of approaches found within a vast array of literature.

CONCLUSIONS

On the basis of the conducted analysis, we infer that mapping TM patterns is easier in large companies, especially MNEs. There are specialists employed at HR departments in such organisations who aim to implement solutions and models perceived as effective. An example of such a model is PCMM (Curtis, Hefley, & Miller, 2009) that precisely defines which tasks and actions should be undertaken. This results in the implementation of advanced processes of recruitment, development, appraisal, and remuneration, which are the foundations for introducing detailed tailored TM programmes. By contrast, HR management processes in SMEs are mostly run by managers or owners who

may not possess adequate knowledge and skills to design TM. Additionally, the implementation of advanced HR management procedures can be costly and time-consuming – this causes it to be too costly for many SMEs. As a result, managers and owners may reduce spending on HR management, instead concentrating on the main scope of their business activities. Moreover, TM is strictly connected with the design of processes that refer to other functions in an enterprise. Thus, SMEs may develop different TM patterns, because they apply a variety of business models.

Our paper contributes to existing knowledge in two ways. Firstly, it is based on empirical research and provides readers with data gathered from 200 SMEs. As discussed above, we investigated TM in SMEs while there are only a few such studies based on empirical data. Secondly, we presented TM patterns in SMEs, which can be further modified and adjusted. These patterns describe potential approaches to TM in SMEs. Its variety proves the necessity to apply a contextual framework as this allows analysing TM processes with regard to the characteristics of SMEs (Joyce & Slocum, 2012; Krishnan & Scullion, 2017).

Limitations

The main limitation of the research relates to the structure and size of the sample. The research focused on a heterogeneous group of 200 SMEs. Narrowing the sample to more homogeneous enterprises could result in the identification of more internally similar clusters. Moreover, some other factors that determine the patterns of TM in SMEs could have been identified. In the sampling process we have asked a recruiting question concerning the implementation of any practices that refer to TM, and only those firms that confirmed it were included in the research. This could cause a possible bias as – according to Valverde *et al*. (2013) – some representatives of SMEs chose not to formally label their activities as TM. Thus, some valuable data that refers to TM in SMEs could not be captured. In our research, we applied only structured interviews; although this provided us with valuable information from managers and owners, it did not give us a deeper insight into detailed actions undertaken by SMEs. Thus, future studies should apply more detailed research that includes the analysis of documents and interviews with employees identified as talents.

Further study should enable the verification of the proposed patterns and praxis adjustment. Moreover, future scholars should verify if these patterns can be applied to SMEs other than Polish. Moreover, further research should focus on verifying which TM practices are the most effective. Such studies should evaluate the impact of TM on SME performance – which refers not only to financial indicators but also to those which are organisational, relational, and innovative in nature.

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