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The relationship of economic sentiment and GDP growth in Russia in light of the Covid-19 crisis

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A B S T R A C T
Objective: The objective of the article is to prove the empirical and predictive value of the aggregate opinions of businesses and households for expanding cyclical macroeconomic data in Russia, especially during the coronavirus shocks.
Research Design & Methods: We use qualitative information from surveys that cover about 24 000 organisations and 5100 households in all Russian regions. The total economic sentiment indicator (TESI) combines information on 18 survey-based indicators. Cross-correlation analysis, Hodrick-Prescott filtering, and a vector autoregressive (VAR) model with dummy variables are used as the research methods.
Findings: The study confirms an almost synchronous cyclic conformity of the gross domestic product (GDP) growth and TESI dynamics for the period of 1998-2020. Probable GDP growth until the end of 2021 is estimated based on the expected impulses in the TESI dynamics, including those due to the sudden impact of the coronavirus.
Implications & Recommendations: Assessments of business and household activity are reliable and available much earlier than quantitative statistics on GDP growth. Therefore, we advise to use them as an early warning system about economic growth and take them into account in policymaking.
Contribution & Value Added: We are the first to confirm the effectiveness and reliability of TESI as a leading indicator of GDP growth in Russia, using data from large-scale business surveys and with a focus on crisis shocks.

Article type:	research article
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INTRODUCTION

During periods of cyclical reversals to a slowdown or acceleration of economic development, what complicates flash quantitative measurements of current and expected economic development are the growing uncertainty of economic business activity, new challenges for the economy and society, and risks of sudden changes compared to preliminary estimates.

To gain additional information about the possible prospect of the country achieving Sustainable Development Goals and to increase the effectiveness of statistical monitoring in the new economic situation, we advise focusing on information from businesses and households based on regular large-scale surveys by the Federal State Statistics Service (Rosstat).

We studied the dynamics of GDP growth and the aggregate results of surveys among managers and consumers – i.e. the total economic sentiment indicator (TESI) – for the period of 1998-2020. The

key question of the study was whether the quantified opinions of economic agents, combined in composite indicators, are relevant for the early estimation of macroeconomic development, especially with sudden short-term impulses in sectoral evolution.

Sharp changes for the worse in economic situation – which began in the first quarter of 2020 – will negatively affect further aggregate supply and demand until at least the end of 2021. These tendencies will become especially pronounced if uncertainty persists and new crises arise. For Russia, what is becoming more obvious is the prospect for overcoming negative sectoral developments according to the scenario of a W-shaped recovery of economic growth (IMF, 2020).

Therefore, as a special case for flash quarterly nowcasts of GDP growth, we examine the sharp negative shock in the dynamics of the composite survey indicator – caused by the coronavirus attack from Q2-2020 – in the context of a possible new cyclical reversal and subsequent recession.

We use a universal model specification for the case of two economic dynamics – the GDP growth and TESI – determined by the main goal of the study: to substantiate the empirical and predictive value of aggregated results of business and consumer surveys (BCS) for expanding current and expected short-term information about economic growth in Russia. Such information is useful for decision-makers and the expert community, especially during rapid negative changes.

There are two scientific novelties in this paper:

1. The introduction of a new composite indicator TESI into the practice of economic analysis; TESI aggregates quantified information on the sentiment of businesses and consumers in Russia based on the results of surveys conducted by the Federal State Statistic Service (Rosstat) in all Russian regions over 20 years.
2. The substantiation of the possibility of using accumulated TESI values in the short- and medium-term forecasting of GDP growth, especially in the context of the ongoing Covid-19 crisis.

Important advantages of TESI are its significant correlation with reference dynamics: the quarterly GDP growth (as a year-on-year percentage) for the period from the Q1-1998 to the Q2-2020 and harmonisation with the composite index used by the European Commission (EC) to aggregate BCS results in European countries.

This paper is structured as follows. First, we provide a literature review on approaches to using survey-based indicators in economic analysis. Then, we describe the data and methodology used. Next, we develop the hypothesis about the compatibility of cyclical dynamics of aggregate economic sentiment and GDP growth. Later, we calculate scenario forecasts for GDP growth until the end of 2021 by using a VAR model with dummy variables. The concluding section discusses the main results and possible areas for future investigation.

LITERATURE REVIEW

Composite indicators of sentiment based on results of business and consumer surveys (BCS) are widely used in international practice for the early estimation of economic growth; e.g. the European Commission's harmonised confidence indicators,[1] the Purchasing Managers' Index (PMI) by IHS Markit,[2] and other indices calculated by various institutions. These indicators, obtained by aggregating individual measures that reflect the perceptions or expectations of respondents, evaluate multidimensional phenomena that are not covered by traditional statistics. Over the past decade, composite sentiment indicators are in high demand; they become official statistical short-term indicators and are used in various areas of economic analysis, including business cycles analysis, well-being measurements, sentiments, confidence and expectations of businesses and households, and international comparisons (UNECE, 2019).

In particular, the economic sentiment indicator (ESI) is widespread in European countries; the ESI is calculated and published monthly by the European Commission (EC) for European Union's (EU)

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[1] The Directorate-General Financial and Economic Affairs of the European Commission, https://ec.europa.eu/info/business-economy-euro/indicators-statistics/economic-databases/business-and-consumer-surveys/download-business-and-consumer-survey-data/time-series_en.

[2] IHS Markit, https://ihsmarkit.com/products/pmi-faq.html.

Member States and the eurozone within the Joint Harmonised EU Programme of BCS.[3] The economic rationale and the algorithm for ESI calculation are presented in the basic methodological recommendations by the EC's Directorate-General for Economic and Financial Affairs (DG ECFIN) (EC, 2020).

The ESI belongs to a group of coincident composite indicators of business activity, as it changes synchronously with the dynamics of reference statistic: the GDP growth. However, the ESI uses simple questionnaires and short data processing, and it is published much earlier than GDP, thus providing early signals of changes in economic activity. Timeliness and a high synchronous correlation with the reference statistic are the key ESI advantages (EC, 2020; Kitrar *et al.*, 2015; Lipkind *et al.,* 2019; UNECE, 2019).

A broad consensus has been reached regarding the coincident properties of BCS indicators; there is also evidence of their ability to predict the evolution of economic growth (Cesaroni, 2011). Recent studies investigate the performance of survey-based composite indicators – including the ESI – during recessions and crises at both European and country levels. Biau and D'Elia (2011) give evidence to a change in the relationship between the ESI and the GDP growth in European countries before and after the 2008 crisis and conclude that the further study of this relationship is necessary. A number of articles examine the possible change in correlations between quantitative (hard) statistics and qualitative (soft) survey-based indicators after the European Great Recession of 2008-2012 (EC, 2016; Gayer & Marc, 2018). The studies confirm the hypothesis of a level shift or 'new modesty,' according to which survey indicators rose to values that did not correspond to the post-crisis levels of reference indicators (GDP growth, industrial production, etc.).

Nonetheless, BCS indicators remain an important tool in economic analysis and forecasting. European studies (EC, 2017) prove that the post-crisis ESI dynamic demonstrates an even higher correlation with annual GDP growth. Astolfi *et al.* (2016) confirm the leading nature of dated turning points based on OECD composite indicators compared to those based on national accounts during the Great Recession. Cesaroni and Iezzi (2017) note the high statistical ability of survey-based indicators to predict macroeconomic changes in the short term.

Business trends and macroeconomic developments in recent years have renewed scholarly interest in the cumulative effects of time-varying uncertainty. Bloom (2014) examines the causes and consequences of fluctuations in uncertainty and concludes that external shocks leading to recessions directly increase uncertainty, but uncertainty increases endogenously during recessions. In international practice, soft statistics – the disagreement between the forecasts of survey respondents – are used as a proxy indicator of economic uncertainty (Bachmann *et al.*, 2013).

Most studies devoted to the economic consequences of the Covid-19 pandemic are based on quantitative statistics: dynamics of GDP and the output of goods and services, volumes of imports and exports, industry indicators, changes in global value chains (Jorda *et al.*, 2020; Gollier & Straub, 2020; Fernandes, 2020; Bonadio *et al.*, 2020; Guerrieri *et al.*, 2020). Such statistics are usually published with a significant lag, although the need for flash estimates based on monitoring economic sentiments of businesses and consumers increases during periods of crisis.

The seminal papers on nowcasting economic growth (Angelini *et al.*, 2008; Banbura & Runstler, 2007) investigate the role of high frequency indicators, both quantitative and qualitative, and find that they provide useful information for predicting GDP. The empirical results of further studies show that adding flash BCS data to the set of indicators can improve nowcast and forecast accuracy (Darracq, Paries, & Maurin, 2008; Drechsel & Maurin, 2011; Girardi, 2014; Girardi *et al.*, 2015).

Various econometric methods are applied to produce early estimates of economic growth using BCS indicators. Lehmann and Wohlrabe (2013) develop an autoregressive distributed lag (ADL) model with hard and soft statistics for forecasting GDP in German regions. D'Amato *et al.* (2015) exercise the nowcasting of Argentinian GDP growth by using bridge equations and the dynamic factor model (DFM) with consumer surveys data. DFM models, which include survey information, are also used to forecast GDP for the eurozone (Banbura & Runstler, 2007; Basselier *et al.*, 2017), along with France, Germany, Italy, Japan, the United Kingdom, and the United States of America (Ollivaud *et al.*, 2016). Galli *et al.*

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[3] The latest ESI releases can be found here: https://ec.europa.eu/info/business-economy-euro/indicators-statistics/economic-databases/business-and-consumer-surveys/latest-business-and-consumer-surveys_en.

(2019) apply the DFM and mixed frequency data sampling (MIDAS) regression models to monitor short-term economic developments in Switzerland. The nowcasting performance of the MIDAS regression model for the eurozone GDP in a pseudo real-time setting is evaluated in an EC article (2018).

Vector autoregressive (VAR) models based on BCS data or combined hard and soft statistics are developed in Hansson *et al.* (2003), Mattos *et al.* (2016), and in articles by the EC (2014). The researchers conclude that VAR forecasting accuracy often outperforms the alternatives procedures including DFM.

In Russia, the empirical measurement of economic growth is not an easy task due to the lack of long-term time series, especially at the industry-disaggregated level. In addition, frequent revisions of data and weighting factors complicate statistical analysis and the interpretation of its results.

Most relevant Russian studies are devoted to the analysis of GDP dynamics, the dating of cyclical turning points, and the construction of leading indicators based on quantitative statistics. In particular, in Rayskaya *et al.* (2012), a conjuncture index consists of an extensive set of quantitative indicators of supply and demand. Dubovskiy *et al.* (2015) use national accounts statistics for this purpose. The decomposition of Russian GDP growth rates based on the Cobb-Douglas production function is developed in Sinelnikov-Murylev *et al.* (2015). Polbin (2020) estimates the trajectory of the growth rate of Russian GDP based on an autoregressive model with oil prices as a control exogenous variable for GDP dynamics. Smirnov (2020) provides an overview of leading indicators for Russia with an analysis of their advantages and disadvantages and the ability to give warnings about new phases of the economic cycle. However, as far as we know, there are no studies in the Russian academic literature that directly refer to the analysis of the long-term dynamics of the business activity of economic agents formed on the basis of large-scale Rosstat surveys and its correspondence to quantitative estimates of economic growth for a period of over 20 years.

To simulate the relationship between the GDP growth and the TESI, we chose relatively simple model specifications. Typically, such specifications consist of a minimum number of equations that reflect a single theoretical macroeconomic relationship, and they only operate with significant determinants of the modelled process. Therefore, we used an approach to modelling the cyclical relationship of indicators based on empirical facts about business cycles and vector autoregressions, initially allowing no more than seven to eight parameters of the standard VAR model (e.g. Bernanke *et al.*, 2005; Kitrar *et al.*, 2020).

Such model representations can differ significantly. For example, they can reflect the a priori assumed theoretical macroeconomic ratio (Korhonen & Mehrotra, 2010; Mehrotra & Ponomarenko, 2010). Korhonen and Mehrotra (2009) identify economic shocks based on a theory-driven identification scheme. In articles by Granville and Mallick (2010) and Mallick and Sousa (2013), sign restrictions are imposed on the response impulse functions. Rautava (2013) considers them as the most important determinants of the modelled process. A class of Bayesian VAR (BVAR) models is aimed at overcoming the 'curse of dimensionality.' Reducing the number of estimated parameters is conducted based on the researcher's a priori ideas about the possible distribution of their covariance error matrix; e.g. the introduction of the Minnesota prior, first highlighted by Litterman (1986). The BVAR models are very effective when incorporating many various time series with a 'jagged edge,' frequent adjustments, and revisions. They include information matrices of large dimensions, e.g. for the formulation of monetary policy, which is a common practice of many central banks (Banbura *et al.*, 2010, 2014; De Mol *et al.*, 2008; Giannone *et al.*, 2012).

In our case, the selected time series were primarily aggregated into a composite indicator. Then, the statistical relationship between the dynamics of this indicator and quantitative reference series (GDP growth) were confirmed through VAR-modelling, when the behaviour of any variable depended both on its past values and on the values of other series included in the model (Mayr & Ulbricht, 2007; Lütkepohl, 2011). Based on the literature review and in accordance with the study objective we formulate the main research hypothesis:

H0: The compatibility of cyclical dynamics of aggregate economic sentiment and GDP growth allows TESI to be used for the early estimation of economic growth, especially taking into account its timelier publication.

Several sub-hypotheses have been formulated, which are illustrated in the study using specific visual examples for different time intervals:

H1: In periods of economic overheating, the TESI grows faster than GDP and can act as a leading indicator that anticipates cyclical reversals towards a phase of growth slowdown.

H2: The rate of growth of negative sentiments of economic agents synchronously exceeds the intensity of the slowdown in GDP growth. In such periods, the TESI is defined as a coincident indicator, which confirms the transition of economic growth to a phase of contraction.

H2: After each crisis period, there is a significant gap and lag between an intense GDP growth and a less pronounced TESI improvement. The four-year period since the 2015-2016 recession should be defined as the 'new normal' in the dynamics of entrepreneurial opinions and expectations in Russia.

H4: Each clear short-term surge in the dynamics of aggregate economic sentiment initially contributes to the synchronous expansion of economic growth, not less than by 0.6 standard deviations. The expansion continues for six months, but with a noticeably lower intensity.

A joint investigation of the TESI and the GDP growth in the context of the above hypotheses seeks to substantiate the relevance of BCS information and its use in analysing short- and medium-term prospects for the development of the Russian economy.

RESEARCH METHODOLOGY

Data source

This study is based on the results of surveys conducted by Rosstat in 85 regions of Russia and six basic sectors of the economy.[4] They are conducted regularly (monthly and quarterly) and their results are published timely and not revised. To construct the TESI, we integrate the opinions and expectations of 29 000 economic agents: 3100 manufacturing firms, 500 mining firms, 6000 construction organisations, 4000 retail firms, 4000 wholesale firms, 6000 services organisations, and 5100 households.[5]

The surveys contain qualitative assessments and expectations: all respondents are asked about the current level, along with recent and expected changes in their business. The answers are aggregated in the form of balances, which are constructed as the difference between the percentages of positive and negative replies, i.e. an 'increase' and 'decrease' in the indicator compared to the previous period or the indicator level 'above normal' and 'below normal' in the surveyed period. The series of balances are used to build various composite indicators, harmonised as much as possible with the recommendations of the DG ECFIN and OECD (EC, 2020) for cross-country comparative analysis. The quantified results of the surveys mainly reflect early measurements of current and expected business tendencies in various sectors of the economy.

Research methodology

For the TESI calculation, we use 18 quarterly indicators, from regular BCS by Rosstat, which promptly reflect the short-term fluctuations in entrepreneurial estimates of business tendencies in the Russian economy in 1998-2020. These indicators (Table 1) show the highest synchronous correlation with GDP growth.

Methodologically, the TESI consists of a harmonised set of components recommended by the EC, which we expanded by including six indicators of mining and wholesale trade. This expansion allows us to summarise the survey results in economic activities, with a total contribution to GDP of up to 70%. The TESI calculation algorithm includes seasonal adjustment and the standardisation of components, their weighting according to their shares in GDP, and summing up of the components and normalising the result with an average value of 100 and a standard deviation of 10.

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[4] The surveys were gradually introduced into state statistical practice from 1998, first by the Centre for Economic Analysis under the TACIS program (Kitrar & Nilsson, 2003), and then, from 2009, by the Centre for Business Tendency Studies in collaboration with Rosstat (Lipkind *et al.*, 2019). All series of survey indicators are disseminated to external users, including the OECD database.
[5] Survey results (time series, not seasonal adjusted) and metadata are presented on the Rosstat website (only in Russian), https://rosstat.gov.ru/leading_indicators. Survey questionnaires are presented in the album of statistical observation forms (also in Russian), https://rosstat.gov.ru/monitoring.

Table 1. List of TESI components: the BCS results

No.	Indicator	Attribute	Synchronous correlation with the dynamics of GDP growth
		Mining	
1	Output	expectations	0.78
2	Demand	level	0.84
3	Stocks of finished goods	changes	0.69
		Manufacturing	
4	Output	expectations	0.83
5	Demand	level	0.82
6	Stocks of finished goods	changes	0.68
		Construction	
7	Orders book	changes	0.69
8	Employment	expectations	0.73
		Retail trade	
9	Economic situation	changes	0.79
10	Economic situation of organisations	expectations	0.74
11	Stocks	level (inverted sign)	0.72
		Wholesale trade	
12	Economic situation	changes	0.86
13	Economic situation	expectations	0.72
14	Stocks	level (inverted sign)	0.71
		Services	
15	Economic situation	changes	0.80
16	Demand	changes	0.79
17	Demand	expectations	0.77
		Households	
18	Confidence indicator	–	0.86

Source: own study.

First, the seasonally adjusted components were standardised; in this study, we used a sample for the period 1998-2019, or 88 quarters, to standardise:

$$Y_{1,t} = \frac{X_{1,t} - \overline{X_1}}{S_1} \tag{1}$$

where:

$$S_1 = \sqrt{\frac{1}{87} \sum_{t-1}^{88} (X_{1,t} - \overline{X}_1)^2}, \ \overline{X}_1 = \frac{1}{87} \sum_{t-1}^{88} X_{1,t}$$

$Y_{1,t}$ - standardised value of each component;
$X_{1,t}$ - initial value of each component.

In the second iteration, all standardised series were weighted according to the share of each sector in GDP[6] and summed. The weighted sum was divided by the sum of the assigned weights; as a result, the time series *Z(t)* was determined:

$$Z_t = \frac{\sum_j w_j \cdot Y_{j,t}}{(\sum_j w_j)_t} \tag{2}$$

where:

$j = \overline{1,18}$
w_j - weight assigned to each component.

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[6] The household sector is assigned an estimated weight of 0.10.

In the third iteration, the weighted averages were scaled to obtain a long-term average of 100 and a standard deviation of 10:

$$\bar{Z} = \frac{1}{87} \sum_{t=1}^{88} Z_1 \tag{3}$$

$$S_Z = \sqrt{\frac{1}{87} \sum_{t-1}^{88} (Z_t - \bar{Z})^2} \tag{4}$$

$$TESI_t = \left(\frac{Z_t - Z}{S_Z}\right) \cdot 10 + 100 \tag{5}$$

where:

$\bar{Z}$ - period average;

S_Z - standard deviation.

According to the logic of the TESI construction, the value of 100 or close to 100 identifies the business environment with an uncertain economic situation. An increase in TESI values above 100 indicates an increase of entrepreneurial optimism; a decrease to a level noticeably below 100 indicates an increase in depressive sentiment and recessionary events (crisis). TESI values significantly above 100 indicate excessive optimism in the sentiments of economic agents, which is usually typical for overheating of the economy, when the market saturation of manufactured products exceeds the growth in demand. In terms of growth cycles, this situation generates an expansion, a boom. However, if the ESI falls significantly below 100, when the output increasingly fails to meet stable or still growing demand, a gradual increase in recessionary phenomena and – accordingly – excessive pessimism and crisis sentiments of economic agents become obvious.

In our previous study, the TESI series were iteratively tested for sensitivity to a short-term cyclical profile in the dynamics of GDP growth (Kitrar *et al.,* 2015). The algorithm for such a joint decomposition of quantitative and qualitative indicators was based on the two-sided linear Hodrick-Prescott (HP) statistical filter (Hodrick & Prescott, 1997), according to the recommendations and relevant experience of the OECD and the EC (OECD, 2012; EC, 2020; Nilsson & Gyomai, 2011). The HP filter computes a smoothed time series by minimising the variance of s_t elements around y_t:

$$\sum_{t=1}^{T} (y_t - s_t)^2 + \lambda \sum_{t=2}^{T-1} \left((s_{t+1} - s_t) - (s_t - s_{t-1})\right)^2 \to min \tag{6}$$

where:

S_t - smoothed time series.

The smoothing parameter was calculated as:

$$\lambda = \left(2 \cdot sin\left(\frac{\pi}{cut - off\ frequency}\right)\right)^{-4} \tag{7}$$

where:

$cut - off\ frequency$ - the period of smoothing.

This algorithm allowed us to extract unobservable cyclic components with a smoothed amplitude. A double pass of the HP filter should be applied for the decomposition of the TESI dynamics, if the pessimism/optimism accumulates at certain time intervals, and a low-frequency component appears in the analysed dynamics. In this case, the first HP pass at low frequencies (with λ = 8330.69) neutralises the influence of the long-term stable component (15 years), and the second pass (with λ = 6.885) extracts a growth cycle, smoothing out fluctuations with an amplitude of less than 30 months. In the absence of low-frequency components in the primary dynamics of the indicators, only one filter pass is used at high frequencies. The logic of this calculation and the periods of smoothing were previously established empirically (Kitrar *et al.*, 2015).

The time series of the TESI and the GDP growth for the period from Q1-1998 to Q2-2020 were tested for stationarity using the Augmented Dickey-Fuller (ADF) test. The null hypothesis was the presence of a unit root; if it was rejected, the series were considered stationary. The obtained *p*-values of less than 0.01 for both variables for the entire observation period allowed for the rejection of the null hypothesis, and the analysed dynamics were considered stationary at the 1% significance level. Consequently, to identify the short-term cyclical profile in the TESI and GDP growth series, one pass of the HP filter was used.

Then the sensitivity of the quantified survey results to phase changes in the cyclical development of the economy was tested. The cyclical profile in the TESI dynamics was compared with the retrospective of turning points in the similar dynamics of GDP growth. The proximity of the peaks and troughs of the observed growth cycles in the indicators' co-movement and the significant synchronous correlation of the series was the main criterion for assessing the cyclical sensitivity of TESI.

As the TESI and GDP growth series are stationary, we were able to apply VAR modeling. The proposed model specification includes two jointly dependent variables: X_t (TESI) and Y_t (GDP growth) in which *t* is quarters for the period from Q1-1998 to Q3-2020. The selected extreme points of the time series sufficiently affected the simulation results; the used sample length was currently available.

We proved that two lags (quarters) were the optimal lag number for this specification, based on the minimum values of generally accepted information criteria, which were determined for the model with two lags (Table 2).

Table 2. Selecting the number of lags for the model

Lags	Likelihood logarithm	Akaike information criteria (AIC)	Schwartz information criteria (BIC)	Hennan-Quinn information criteria (HQC)
1	-374.11335	9.746496	9.927781	9.819068
2	-358.05864	9.437401*	9.739543*	9.558354*
3	-355.20766	9.466863	9.889862	9.636197
4	-353.29068	9.520274	10.06413	9.737989
5	-348.52688	9.500689	10.165402	9.766786
6	-346.78149	9.5585	10.344069	9.872978
7	-345.84565	9.637068	10.543494	9.999927

* marks the lowest values of each criterion
Source: own calculation conducted in Eviews.

Accordingly, we used a second-order VAR model of two equations, each of which (separately for X_t and Y_t) included autoregressive components of the second order: $X_{t-1}, X_{t-2}, Y_{t-1}, Y_{t-2}$:

$$X_t = c_1 + a_{1,1}X_{t-1} + a_{1,2}X_{t-2} + a_{1,3}Y_{t-1} + a_{1,4}Y_{t-2} + a_{1,5}D_1 + a_{1,6}D_2 + a_{1,7}L_1 + \\ + a_{1,8}L_2 + a_{1,9}L_3 + \varepsilon_{1,t}$$
(8)

$$Y_t = c_2 + a_{2,1}X_{t-1} + a_{2,2}X_{t-2} + a_{2,3}Y_{t-1} + a_{2,4}Y_{t-2} + a_{2,5}D_1 + a_{2,6}D_2 + a_{2,7}L_1 + \\ + a_{2,8}L_2 + a_{2,9}L_3 + \varepsilon_{2,t}$$
(9)

where:

X_t - TESI seasonal adjusted series;

Y_t - GDP growth, y-o-y, %;

D_1 - dummy variable for the external crisis, active (=1) for Q3-1998, Q4-2008, Q1-2009, Q2-2020, Q4-2020;

D_2 - dummy variable for recovering from a severe crisis, active (=1) for Q1-1999, Q1-2009, Q3-2020, Q1-2021;

L_1 - dummy variable for a very weak TESI fall compared to the strong GDP fall in Q3-1998;

L_2 - dummy variable for strong GDP growth without TESI growth in Q3-1999;

L_3 - dummy variable for a strong TESI fall without a GDP fall in Q1-2002, Q1-2015.

The random residuals in the equations were denoted as ε_{1t} and ε_{2t} and were white noise processes with the following distribution parameters:

$$E(\varepsilon_{1t}) = 0, Var(\varepsilon_{1t}) = \sigma^2 \tag{10}$$

$$E(\varepsilon_{2t}) = 0, Var(\varepsilon_{2t}) = \sigma^2 \tag{11}$$

The variables in the VAR model were stationary, endogenous, and defined within the system. The presence of delayed relationships for two quarters allowed us to classify this model as dynamic. The universality and simplicity of the proposed model were among the main advantages that guided us. The model specification was clearly limited according to the goal of the study.

We introduced dummy variables into the model specification to account for unexpected crises in the trajectory of the analysed indicators – including the last shock caused by Covid-19 lockdowns – and the fact that the 'bottom' of this episode has already been reached and a recovery has started. The lowest TESI values in Q3-1998, Q4-2008, Q1-2009, and Q2-2020 were initially provoked by the 'unexpected shocks' of mostly non-economic nature. In this case, any variable 'crisis' had a value of 1, and for the rest of the dynamics, 0. To fix the recovery period the variable 'recovery' was activated (with a value of 1). This allowed us to take into account the specifics of this period in the short- and medium-term forecasting of GDP growth without over-complicating the model.

The proposed model specification with dummy variables (formulas 8, 9) was evaluated as consistent. According to the Doornik-Hansen test, for the first four lags, the null hypothesis of the normal distribution of residuals was not rejected at the 5% significance level (*p*-value 0.177). The hypothesis of no autocorrelation according to the Broysch-Godfrey test was not rejected at the 5% significance level (*p*-values for each lag are higher than 0.05).[7]

The VAR-simulation results are presented in Table 3.

Table 3. Results of the VAR simulation

Lags	Coefficients	Standard error	t-statistics	p-values	Coefficients	Standard error	t-statistics	p-values
	Equation: GDP				Equation: TESI			
const	16.97	3.85	4.41	0.00	7.90	7.92	0.99	0.32
X_1	0.08	0.04	2.13	0.04	0.86	0.08	10.62	0.00
X_2	−0.09	0.04	−2.45	0.02	−0.17	0.08	−2.15	0.03
Y_1	1.07	0.08	13.36	0.00	0.38	0.16	2.28	0.03
Y_2	−0.23	0.08	−2.91	0.01	−0.15	0.16	−0.93	0.36
D_1	−8.79	0.68	−12.86	0.00	−22.78	1.41	−16.19	0.00
D_2	5.20	0.96	5.41	0.00	16.70	1.98	8.45	0.00
L_1	0.59	1.51	0.39	0.69	13.09	3.11	4.20	0.00
L_2	6.49	1.33	4.87	0.00	−1.12	2.74	−0.41	0.68
L_3	−2.86	1.30	−2.20	0.03	−10.89	2.67	−4.08	0.00

Source: own calculation conducted in Eviews.

The results of the Granger causality test (Table 4) showed that there are dependencies of the TESI in the GDP growth and the GDP growth in the TESI.

Table 4. Granger causality test results

Hypothesis	Chi-square	p-value	Result
TESI does not affect GDP growth	3.2364	0.0446	Rejected
GDP growth does not affect TESI	3.1243	0.0494	Rejected

Source: own calculation conducted in Eviews.

We used the impulse response function (IRF) to clarify the relationship between two series in the model and to estimate the strength and direction of the shock, and the duration of adjusting the estimated series (GDP growth) to the shock in TESI equal to one standard deviation. To identify

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[7] All test results are available upon request.

shocks, the Cholesky decomposition was used; the order of the variables was set by variance decomposition. The optimal ordering provided the greater impact of the TESI on the dependent variable (the GDP growth). This result of variance decomposition of GDP series was achieved with the following ordering of the variables: the TESI → the GDP growth. In this ordering, shocks in economic sentiment affected both the TESI and the GDP growth, while shocks in the GDP growth had an immediate impact only on economic growth. Therefore, we were considering a situation when GDP growth does not have a leading effect on economic sentiment.

The IRF reflects the statistically significant relationship between the variables in the model used to calculate scenario forecasts of GDP growth. The calculations were conducted by taking into account possible gaps in the TESI at the end of 2020 relative to the long-term average level of its dynamics.

On the in-sample interval (from the Q1-1998 to Q1-2020), the model acceptability for the quarterly forecast was confirmed based on parameters of the forecast quality (Table 5).

Table 5. Parameters of the forecast quality

Forecast without dummies		Forecast with dummies		Forecast without pandemic shock	
R-squared	0.78	R-squared	0.93	R-squared	0.93
Sum sq. resids	542.54	Sum sq. resids	130.29	Sum sq. resids	116.88
S.E. equation	2.32	S.E. equation	1.29	S.E. equation	1.24
MSE	5.08	MSE	1.46	MSE	1.34
RMSE	2.26	RMSE	1.21	RMSE	1.16
ME	4.38	ME	4.15	ME	-4.48
MAE	1.41	MAE	0.94	MAE	0.87
MAPE	0.01	MAPE	0.01	MAPE	0.01

Source: own calculation conducted in Eviews.

The proposed method of analysis largely illustrates the potential of an empirical approach, which is available to most researchers and experts and is flexible and convenient for solving more complex problems that require the introduction of additional indicators and the complication of the model specification of their relationship.

RESULTS AND DISCUSSION

Visualisation, cross-correlation, and scatter diagram

Figure 1 presents the time series of the TESI and the GDP growth (1998-2020). According to our estimates, the minimum value of the TESI in Q1-2015 signalled the beginning of a decrease in aggregate uncertainty, anticipating preliminary estimates of economic growth at that time. Since mid-2018, after short-term episodes of growth in entrepreneurial optimism, the uncertainty of opinions and expectations has periodically increased, bordering on pessimism. In Q2-2020, we observed the sharpest and almost vertical collapse of the aggregate sentiment of Russian entrepreneurs and households. The sudden and unprecedented TESI drop was obviously associated with strict measures to contain the pandemic, which had an extremely adverse effect on business and the population both on the demand (reduced household consumption, investment activity, export earnings) and supply side (a decline in production and services, disruptions in production and supply chains).

The primary visual and cross-correlation analysis of the TESI and GDP growth dynamics revealed a statistically significant relationship with a high value of the synchronous correlation coefficient of 0.86. The prompt calculation of the TESI – almost two months ahead of the first quantitative estimate of the GDP growth – and the stable synchronous correlation between these series are the first evidence of the feasibility of using the TESI as an early estimate of possible changes in economic growth. This allowed us to continue the examination of TESI dynamics for its accuracy for early estimates of the change in economic growth rates.
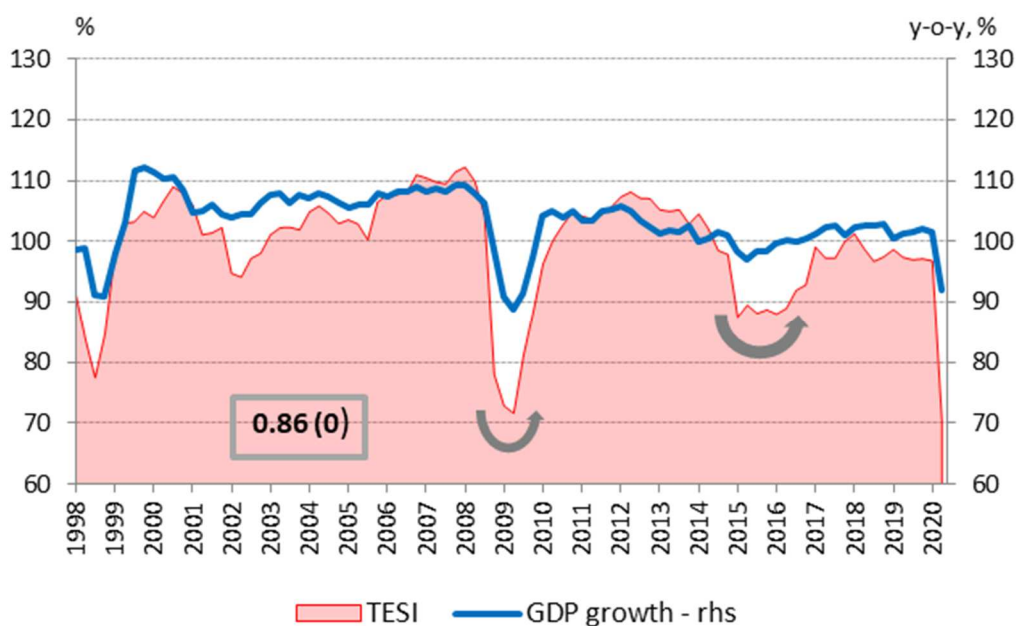
Figure 1. TESI and GDP growth dynamics in 1998-2020
Note: The marker indicates the coefficient of synchronous correlation between the TESI and GDP growth series.
Source: own elaborations based on Rosstat data.

The scatter diagrams shown in Figure 2 enhance the visualisation of the general correspondence between TESI and GDP growth and allow us to illustrate the sub-hypotheses of the study. The different sets of points (I-V) are also presented separately.

According to this visualisation, relationships can be traced in the dynamics of the TESI and the GDP growth at different time intervals. With an increase (decrease) in TESI values, the GDP growth changes in a similar direction. However, in different periods of cyclical development, the relationships between the levels of time series differ.

A significant improvement in the TESI throughout the analysed period was consistently associated with the phase of accelerating economic growth (H1). In the range of the highest values of the indicators – corresponding to the periods of the most successful economic development (the economy overheating) – the TESI largely grew faster than GDP (Figure 2a). High entrepreneurial optimism signalled a new expansion of gross value added. In the phase of accelerating economic growth, the TESI was one of leading short-term indicators that anticipated cyclical reversals to growth, especially from the moment when a steady excess of TESI values over GDP growth rates was recorded.

The set of extremely low values of both indicators clearly shows the inverse relationship (Figure 2e). During periods of economic downturn, the most intense growth in the TESI is observed (H2). In the recession phase, the TESI can also be defined as an indicator that warns in advance about the crisis' aggravation, from the moment when its values are less than 100 and become noticeably lower than similar values of GDP growth.

In different periods of economic stabilisation, the TESI was lower than the GDP growth rates and remained almost synchronous. Any upward deviations in entrepreneurial confidence signalled a stable economic situation (Figure 2b).

Fluctuations in the TESI during periods of economic uncertainty had largely uneven and low amplitudes (Figure 2c). After each clear crisis period, there was a significant gap and lag between intensive GDP growth and a less pronounced improvement in economic sentiment (Figure 1; H3). At the epicentre of the recession of 2014-2016, the aggregate confidence (the TESI) declined at a noticeably larger scale relative to the change in the GDP growth (Figure 2d).
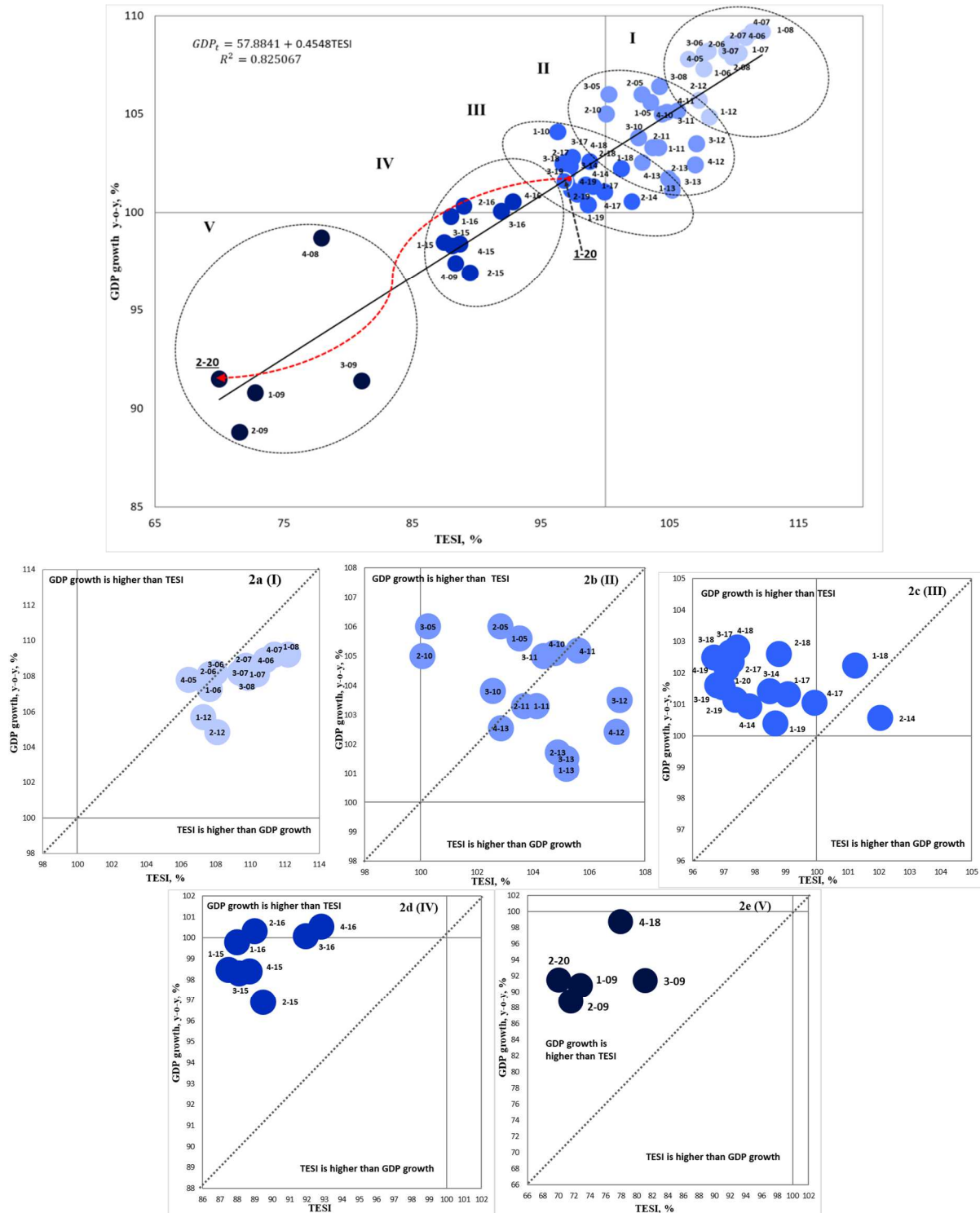
Figure 2. Scatter chart of GDP growth and TESI in the 2005-2020 period

Note: Light markers (the set of points I) indicate periods of the boom of optimism and the peak of GDP growth with quarters of economy overheating at the intersection of the highest values; set II – high TESI values and high GDP growth; set III – neutral TESI values and low GDP growth; set IV – low TESI values and a moderate decline in GDP; dark markers (V) – extremely low TESI values and the recessions of economic growth with crisis quarters at the intersection of the lowest values.

Source: own elaborations based on Rosstat data.

Our conclusion based on the empirical analysis of the relationship between the TESI and the GDP growth is consistent with the main hypothesis. To ensure the highest rates of economic development, it is necessary to strengthen the parameters of business activity and a high level of entrepreneurial

confidence. Conversely, weakening positive economic trends is accompanied by a faster increase in negative business sentiment compared to a slowdown in the GDP growth. Thus, the empirical result of the joint visual assessment of the two macro indicators shows that at the upper and lower turns of cyclical economic development, the TESI reacts more strongly and corresponds to upcoming economic events more clearly, becoming their precursor. Stabilisation periods correspond to more restrained intentions of economic agents with the prevailing uncertainty of estimates.

However, the level of aggregate entrepreneurial confidence over the period of the protracted recession of 2015-2016 decreased significantly; as a result, even with an increase in TESI values, all of its subsequent four-year dynamics were characterised by the lowest potential compared with the recovery periods after previous crises; lower than the corresponding intensity of economic growth (H3). The post-crisis economic reality can be defined as the 'new normal' for the cumulative dynamics of entrepreneurial opinions and expectations. Studies devoted to the dynamics of BCS results in the EU came to similar conclusions (Gayer & Mark, 2016; Astolfi *et al.*, 2016). The bottom line is that the sentiment of business and consumers – not recovered from the crisis even to the previous (normal) level – was again pulled into uncertainty and high volatility when the crisis phase was only smoothed out and upward trends manifested mainly in the case of a low base effect.

Decomposition of the TESI sectoral structure and cross-countries comparisons

Current trends in the annual TESI dynamics are determined by the potential and scale of the growth of its sectoral components. Figure 3 with four quadrants presents the TESI sectoral decomposition at a point in time according to the current level and annual growth of TESI components.

The main thesis in this regard is that industries that have a high level of entrepreneurial confidence and develop more intensively have much more potential. Other industries, even those with high activity at the moment – but growing at a slower pace or stagnating – are defined as having less potential and 'catching up' in terms of developing aggregate optimism.

The main negative impulses for the TESI annual change before the corona crisis (top panel) were generated by a decrease in entrepreneurial confidence in mining (components 1 and 2), retail, and wholesale trade (components 9–14). Economic sentiment in the construction and consumer sectors improved, but the components remained low and far from the quadrant of confidence growth. In manufacturing and services, the indicators were fixed practically on the border with the cyclical phase of growing uncertainty. In Q2-2020 (bottom panel), at the height of the pandemic in Russia and the strictest lockdowns, a sharp increase in pessimism of entrepreneurs in services (components 15 and 16) was the main driver of the negative TESI dynamics.

A comparison of the Russian TESI with similar information in the EU is also feasible due to the high harmonisation of Russian and European surveys in terms of questions, data treatment, and aggregation methods. The joint visualisation of economic sentiments indirectly reflects the short-term expected fluctuations in GDP growth, based on the statistically significant correlation between TESI and the macro-referent (EC, 2016, 2017). The results of this analysis of economic sentiment in Europe and Russia are presented in Figure 4, which shows the position of each country in a particular quadrant of TESI changes.

At the initial stage of lockdowns in Q1-2020 (top panel), most countries were located in the quadrants of stagnation or crisis of confidence, and TESI values were evenly distributed in the range from 90 to 110. The different rates of TESI decline in European economies were largely explained by different timing of the survey in March 2020, regarding the adoption of strict restrictive measures to contain the pandemic in these countries. In the second quarter, negative sentiments sharply increased in all European countries, all assessments moved deep into the quadrant of a crisis of confidence.
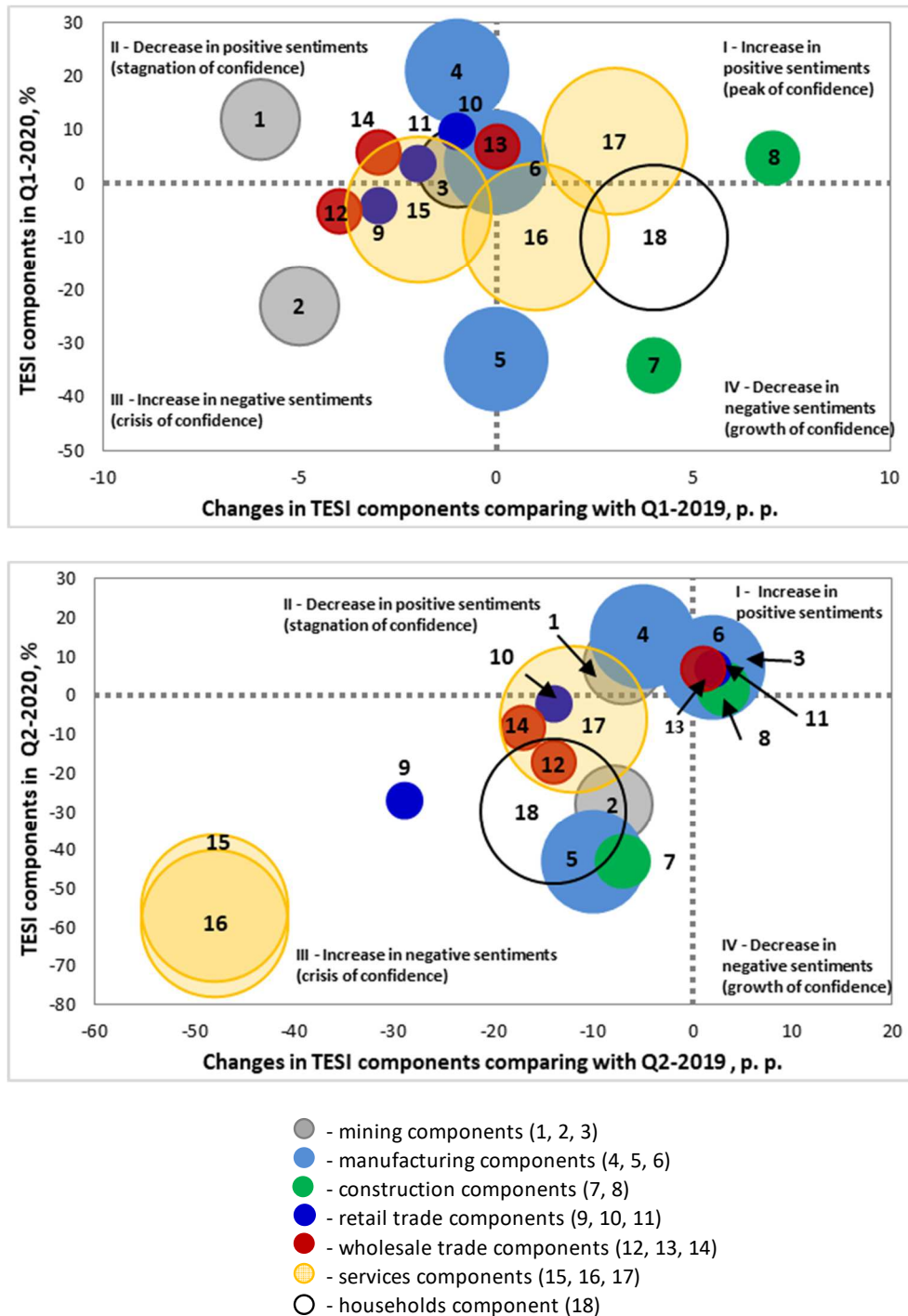
Figure 3. The TESI decomposition in 2020: levels and annual growth of sectoral components
Note: The markers' sizes are determined by the shares of each sector in the TESI structure.
Indicators are numbered according to Table 1.
Source: own elaborations.
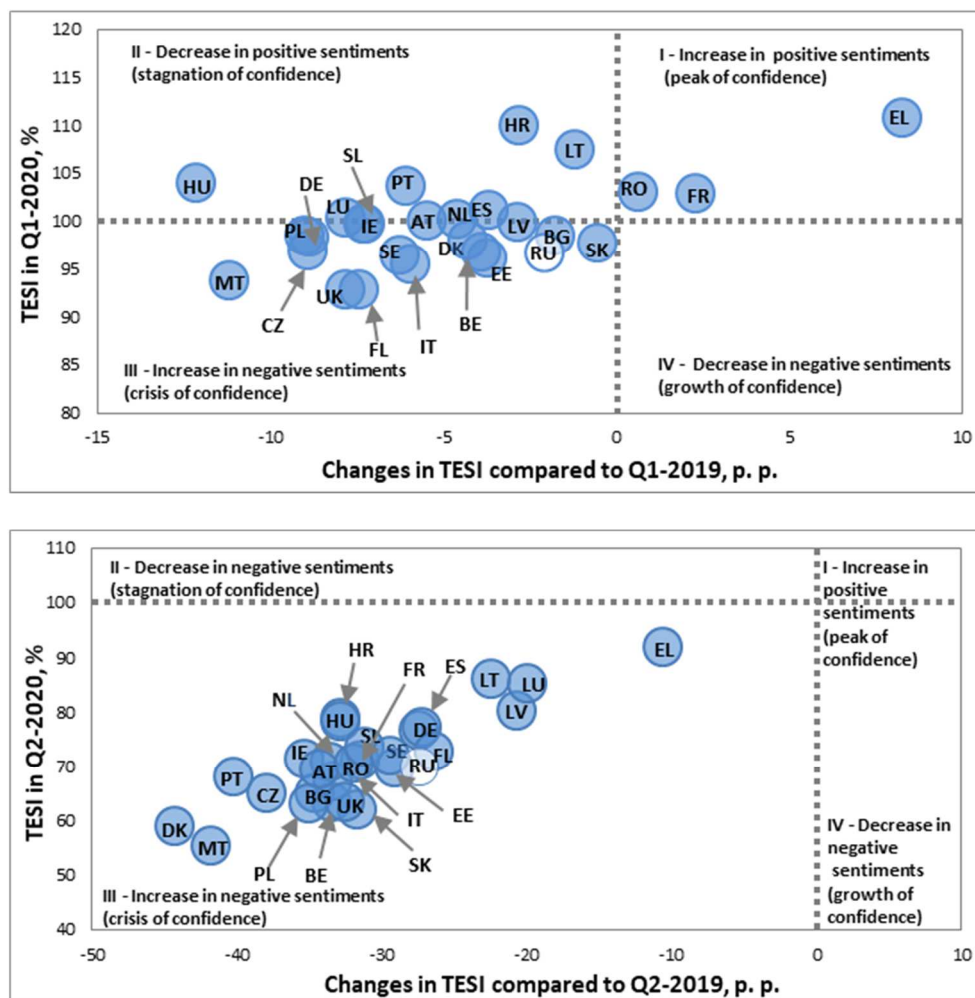
Figure 4. Economic sentiment in European countries and Russia in 2020
Note: Quarterly data for European countries is obtained by averaging monthly data (for comparability with Russian data).
AT – Austria, BE – Belgium, BG – Bulgaria, CZ – Czech Republic, DK – Denmark, DE – Germany, EE – Estonia, EL – Greece,
ES – Spain, FL – Finland, FR – France, IE – Ireland, IT – Italy, HR – Croatia, HU – Hungary, LV – Latvia, LT – Lithuania,
LU – Luxembourg, MT – Montenegro, NL – Netherlands, PL – Poland, PT – Portugal, RO – Romania, SL – Slovenia,
SK – Slovakia, SE – Sweden, UK – Great Britain
Source: own elaboration based on EC business and consumer survey database.

Joint cyclical testing of the TESI and the GDP growth time series

At the next stage, the TESI dynamics were tested for statistical sensitivity to short-term cycles in GDP growth. The results of the time series decomposition – the smoothed growth cycles in the dynamics of TESI and GDP growth in 1998-2020 – are presented in Figure 5.

The results of joint graphical visualisation and the cross-correlation analysis of the smoothed cyclic dynamics of the TESI and the GDP growth confirm a stable synchronous correlation of short-term growth cycles in these time series: 0.89.[8] The turning points in the growth cycles are almost identical and are identified using the traditional Bry-Boschan procedure (Bry & Boschan, 1971).

We empirically identified the dominant growth cycles in the dynamics of the two indicators from Q1-1998 to mid-2020. During this period, four completed (from peak to peak) growth cycles with expansion phases and contraction phases were identified. The fourth cycle in the TESI dynamics began in Q2-2012 after a period of economic overheating (with the peak in Q4-2011) and the subsequent boom of the optimism of economic agents. This cycle was the longest in the history of cyclical analysis

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[8] The TESI lag at the beginning of 2012 is due to a shift in the TESI level resulting from changes in the sample (services organisations were added).

of modern economic dynamics in Russia. For almost a year, since mid-2014, the economy remained in a phase of recession, crisis events, and depressed economic sentiment. However, then we can observe the 'cognitive shift' in the level of aggregated economic sentiment. After the protracted recession of 2015-2016, its subsequent four-year dynamics was characterised by the lower potential compared to the recoveries after all previous crises. The coronavirus pandemic and quarantine measures taken in April-May 2020 led to a sharp and deep decline in economic activity. According to estimates of GDP growth in Q2-2020, this period can be defined as the immersion of the economy in a new crisis, the onset of which was caused mainly by non-economic factors.[9]
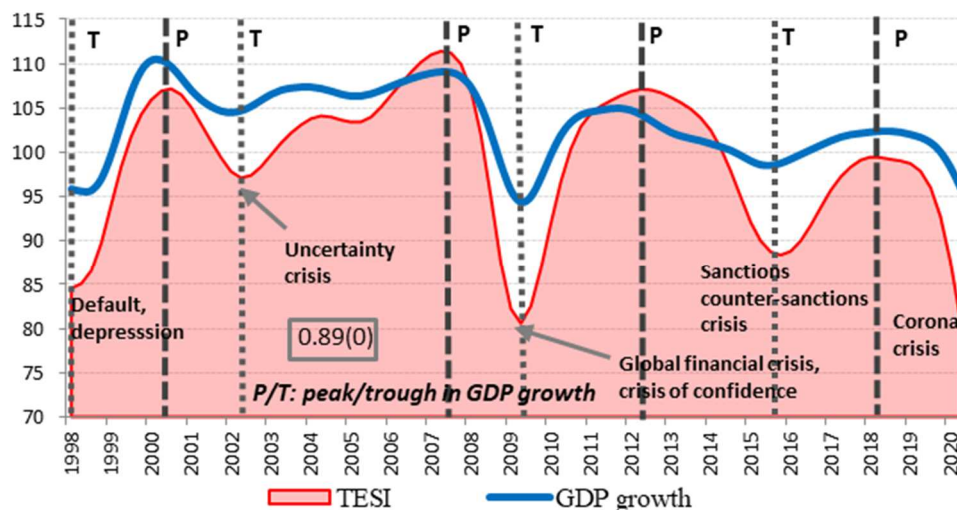
Figure 5. Short-term cycles in the TESI and GDP growth dynamics in 1998-2020
Note: The marker indicates the coefficient of synchronous correlation between the TESI and GDP growth cycles.
Source: own calculations, one pass of the HP filter.

The visualisation of the cyclical movement of economic sentiment is achieved through a tracer (Figure 6), which is based on the EC concept in terms of the diagram quadrants and the direction of the tracer movement (EC, 2019; Gayer, 2008).

The tracer clearly shows the last two complete growth cycles in the TESI dynamics since Q3-2007. The tracer passed the last cyclic trough in the second half of 2015, when the aggregate economic sentiment reached its lowest value over the past seven years. The transition of the tracer to the quadrant of recession slowdown and a decrease in pessimism in Q1-2016 reflected the beginning of the cyclical recovery in TESI growth. Since mid-2018, the tracer has moved deeper into the third quadrant, indicating increased pessimism and pronounced recessionary sentiments.

Thus, the joint decomposition of the TESI and the GDP growth series with the extraction of short-term growth cycles and the dating of cyclical turning points allow us to note the cyclical conformity of the dynamics of economic indicators. We believe that the TESI – by its nature – has leading capabilities, since the timeliness of collecting the relevant data allows it to be published much earlier than GDP growth.

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[9] The experts from the Committee on Dating Business Cycles of the US National Bureau of Economic Research (NBER) made the same conclusion; they determined the peak of quarterly economic activity in the US in the Q4-2019.The Committee acknowledged that the pandemic and the public health response had led to a recession with unusual characteristics and dynamics. Nonetheless, NBER experts believe that the unprecedented large-scale decline in employment and output – and its widespread impact on the entire economy – justify identifying this episode as a recession, even if it could be shorter than previous recessions (see https://www.nber.org/cycles /june2020.html).
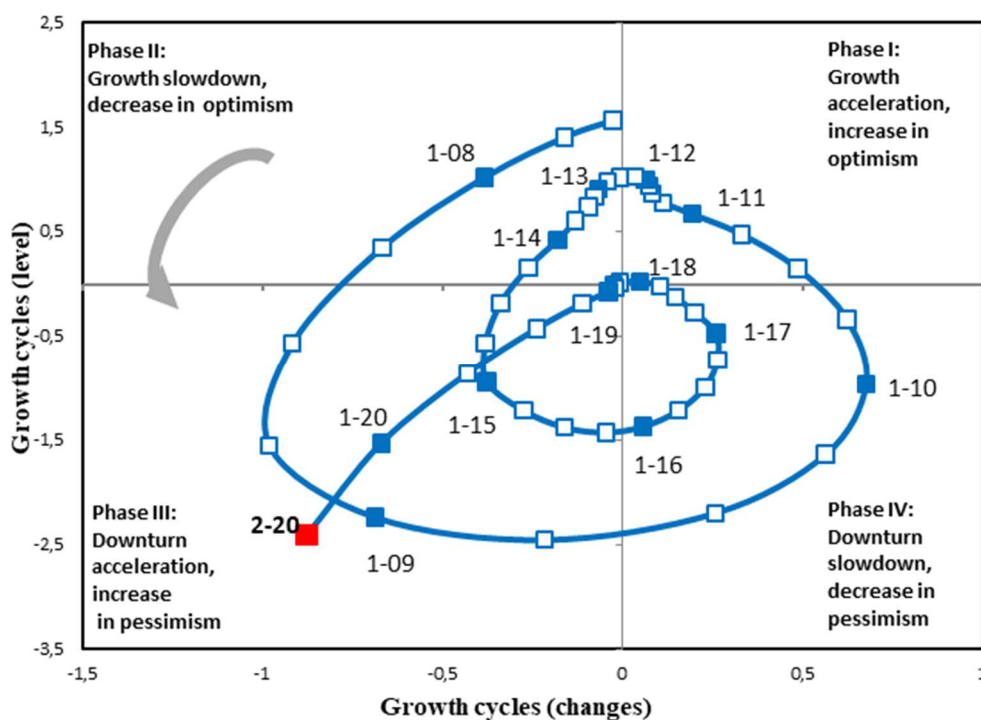
Figure 6. Tracer of cyclic profile in the TESI dynamics in 2007-2020
Note: The upper and lower values located within the central vertical line indicate the turning points of the growth cycles of economic sentiment: the peaks of overheating (optimism) and the troughs of crisis (depression). Values grouped around zero are more likely to correspond to uncertain sentiments.
Source: own elaborations based on EC concept, one pass of the HP filter.

The early estimates of quarterly GDP growth based on VAR simulation results

The results of the VAR simulation through the IRF (Figure 7) allows us to estimate the strength and direction of the impact of an artificial shock in the TESI series on the GDP growth and the duration of the GDP growth adjustment to the shock. On this basis, H4 is proved, i.e. a significant unidirectional relationship of two indicators is confirmed: each clear surge (equal to one standard deviation) in the TESI dynamics initially contributes to the expansion of economic growth by 0.6 standard deviations, which continues in the next quarter, but with a lower intensity (H4).The response of the GDP growth to an impulse in the TESI fades for at least six quarters, and then the reference indicator stabilises for five consecutive quarters, reaching its initial level.

We calculated scenario forecasts for GDP growth until the end of 2021 driven by the GDP response to actual and expected impulses in the dynamics of the aggregate economic sentiment from Q1-1998 to Q3-2020. Consequently, the calculations were based on the indicator values for the entire period, including a sharp decline in its dynamics due to the Covid-19 crisis.

Moreover, we introduced an expertly set interval of TESI values that are possible in Q4-2020 if expectations were to remain uncertain; in particular, due to large-scale vulnerability and slow recovery of the most affected activities, new local lockdowns, the pressure of external and internal challenges, delays in the vaccination of the population and other preventive antiviral measures. The simulation of TESI values was conducted by the input of conditional impulses as deviations from the long-term average value (100), depending on the potential of new crisis shocks at the end of 2020.

The first scenario forecast of the GDP growth (Figure 8) is associated with a more optimistic version of the TESI decline in Q4-2020 (by 0.5 standard deviations). The moderate scenario forecast was calculated based on the possible TESI falling by 1.5 and the most pessimistic scenario assumes a new strong contraction of aggregate economic sentiment by 2.5. Figure 8 also presents expected estimates of GDP growth if the coronavirus shock had not occurred in Q2-2020.
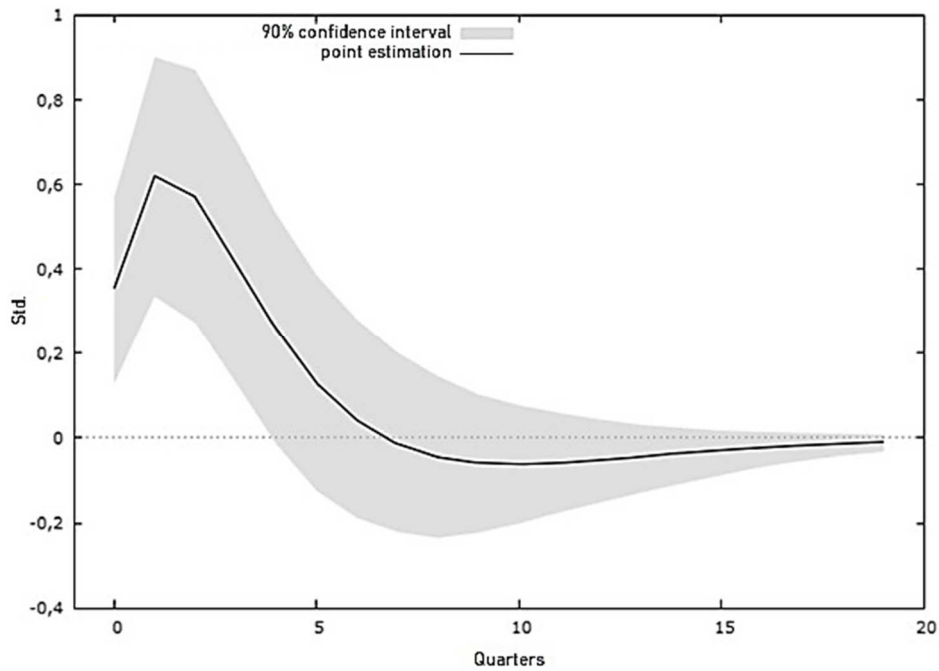
Figure 7. The response of the GDP growth to the impulse in TESI:
the degree and direction of impact (Cholesky decomposition)
Source: own calculation conducted in Eviews.
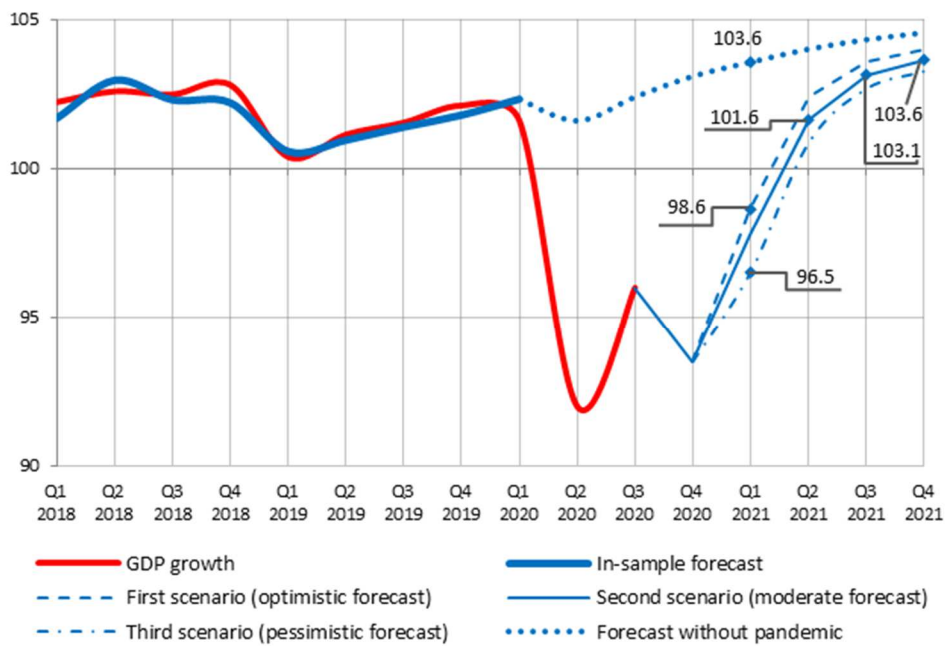
Figure 8. Scenario forecasts of GDP growth
Note: For the period from Q1-2018 to Q1-2020, the blue line denotes in-sample forecast.
Source: own calculations based on Rosstat data.

The forecast results are based on the dynamic relationship of two series with the response of the estimated variable (GDP growth) to the reaction of the business environment and to the simulation of the variations we set in the TESI dynamics, which reflect possible economic sentiments under crisis

events at the end of 2020. The results clearly indicate the replacement of the sluggish growth of Russian GDP, observed over the past two years, with an even lower trajectory. According to the calculations, the expected estimates of the economic growth in the first half of 2021 – caused by the previous values (actual and target) in the TESI dynamics – may differ between the extreme forecasts of the GDP growth by two percentage points, on average. Nevertheless, under all scenarios for the development of business trends in Q4-2020 – if we do not take into account the possible further aggravation of risks for business and consumers – the economic growth can exceed the level of the end of 2019 from Q3-2021. In particular, according to the moderate scenario, the GDP growth will amount to 103.6% in Q4-2021. National economic growth could return to a phase of sustainable recovery in 2022 only if the Covid-19 crisis is limited, local, and short-term – when only some sectors of the economy are affected – and assuming the introduction of rapid vaccinations in early 2021, full control over the viral situation, and the strengthening of business confidence.

CONCLUSIONS

The results of our study confirm the empirical and predictive value of the aggregated results of business and household surveys for assessing economic growth in Russia. The joint decomposition of the TESI and the GDP growth time series with the identification of short-term cycles proved the hypothesis of their almost synchronous cyclical conformity. However, the TESI has leading capabilities, since the timeliness of collecting the relevant data allows it to be published much earlier than the GDP growth.

Statistically significant results of the VAR-modeling with dummy variables – which fix the periods of deep economic recessions (including those associated with the coronavirus crisis) – enable the performance of short-term forecasting of the GDP growth. Given the expected impact of various new coronavirus shocks, all scenario forecasts indicate a slow recovery of economic growth, reaching the level from the end of 2019 in the second half of 2021 only.

Thus, the long-term BCS results – which summarise estimates of entrepreneurial and household sentiment over the past 23 years – are reliable as early warning information on the economic growth in Russia. We deem these results applicable for assessing the impact of crisis on business tendencies and economic growth in any resource-dependent and service-dependent economy with deep institutional interventionism, especially for emerging market countries.

The main limitation of the study is that for short-term forecasts of the GDP growth we use only a composite indicator that summarises the survey results. Despite the consistency of the proposed model specification, we assume that forecasting performance can improve if quantitative economic variables are included in the model. Another area for the further development of survey-based methods of analysis and forecasting is the improvement of the TESI leading properties by updating its composition and selecting the optimal set of components.

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Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

The role of family environment in developing the entrepreneurial intention of young Tunisian students

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A B S T R A C T

Objective: The objective of the article is to identify the role and importance of family environment (parental support for autonomy, entrepreneurial role model, and family support for entrepreneurship) in determining the entrepreneurial intention of young Tunisian students in a post-revolution context.

Research Design & Methods: The study is based on a quantitative approach using a survey of 297 final year under-graduate students in Tunisian universities. Data analysis was performed using Statistical Package for the Social Sciences (SPSS) V23 software.

Findings: The results show that parental support for autonomy as the promotion of independence and exposure to an entrepreneurial role model are the most important factors capable of stimulating entrepreneurial intention. Contrary to our expectations, we found that the family support for entrepreneurship (financial capital and social capital) has no effect on the entrepreneurial intention of young students.

Implications & Recommendations: Parents should be aware that orienting their children towards entrepreneurship is first developed at the family level. Their role is therefore essential in encouraging the promotion of independence. Parents should also bring their children closer to family entrepreneurs so as to build on their success.

Contribution & Value Added: Our main contribution is the development of an empirically verified model that high-lights relationships between different components of family environment and the entrepreneurial intention of final year undergraduate students.

INTRODUCTION

Since 14 January 2011, Tunisia's post-revolution environment has been characterised by political, economic, and social crises (Ben Moussa, 2018). In addition, in 2017 the Tunisian government decided to suspend recruitment in the public sector. Under such austerity measures, young people must move towards launching their own projects to deal with unemployment.

Bearing on the theory of planned behaviour (Ajzen, 1991) and findings from previous research, the study of entrepreneurial intention enriches understanding of entrepreneurial behaviour (González *et al.*, 2019). Indeed, the decision to go into an independent business requires, in the first place, entrepreneurial will (Ajzen, 1991). The latter can be determined when we consider personal and contextual factors (Shapero & Sokol, 1982). Ajzen (1991) shows that entrepreneurial potential appears in specific contexts that promote attitudes, social norms, and perceptions of behaviour control that result in the manifestation of entrepreneurial intention.

Thus, the environment in which a person develops can facilitate or inhibit launching a business. It seems that the family environment, as a factor that influences and gears career choices, determines the personality and behaviour of the individual and brings – besides to financial support – a relational network that stimulates entrepreneurial intention. Family environment is the first social experience of students (Boudabbous, 2011). Indeed, family environment denotes the entire fundamental system that transfers entrepreneurial values. It is for this reason that we first bear on the literature examining the effect of family environment on entrepreneurial intention as a factor acting on the perceived desirability and feasibility of entrepreneurial intent (Ajzen, 1991; Shapero & Sokol, 1982). Several studies show that the family is a determining factor of entrepreneurial intention but few focus on identifying the components of the family concept and on showing their effect on the development of entrepreneurial intention in young people. To our knowledge, few previous studies scrutinised the relationship of the family environment with its different components and entrepreneurial intent.

In our study, we will try to answer the following question: What is the impact of family environment on the entrepreneurial intention of young people? By answering this question, we hope to determine the relative importance of each component of family environment in the development of entrepreneurial intention among young people.

The current study bases on a quantitative approach using a survey of 297 final year undergraduate students at public universities in Tunis. Data analysis was performed using the SPSS V23 software.

Thus, our paper is structured as follows. We first review the relevant literature, then we outline our methodology to test our research hypotheses, and finally, we discuss the main results.

LITERATURE REVIEW

In this section we first present the two basic concepts of our study. These are entrepreneurial intention and family environment. Then we outline the nature of the relationship between them.

Entrepreneurial Intention

Since it was identified as the best predictor of entrepreneurial behaviour (Ajzen, 1991), entrepreneurial intention continues to attract entrepreneurship researchers' attention (Leung *et al.*, 2020; Bazan *et al.*, 2020). In fact, any planned behaviour, including starting up a new business venture, cannot take place without the intention of doing business (Ajzen, 1991). Entrepreneurial intention is considered to be the first step in the process of business creation (Ajzen, 1991) reflecting the effort a person is willing to make to actually start a business. Engle *et al.* (2010) defined entrepreneurial intention as a deliberate desire to go into business. Indeed, it is personal belief that is translated into an ability to assess the feasibility of the idea (Bird, 1992). Therefore, entrepreneurial intention is a thoughtful combination of goal and the means to achieve it. It is also known as a cognitive representation determined by needs, values, motivations, and beliefs (Bird, 1992). As shown by the entrepreneurial event model (Shapero & Sokol, 1982) and the theory of planned behaviour proposed by Ajzen (1991), Carmen *et al.* (2016) prove that entrepreneurial intention can be developed throughout a person's life and several factors can influence it. Previous research (e.g. Ajzen, 1991; Shapero & Sokol, 1982) showed that entrepreneurial intention depends on:

− attitude towards action, which reflects the degree of perceived desirability of behaviour (Shapero & Sokol, 1982). In other words, it is a favourable or unfavourable assessment of the intended behaviour,

− perceived behavioural control, which refers to the feeling of self-efficacy, i.e. the perceived ability to perform a specific behaviour (Ajzen, 1991). Past experiences, psychological and emotional events are variables that may influence the sense of self-efficacy in an individual,

− social norms reflect the influence of the potential entrepreneur's entourage on their decision to start a business.

Scholars (e.g. Hayton & Cacciotti, 2014) identify several factors that may influence the entrepreneurial intention, such as personal effectiveness, personality traits, work experience, entrepreneurship education, societal orientation of gender roles, parental behaviour, family history, neighbourhood, school, peer group, and work status. However, in our study, we are only interested in the factor of family environment and its impact on the entrepreneurial intention of young people. Therefore, the

peculiarity of our study stems from its sole focus on family environment as the determining factor of entrepreneurial intention applied to its importance.

Family Environment

Family is the first social entity in which individuals learn to integrate and interact (Wiani *et al.*, 2018). In other words, family has a great influence on the social development of individuals, which is where they learn the basic principles necessary for their integration in society. Family shapes their behaviour, their ways of solving problems, and in particular, how they make decisions (Figueiredo & Dias, 2012). Family is the environment where the identity and personality of individuals are shaped because of direct and early contact with parents, brothers, sisters, and relatives (Wiani *et al.*, 2018).

The family environment essentially consists of parental support for autonomy (e.g. Anil *et al.*, 2014; Sharma, 2014), entrepreneurial role model (e.g. Basow & Howe, 1980), and family support for entrepreneurship (e.g. Bird & Weinberg, 2016; Sharma, 2014).

The previous studies have examined the impact of the family environment concept on entrepreneurial intention, as a whole and unidimensional construct. Unlike our study, which is interested in analyzing the impact of its several dimensions on entrepreneurial intention.

Parental Support for Autonomy

In developmental psychology, the term autonomy was associated with independence, self-determination, and self-assertion (Beyers *et al.*, 2003). In the field of cross-cultural psychology, autonomy is defined as the capacity to act on personal goals and interests, namely the development of individual self-determination (Kyriaki *et al.*, 2014). Under the self-determination theory proposed by Deci *et al.* (1991), parental support for autonomy leads to positive, affective, cognitive, and behavioural consequences which encourage self-expression, self-asserting, and the adoption of more mature behaviours by children. In addition, psychological self-reliance determines parents' ability to stimulate the desire for discovery, but also to encourage children to express one's opinions, desires, and preferences, along with building in them problem-solving skills (Prinzie *et al.*, 2009). Consequently, the concept of parental support for autonomy takes two forms (Soenens *et al.*, 2005). It is initially a question of perceived promoting of independence (PI) through parental educational practices, i.e. parents tend to develop and promote decision-making and freedom of expression in their children (Silk *et al.*, 2003). On the other hand, parental support for autonomy refers to the perceived promotion of volitional functioning (PVF), i.e. parents favour the will of psychological independence (Soenens *et al.*, 2005).

Autonomy is an influential predictor of entrepreneurial intention (Al-Jubari *et al.*, 2017). Research published in the subject shows that parenting practices are the conditions that predispose an individual to have entrepreneurial traits and the intention to set up a business project, through encouragement of creativity, risk taking, promotion of autonomy, and innovative thinking (Anil *et al.*, 2014). Indeed, parents develop the entrepreneurial intention of their children when they promote their independence by giving them more freedom to think and make decisions in the family. In the same way, by stimulating the voluntary functioning of their children, parents develop their entrepreneurial spirit. Therefore, it is likely that parental support for autonomy, through its two components, contributes to the development of children's entrepreneurial intention. Accordingly, we formulate our hypothesis:

H1.1: Parental support for autonomy as the perceived promotion of independence promotes young people's entrepreneurial intention.

H1.2: Parental support for autonomy as the perceived promotion of volitional functioning promotes young people's entrepreneurial intention.

Entrepreneurial Role Models

Entrepreneurial role models are a particular type of social capital known for their intense networks and ability to provide secure access to different types of resources (Holienka *et al.*, 2013). Given their importance in the development of entrepreneurial intention, we chose to give entrepreneurial role models special attention and treat them separately from the concept of social capital. Gibson (2004)

postulates that the role model concept is a combination of two aspects: the role aspect and the modelling aspect. The role aspect translates the identification with his model in terms of similar characteristics and behaviours, while the modelling aspect inspires others to imitate one's personality and acquire the desired abilities and skills (Bosma *et al.*, 2011).

The role model typically plays a major role in determining career choices (Shapero & Sokol, 1982). S/he is a person who serves as the basis for imitation in terms of professional goals and decisions (Basow & Howe, 1980). Therefore, an entrepreneurial role model may be defined as a person who inspires others to acquire desired entrepreneurial skills and become entrepreneurs. In fact, entrepreneurial role models are acknowledged as influencers through their behaviours, which serves as a guide for potential entrepreneurs (Gibson, 2004).

Entrepreneurial research confirms the impact of role models on entrepreneurial intention. In the context of entrepreneurial socialisation, successful entrepreneurial examples promote the learning and acquisition of entrepreneurial skills (Karimi *et al.*, 2014).

Entrepreneurial role models and – more specifically – family members not only help to build one's own network, which is a source of inspiration and motivation, but also to have the skills to launch a business (Holienka *et al.*, 2013). Living in a family of entrepreneurs increases entrepreneurial motivation and intention.

A study conducted by Gray (2006), with 201 Moroccan entrepreneurs to identify the determining factors of their choice of entrepreneurial career showed that 70% of respondents had a role model and followed the example of a parent or relative. Bearing on this, we formulate the following hypothesis:

H2: Exposing young people to an entrepreneurial role model reinforces their entrepreneurial intention.

Family Support for Entrepreneurship

Family support for entrepreneurship can take several forms: moral (Boudabous, 2011), financial, and social (Bird & Weinberg, 2016).

We are interested in studying the influence of social and financial family support, since they are the most useful resources to facilitate the decision to start a business (Bird & Weinberg, 2016). Financial capital is the starting point of any project, which can be transformed into other types of resources required for the execution and development of entrepreneurship (Edelman *et al.*, 2016). However, Bates (1985) considers that financial capital should be associated with human or social capital to ensure a project's sustainability.

Social capital has three dimensions: structural, cognitive, and relational. The structural dimension refers to the general architecture of connections between actors (Nahapiet & Ghoshal, 1998). The cognitive dimension refers to structuring resources between parts such as representations and interpretations. The relational dimension refers to all assets obtained through these relationships conditioned by trust, norms, expectations, and obligations (Nahapiet & Ghoshal, 1998).

Family influence on business creation was extensively studied in several studies that examine family businesses (e.g. Rodriguez *et al.*, 2009). Nevertheless, the effect of family support on stimulating entrepreneurial activities among novice entrepreneurs is poorly studied (Edelman *et al.*, 2016).

Indeed, social capital helps to identify opportunities and sustain company performance (Bhagvatula *et al.*, 2010). Recent studies on social capital have shown that all broader relational networks reinforce the choice of an entrepreneurial career and represent both a tool to help set up projects and entrepreneurial objectives (Sharma, 2014).

Several studies tried to determine the role of family's financial capital in helping novices to choose an independent professional career (Rodriguez *et al.*, 2009), which is often identified as the most rapidly sought capital, which can be transferred across generations (Dyer *et al.*, 2014). Indeed, the availability of family's financial capital is the starting point of the project and positively related to the choice of an entrepreneurial career (Rodriguez *et al.*, 2009). Then, we formulate the following hypothesis:

H3.1: The family's social capital reinforces young people's entrepreneurial intention.

H3.2: The availability of family's financial capital increases young people's entrepreneurial intention.

Our research model (Figure 1) summarises all of our hypotheses.
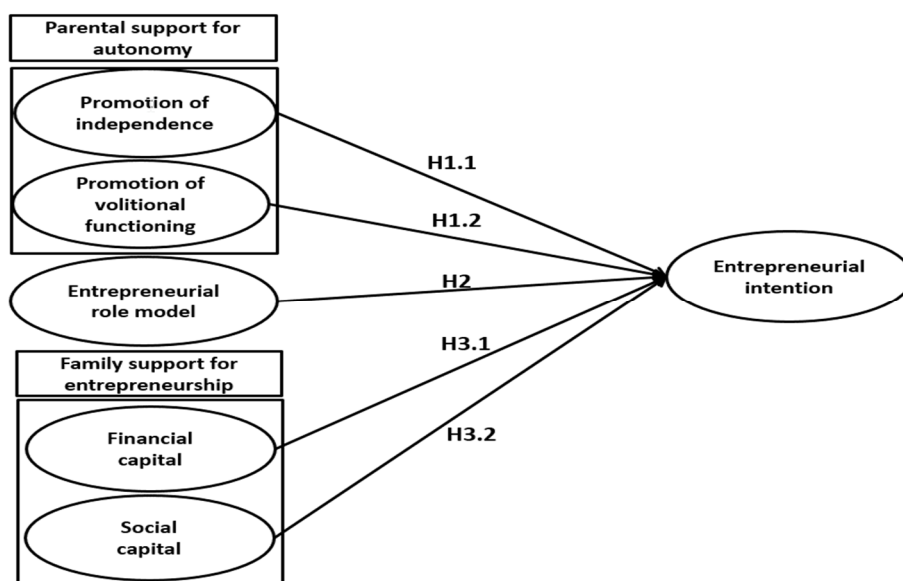
Figure 1. Conceptual model
Source: own elaboration.

RESEARCH METHODOLOGY

In order to answer and test our research questions and hypotheses, we opted for a questionnaire-based survey to gather the data needed to study the role of family environment in the development of entrepreneurial intention. The survey was conducted among final year undergraduate students in Tunisian universities. We distributed 400 questionnaires but we were only able to administer 300. Three of them were not correctly completed. Therefore, our sample includes only 297 questionnaires. We measured "entrepreneurial intention" with six items inspired by Linan and Chen (2009). A sample item was "I am ready to do anything to be an entrepreneur." The "parental support for autonomy" (perceived promotion of independence and perceived promotion of volitional functioning) has been operationalised by 17 items (Appendix A) adopted from Silk *et al.* (2003), Grolnick *et al.* (1991), and Soenens *et al.* (2007). Sample items were "My mother/father pushes me to think independently," "My mother/father allows me to decide things for myself."

For "entrepreneurial intention "and "parental support for autonomy," we used a five-point Likert scale ranging from strongly agree (1) to strongly disagree (5). The independent variable "entrepreneurial role model" was measured by 12 items inspired by Howard *et al.* (2006) and rated on a five-point Likert scale ranging from very often (1) to never (5).

Table 1. Demographic characteristics of respondents

Characteristics	Frequency	Percent (%)
Sex:		
Female	188	63.3
Male	109	36.7
Total	297	100
Fields of study:		
Engineering	124	41.75
Social Sciences	173	58.25
Total	297	100

Source: own elaboration of the survey (*n* = 297).

The sample item was, "Do you have a self-employed parent or family member who you want to imitate and who has significant discussions with you about their job or business?" "Family support for

entrepreneurship" (financial capital and social capital) was evaluated by 11 items inspired by Sieger *et al.* (2011) and used by Lima *et al.* (2014). Sample items included in this scale were "If I want to start a business my family will provide me with own capital" and "If I want to start a business my family puts me in contact with business networks, partners, and/or potential customers." This variable was also measured by a five-point Likert scale ranging from very sure (1) to not sure at all (5).

RESULTS AND DISCUSSION

Findings

Data analysis was performed using the SPSS V23 software. Table 1 presents some characteristics of our sample. As we can see, 63.3% of young respondents were females, whereas only 36.7% were males. The sample of our study consists mainly of young Tunisian final year undergraduate students belonging to 25 universities, but we have grouped them in two disciplines (engineering and social sciences). As a result, the majority of the sample (58.25%) consists of young students in universities that pursuing studies in social sciences (Business administration, Economics and Law), while the rest of the sample (41.75%) pursue engineering.

Table 2 presents descriptive statistics of the different variables used in our study. These results show that young people are ready to make all the necessary efforts to create their own projects. But they are not completely prepared to immediately embark on this adventure. Such attitude of young people can be explained by the uncertainty of the post-revolution environment that Tunisia has experienced since 2011.

As for the variable "parental support for autonomy" (the perceived promotion of independence and of volitional functioning), the interviewed young people agree with almost all the statements. Such a trend can be explained by the presence of a democratic parental style, which promotes autonomy.

Respondents report the existence of a very low presence of role model in their family environment. For family support of entrepreneurship, the results show that the different resources – financial and social – necessary for the creation of a business are very unlikely to be provided by the respondents' family environment.

Before studying the relationships between the different constructs of our model, we checked the consistency of their measurement scales. For this reason, we began with reliability analysis, then we performed factor analysis, and finished with multiple linear regression analysis.

We checked the reliability of different concepts of our model with Cronbach's alpha. Table 3 shows that the alpha coefficient of all constructs varies between 0.694 and 0.945. This proves the adequate internal consistency of all the studied constructs.

Then, we conducted principal component analysis (PCA) in order to purify measurement scales. Let us note that we retained only the items that have the correlation coefficient greater than 0.3, as recommended by Netemeyer *et al.* (2003). However, we removed five items (PI1, PI2, PI3, PI4, and PI7) from "parental support for autonomy" due to their low correlation coefficients: two of its items (PVF4 and PVF7) as promotion of volitional functioning and the promotion of independence construct. Similarly, we removed CS8 from the "family support for entrepreneurship" construct for the same reason. A factor analysis was carried out on the dependent variable "entrepreneurial intention." It showed that the construct was unidimensional (KMO=0.916, Bartlett's test = 0.000), giving off a factor that expressed 74.871% of total variance. The factor analysis performed on the first independent variable "parental support for autonomy as promotion of independence" expressed 53.049% of total variance (KMO=0.719, Bartlett's test = 0.000). The second one, "parental support for autonomy as promotion of volitional functioning" (KMO=0.825, Bartlett's test = 0.000), expressed 47.218% of total variance. In the same way, the factor analysis conducted on the independent variable "entrepreneurial role model" showed that it was unidimensional (KMO=0.938, Bartlett's test = 0.000), producing a factor that expressed 62.882% of total variance.

Finally, the factor analysis of the independent variable "family support for entrepreneurship as financial capital" showed that (KMO=0.691, Bartlett's test = 0.000) and expressed 67.528% of total variance. The

second one, "Family support for entrepreneurship as social capital" (KMO=0.874, Bartlett's test = 0.000), expressed 69.736% of total variance. These results prove that the validity is adequate.

Table 2. Descriptive statistics

Items		Min	Max	Mean	S.D.
Entrepreneurial intention	EI1	1	5	2.32	1.253
	EI2	1	5	2.32	1.361
	EI3	1	5	2.02	1.310
	EI4	1	5	2.28	1.257
	EI5	1	5	2.32	1.329
	EI6	1	5	2.25	1.239
Parental support for autonomy	PI1	1	5	2.21	1.209
	PI 2	1	5	2.53	1.366
	PI 3	1	5	1.74	0.989
	PI 4	1	5	2.03	1.242
Promotion of independence	PI 5	1	5	2.10	1.233
	PI 6	1	5	1.70	0.963
	PI 7	1	5	2.13	1.163
	PI 8	1	5	1.76	1.056
	PI 9	1	5	1.83	1.062
	PVF1	1	5	1.62	0.889
	PVF2	1	5	1.72	0.904
	PVF3	1	5	2.05	0.968
Promotion of volitional functioning	PVF4	1	5	3.02	1.301
	PVF5	1	5	1.90	0.955
	PVF6	1	5	1.76	0.913
	PVF7	1	5	3.33	1.352
	PVF8	1	5	1.70	0.883
Entrepreneurial role model	ERM1	1	5	3.65	1.598
	ERM2	1	5	4.14	1.407
	ERM3	1	5	4.21	1.363
	ERM4	1	5	3.90	1.560
	ERM5	1	5	3.92	1.544
	ERM6	1	5	4.00	1.460
	ERM7	1	5	3.97	1.521
	ERM8	1	5	3.90	1.542
	ERM9	1	5	3.99	1.511
	ERM10	1	5	4.34	1.316
	ERM11	1	5	4.49	1.142
	ERM12	1	5	4.33	1.262
Family support for entrepreneurship	FC1	1	5	3.27	1.440
Financial capital	FC1	1	5	2.92	1.310
	FC1	1	5	3.23	1.405
	SC1	1	5	2.40	1.345
	SC2	1	5	2.60	1.340
	SC3	1	5	2.64	1.393
Social capital	SC4	1	5	2.73	1.332
	SC5	1	5	2.51	1.363
	SC6	1	5	2.61	1.279
	SC7	1	5	3.02	1.314
	SC8	1	5	2.59	1.375

Note: S.D. – standard deviation.
Source: own elaboration of the survey (*n* = 297).

Since all the variables in our model are quantitative, we chose the multiple linear regression analyses to test our hypotheses. Before performing multiple linear regression, we first checked that correlation between independent variables showed no multicollinearity problem. In the same way, regression assumptions have been checked to show that there is no violation of these conditions (linearity, the constant variance of error terms, the independence of error terms, and the normal distribution of error terms). Table 5 showed that the variance inflation factor (VIF) was less than 3.3 as suggested by *Hair et al.* (2011).

Table 3. Results of principal component analysis

Construct		Item	Factors Loading	α	KMO	Variance explained (%)
Entrepreneurial intention		EI1	0.824	0.932	0.916	74.871
		EI2	0.844			
		EI3	0.875			
		EI4	0.887			
		EI5	0.877			
		EI6	0.884			
Parental support for autonomy	Promotion of independence	PI 5	0.734	0.694	0.719	53.049
		PI 6	0.830			
		PI 8	0.641			
		PI 9	0.696			
	Promotion of volitional functioning	PVF 1	0.668	0.772	0.825	47.218
		PVF 2	0.765			
		PVF 3	0.624			
		PVF 5	0.610			
		PVF 6	0.722			
		PVF8	0.721			
Entrepreneurial role model		ERM1	0.849	0.945	0.938	62.882
		ERM2	0.858			
		ERM3	0.827			
		ERM4	0.878			
		ERM5	0.838			
		ERM6	0.817			
		ERM7	0.644			
		ERM8	0.814			
		ERM9	0.808			
		ERM10	0.715			
		ERM11	0.718			
		ERM12	0.712			
Family support for entrepreneurship	Financial capital	CF1	0.812	0.758	0.691	67.528
		CF2	0.843			
		CF3	0.809			
	Social capital	CS1	0.838	0.927	0.874	69.736
		CS2	0.857			
		CS3	0.852			
		CS4	0.877			
		CS5	0.797			
		CS6	0.794			
		CS7	0.827			

Note: KMO – Kaiser-Meyer-Olkin. All Bartlett's sphericity tests are equal to 0.000.
Source: own elaboration of the survey (*n* = 297).

In fact, Model 1 resulted from the multiple linear regression establishing the relationship between entrepreneurial intention (dependent variable) and the five components of family environment (independent variables).

This model showed (Table 4) that family environment contributes 11.3% to the formation of entrepreneurial intention (Adj.R^2=0.113, sig =0.000). These results are quite satisfactory since entrepreneurial intention was affected not only by the family environment – the object of our study – but also by other factors mentioned in the literature. The results in Table 5 underline the importance of the contribution of each component of the family environment in the explanation of entrepreneurial intention.

Table 4. Summarised model and statistics of regression

Model	R square	Adjusted R square	F	Sig.
1	0.128	0.113	8.570	0.000

Note: Dependent variable: Entrepreneurial intention; Independent variables: Promotion of independence; Promotion of volitional functioning; Entrepreneurial role model; Financial capital; Social capital.
Source: own elaboration of the survey (*n* = 297).

Indeed, the relationship between parental autonomy support as the promotion of independence and entrepreneurial intention is significant and positive (β=0.193, *p*=0.006). Hence, hypothesis H1.1 is confirmed.

The relationship between parental autonomy support as the promotion of volitional functioning and entrepreneurial intention is not significant (β=0.032, *p*=0.643). Hence, hypothesis H1.2 is not confirmed.

Table 5. Regressions coefficients

Hypothesis	β	t-value	p-value	VIF	Decision
H1.1: PI -> EI	0.193	2.778	0.006	1.610	Supported
H1.2: PVF -> EI	0.032	0.464	0.643	1.601	Unsupported
H2: ERM -> EI	0.235	4.073	0.000	1.115	Supported
H3.1: FC -> EI	0.023	0.377	0.706	1.238	Unsupported
H3.2: SC -> EI	0.050	0.784	0.434	1.339	Unsupported

Note: EI: entrepreneurial intention; PI: Promotion of independence; PVF: Promotion of volitional functioning; ERM: Entrepreneurial role model; FC: Financial capital; SC: Social capital; VIF: variance inflation factor.
Source: own elaboration of the survey (*n* = 297).

Likewise, the relationship between the entrepreneurial role model variable and entrepreneurial intention is significant and positive (β=0.235, *p*=0.000). This allows us to confirm hypothesis H2. Finally, the relationship between the two components of family support for entrepreneurship (financial capital and social capital) with entrepreneurial intention is not significant (β=0.023, *p*=0.706; β = 0.050, *p*= 0.434). Hence H3.1 and H3.2 are rejected.

Discussion

The aim of our study was to identify the role and importance of family environment in determining the entrepreneurial intention of young Tunisian students. We have been able to highlight that family has a multifaceted influence on the desire among young students to set up a project (Boudabous, 2011). In fact, entrepreneurial intention is affected by three components of family environment, namely parental support for autonomy (the promotion of independence and of volitional functioning), entrepreneurial role model, and family support for entrepreneurship (financial capital and social capital).

The results of our survey of 297 students showed that parental support for autonomy (the promotion of independence) is an important factor able to stimulate entrepreneurial intention. Similar to Eva's (2004) study of 320 German students, the results showed that an authoritative parenting style leads to the birth of entrepreneurial skills and the development of interest in entrepreneurship. However, our results run counter to those found by Ahmad *et al.* (2015) who showed that parents have no effect on the entrepreneurial intention of Indonesian students.

Next, we have shown that even low exposure to an entrepreneurial role model is crucial in choosing an entrepreneurial career. Our results are similar to those of many researchers in different contexts (e.g. Howard *et al.*, 2006; Bosma *et al.*, 2011). Hartsenko and Kuttim (2019) have conducted a comparative study of the impact of components planned behaviour theory on entrepreneurial intention between

Central and Eastern Europe (CEE) and developed European countries. They confirmed that social norms and, in particular, belonging to a family with a business background are likely to stimulate the entrepreneurial intention of young Central and Eastern Europe countries (CEEC) university graduates.

Furthermore, we can confirm that business discussions, work integration, and the different interaction opportunities with the entrepreneurial role model have a positive effect on the entrepreneurial intention in our sample.

Finally, contrary to our expectations, we found that family support for entrepreneurship – expressed in terms of financial capital and social capital of the family – has no impact on the development of young peoples' entrepreneurial intention. Families are unable to provide their children with the social and financial support necessary to start their projects. These results confirm those of Boudabbous (2011) who found that financial constraints have no effect on the development of young Tunisians' entrepreneurial intention.

Moreover, Sharma (2014) studied Indian students to determine whether the impact of different types of capital provided by the family stimulates entrepreneurial career choices – only to find no effect of the a family's financial capital on entrepreneurial intention in his sample. Indeed, Bradley *et al.* (2011) consider that the availability of family financial resources can lead to a sense of satisfaction and complacency that can restrict the entrepreneurial behaviour of individuals in terms of strategic orientation and entrepreneurial culture.

Let us note that – to our knowledge – studies conducted in countries close to Tunisia, such as Morocco, Egypt, and Algeria have only dealt with the question of the effect of social norms, including the family environment, on entrepreneurial intention.

In Egypt, Engle *et al.* (2010) found that social norms are an important determinant of the entrepreneurial intention of university students.

In Moroccan context, Gray (2006) showed that 70% of the respondents had a role model and followed the example of a parent or a relative.

Contrary to what was proven in the Moroccan and Egyptian contexts, no effect of components that constitute planned behaviour theory were revealed among Algerian students. In other words, social norms have no impact on the entrepreneurial intention of Algerian students (St-Jean *et al.*, 2014). Therefore, we may conclude that the effect of social norms varies in North African countries.

Moreover, these results reinforce the idea that the impact of components of The Theory of Planned Behaviour varies from one country to another, and it does not have the same effect in all contexts (Ajzen, 1991).

CONCLUSIONS

It seems that the entrepreneurial intention of young Tunisians is partly determined by their family environment expressed in terms of parental support for autonomy as the promotion of independence and entrepreneurial role model.

Family is more than ever called upon to play the primary role in the development of the entrepreneurial spirit of children by preparing them for the external environment – which becomes increasingly difficult – and encouraging them to orient themselves towards the business world. Therefore, a considerable change must occur in the family environment in order to prepare young people to create and succeed in new projects.

The practical implications of our study are the following:

− Young people should understand that the government in a post-revolutionary economy is no longer able to provide employment for everyone. They should take advantage of opportunities in the private sector and seek to start their own businesses;

− Parents should know that orienting their children towards entrepreneurship is first developed at the family level. Therefore, their role is essential in encouraging the promotion of independence. Parents should also bring their children closer to family entrepreneurs to build on their success;

− The government should gear national education policy towards developing the entrepreneurial spirit of young people. It is up to schools and universities to assume from the family the role to

enrich the education of children by imbuing young people with entrepreneurial culture. Furthermore, the government is expected to clarify its economic policies so as to create a favourable economic environment for investments. The government should take steps to encourage young people to undertake independent careers.

However, besides these theoretical and empirical contributions, our study has some limitations. Indeed, the first limitation of our study is essentially related to the structure of our sample. In other words, the answers obtained are certainly representative, but they cannot be generalised because they were collected from 297 students belonging to different academic institutions of Tunis region only. As a reminder, our study focused on social constructs of family system and their impact on entrepreneurial intention. This limited our focus to the differences in family educational practices that are determined by the culture and customs specific to each region. Therefore, it is a question of widening the context by integrating other Tunisian regions.

Bearing on our results and the limitations mentioned above, we suggest that future research broadens the context of our study so as to distinguish the specificities of each region and in order to study the impact of the family system on entrepreneurial intention. Moreover, other moderating variables that can reinforce the existing relationship between the family environment and entrepreneurial intention can be included, such as entrepreneurial self-efficacy and motivation for entrepreneurship. Moreover, future research could develop a longitudinal study to outline the transition from intention to entrepreneurial action. Finally, future research should consider investigating whether parenting practices and family support differ between men and women.

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Appendix A: Items constituting the measuring question instrument

Constructs	Sources
Entrepreneurial intention	
EI1: I am ready to do anything to be an entrepreneur	
EI2: My professional goal is to become an entrepreneur	
EI3: I will make every effort to start and run my own firm	Linan &
EI4: I am determined to create a firm in the future	Chen (2009)
EI5: I have very seriously thought of starting a firm	
EI6: I have the firm intention to start a firm some day	
Parental support for autonomy as Promotion of independence	
My mother/father...	
PI1: emphasizes that every family member should have some say in family decisions.	
PI 2: emphasizes that it is important to get my ideas across even if others don't like it.	
PI 3: says that you should always look at both sides of the issue.	
PI 4: talks at home about things like politics or religion, taking a different side from others.	
PI 5: pushes me to think independently.	
PI 6: gives me more freedom to make my own decisions.	Silk *et al.* (2003),
PI 7: admits that I know more about some things than adults do.	Grolnick *et*
PI 8: often says I have to think about life myself.	*al.* (1991)
PI 9: encourages me to be independent from him/her.	and Soenens
Parental support for autonomy as promotion of volitional functioning	*et al.* (2007)
PVF1: listens to my opinion or perspective when I've got a problem.	
PVF2: lets me make my own plans for things I want to do.	
PVF3: is usually willing to consider things from my point of view.	
PVF4: isn't very sensitive to many of my needs.	
PVF5: whenever possible, allows me to choose what to do.	
PVF6: allows me to decide things for myself.	
PVF7: insists upon doing things her/his way.	
PVF8: allows me to choose my own direction in life.	
Entrepreneurial role model	
Do you have a self-employed parent or family member who you want to imitate and who :	
ERM1: has significant discussions with you about their job or business.	
ERM2: took you to work with them when you were 10 years old or younger.	
ERM3: paid you to do minor tasks for them at work when you were 10-15 years old.	Howard
ERM4: taught you significant details about managing a business or organization.	*et al.*
ERM5: discussed the advantages/disadvantages of joining the organization in which they work.	(2006)
ERM6: included you in business discussions.	
ERM7: encouraged you to take a career other than their organization where they work.	
ERM8: encouraged you to know their colleagues.	
ERM9: encouraged you to read about their job or business.	
ERM10: encouraged you to join their organization.	
ERM11: took you to professional meetings.	
ERM12: encouraged you to join another organization for a few years and then join the organization where they work.	
Family support for entrepreneurship :	
If I want to start a business	
Financial capital	
FC1: My family lends me money that I have to pay back (with interest).	Sieger *et al.* (2011) and
FC2: My family provides me with own capital (capital whose repayment without interest depends on the success of my business).	Lima *et al.* (2014)
FC3: The capital provided by my family is accompanied by favorable and flexible conditions (e.g. reduced interest rates or long repayment period).	
Social capital	

Constructs	Sources
SC1: My family puts me in touch with people who could help me pursue my entrepreneurial career.	
SC2: My family puts me in contact with business networks, partners and / or potential customers.	
SC3: My family offers me general knowledge about how to run a business.	
SC4: My family provides me with industry-related knowledge about how to produce services and products.	
SC5: My family coaches me / advises me in my entrepreneurial activities.	
SC6: My family helps me by providing me with places or facilities for my entrepreneurial activities.	
SC7: My family gives me access to a distribution network for my business.	
SC8: Considering all the resources that my family provides me, I am completely independent of them in the choice of the use of these resources.	

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Contribution share of authors is equal and amounted to 50% each of them. Syrine Kerkeni prepared the introduction and literature, while Nejib Ben Moussa reviewed material and methods, processed the statistical analysis, and prepared results, discussion, and conclusion.

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Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Zombie business strategies: The case of Ukraine

Pedro Pardal, Ihor Hurnyak, Aleksandra Kordonska

A B S T R A C T
Objective: The objective of the article is to study zombie business strategies in Ukrainian practice and present the influence of traditional and manipulative tools on business activity in conditions of weak institutional environment.
Research Design & Methods: We apply linear and logistic regression to estimate the impact of traditional and manipulative tools on the investment possibilities by using data from a sample of small enterprises in Ukraine in 2015-2018. The results of the logistic regression were used to present Nash equilibrium in the payoff matrix to explain the coexistence of traditional and manipulative tools in doing business through the prism of interests of the society as a whole.
Findings: Evidence revealed that the Ukrainian market creates a special type of zombie business resulting from ineffective government policy and unfavourable institutional environment. Moreover, in conditions of weak stock market, this practice could be used not only in Ukraine but also expanded to countries with similar problems. The main problem is the fact that – in the case of searching for the desired level of profitability – Nash equilibrium on the Ukrainian market combines manipulative and traditional tools.
Implications & Recommendations: Considering the business environment that characterized by unprofitability, the equilibrium between adherents of traditional and manipulative mechanisms is reached on the market where the latter prevail. This situation becomes a serious problem for reforms, as fight against manipulative practices by weak market institutions happens almost outside real business. The problem explains why the government and small business practically coexist by interacting only partially without opposition and counteraction. In the case of searching for the desired level of profitability (if the market is in equilibrium), a reformation or transformation of the system will be accompanied by obvious resistance. Our study informs about the risks and economic effects of zombie firms. We recommend the creation of a favourable institutional environment through effective public policies.
Contribution & Value Added: We emphasize the undeniable fact that small business is officially completely unprofitable in Ukraine. The article helps to understand the essence of zombie business. It is one of the first attempts to develop a comprehensive analysis of zombie business by a wide range of manipulative tools of financial statements that apply game theory models.

Article type:	research article
Keywords:	zombie business; strategy; institutions; Nash equilibrium; Ukraine
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INTRODUCTION

The prevalence of zombie firms has ratcheted up since the late 1980s. According to the Bank of International Settlements, a zombie firm is a listed firm with ten or more years of existence, in which the ratio of earnings before interest and taxes (EBIT) relative to interest expense is lower than one (Lacalle, 2017). In essence, as shown by Lacalle (2017), a zombie firm is a company that merely survives due to the constant refinancing of its debt and – despite re-structuring and low rates – remains unable to cover its interest expense with operating profits. Caballero *et al.* (2008) coined the term in their anal-

ysis of the Japanese 'lost decade' of the 1990s. They define a zombie firm as a company that persistently has problems with financial obligations (Caballero *et al.*, 2008) and shows inefficiency (Ahearne & Shinada, 2005). This appears to be linked to reduced financial pressure, reflecting in part the effects of lower interest rates (Banerjee & Hofmann, 2018).

The term 'zombie' is also applied to banks having the influence on business. The problem of zombie banks in the modern economy results from the strong growth of nonperforming loans – a unique indicator of financial health in the banking system. According to Stephen Bush (2018), the term 'zombie bank' appeared more than 25 years ago when the savings and loan crisis in the United States of America resulted in hundreds of financial institutions having liabilities in excess to their assets. Japan is the first well documented case of zombie banking in a developed economy. Moreover, the banking crisis in Europe shares many similarities to the situation in Japan (Acharya & Steffen, 2014; Henselmann *et al.*, 2016; Kanaya & Woo, 2000; Kawai, 2005; Mora, 2017; Nakaso, 2001; Radivojevic & Jovovic, 2017; Schnabl, 2013; Schoenmaker & Peek, 2014; Willam, 2015). Meanwhile, during the crisis period, the sustainability of banks and business were negatively affected by leverage (Berger & Bouwman, 2013; Molina, 2005; Olaniyi *et al.*, 2015). Novita, Tjahjadi, and Irwanto (2018) show how leverage affects firm's fragility and financial soundness during the financial and industry crises based on the example of Indonesian non-financial firms in the period from 2007 to 2016. Their evidence reveals that leverage has a statistically significant correlation with a firm's fragility and affects the firm's financial soundness during an economic crisis. Thus, the higher the debt of a company, the lower its financial soundness during the crisis (Alfaro *et al.*, 2017; Männasoo *et al.,* 2017). However, Urionabarrenetxea *et al.* (2018) state that the zombie category has no correlation with leverage because the level of leverage is uniformly distributed across the firm.

Using Google Books Ngram Viewer (Figure 1), we may observe the increase of investigations related to zombie business in 1980-1990 and at the beginning of the twenty-first century, while the studies related to zombie banks became popular since 1994. The data presented in Figure 1 show that the problem of zombie businesses is relevant but still neglected by scholars compared to the frequent appearance of the term 'zombie banks.' Therefore, we want to study the phenomenon of zombie businesses in Ukraine and present the influence of a selected strategy (of using traditional / manipulative tools) on business activity in conditions of weak institutional environment.
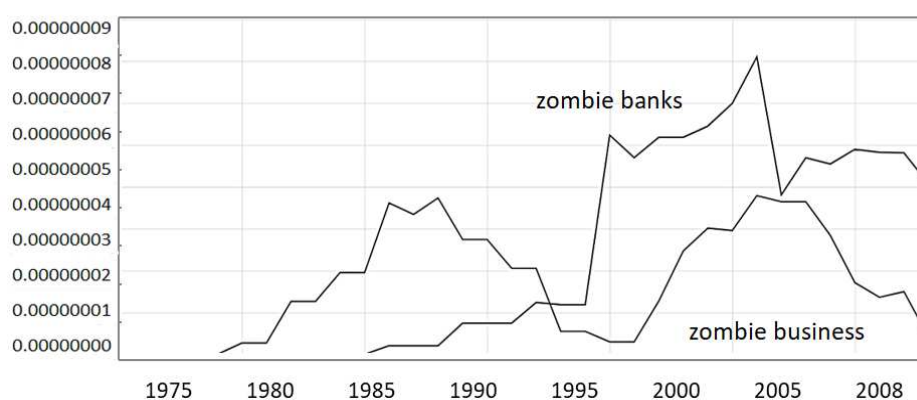
Figure 1. Search frequencies (%) for the term 'zombie business' and 'zombie banks'
in sources printed between 1975 and 2008
Source: adapted from Google Books Ngram Viewer.

The rest of the paper is structured as follows. In the first part of the article (Literature Review), we present a theoretical framework to the research topic, along with advances and contributions of existing literature. In the second part (Material and Methods), we discuss the methodological basis for the research. The next part (Results and Discussion) contains a brief analysis of the Ukrainian business environment (in order to show the relevance of the study in this particular economy) and a test of proposed hypotheses; firstly, by using a linear regression model and, secondly, by a logistic regression approach. The results of logistic regression became the basis for Nash equilibrium in the payoff matrix,

which explains the influence of traditional and manipulative tools in doing business through the prism of the whole society's interests. The last part presents conclusions.

LITERATURE REVIEW

Banerjee and Hofmann (2018, p. 68) focus on addressing the following questions:

1. 'Are the increases in the incidence of zombie firms just episodic, linked to the major financial disruptions, or do they reflect a more general trend? 'Scientists found that 'share of zombie companies has trended up over time through upward shifts in the wake of economic downturns that are not fully reversed in subsequent recoveries.'

2. 'What are the causes of the rise of zombie firms? 'The results of the article suggest that 'lower rates tend to push up zombie shares, even after accounting the impact of other factors.'

3. 'What are the economic consequences of the rise of zombie companies? The higher share of zombie companies could be weighing on aggregate productivity. Moreover, the survival of zombie firms may crowd out investment and employment at healthy firms.'

Their findings confirm these effects for 14 advanced economies since the late 1980s.

McGowan *et al.* (2017) find that 'within-industries over the period 2003-2013, a higher share of industry capital sunk in zombie firms is associated with lower investment and employment growth of the typical non-zombie firm and less productivity-enhancing capital reallocation.'

Caballero *et al.* (2008) examine zombie lending and depressed restructuring in Japan. The researchers note that 'congestion created by the zombies reduces the profits for healthy firms, which discourages their entry and investment' (Caballero *et al.*, 2008). They prove that zombie-dominated industries exhibit more depressed job creation and destruction, along with lower productivity, as the increase in zombies depressed the investment and employment growth of non-zombies and widened the productivity gap between zombies and non-zombies. By keeping these unprofitable borrowers alive, the banks allowed them to distort competition throughout the rest of the economy (Caballero, Hoshi, & Kashyap, 2008).

Storz *et al.* (2017) examine the effect of stressed bank on the deleveraging process of small and medium-sized enterprises (SME), focusing on zombie firms in the euro area. Based on information concerning 400 000 SME over 2010-2014, they find significant association between the increase in the standard deviation of bank stress and the increase of firm leverage in zombie firms from the euro area periphery countries (Greece, Ireland, Portugal, Spain, and Slovenia). Findings also suggest that the deleveraging process of non-financial corporations could be hindered by bank weakness, since these banks may have an incentive to evergreen loan to zombie firms so as to avoid the recognition of impairments and gamble with future economic recovery. As discussed in the previous studies, this behaviour resulted in the misallocation of credit to low productive firms.

Barros *et al.* (2017) study the existence and economic effect of zombie firms in the non-tradable sectors of Construction and Services in Portugal in 2008-2015. They find that higher amounts of resources stuck in zombie firms are, in average, negatively related to investment and job creation by healthy firms. They suggest that the presence of zombie firms slowed down economic recovery by distorting the application of resources by healthy firms.

Goto and Wilbur (2019) focused their study on Japanese firms from the so-called 'lost decades' period. Evidence suggests that zombies existed to a significant degree in the past and at a comparably higher level than large-sized zombie firms estimated in previous studies. This research also examines corporate characteristics of zombie small and medium-sized enterprises (SMEs) and offers evidence that several firms managed to escape from zombie status through recovery or exit. The probability of exit is higher for zombies that are SMEs.

Schivardi *et al.* (2017) define zombie companies by two measures of profitability: return on assets (ROA) and a measure of default risk, that is, leverage; according to the authors, the latter is a 'total financial debt over total assets. 'Then, if the ROA is below prime rate while the level of leverage is greater than a threshold value, the firm is classified as a zombie. Meanwhile, Fukuda and Nakamura

(2010) indicate that the 'evergreen lending criterion.' Under this criterion, firms which are 'unprofitable and highly leveraged with increasing external borrowings' are defined as zombies.

The majority of discussed measures combine indicators of low profitability and a high default risk. This approach enables a focus on the dynamic factors in the case of low value of a company's equity and obligations of the company, including different types of debt and retained earnings. In our opinion, it seems appropriate to develop the approach by using a much more integral indicator of retained earnings instead of EBIT because it contains data from previous years and can provide a more informative representation of a business.

Considering Ukrainian zombie businesses that function in the unfavourable environment of market institutions, we would like to propose the following hypotheses:

H1: The problem concerning banks reluctant to make loans to small businesses in Ukraine is solved by the use and accumulation of other types of liabilities (advance payments, salaries, insurance, debt to supplier, etc.).

H2: The firm uses manipulative tools in operational activities with the aim to maintain a stable level of profitability or its positive dynamics (in the case of unfavourable institutional environment for business).

H3: In conditions of ineffective market institutions and 'permissible' negative fluctuations in profitability, the use of business strategy based on manipulative tools does not serve to support businesses but distorts the real performance of businesses.

RESEARCH METHODOLOGY

The methodological basis for this study is both economic and statistical methods. First of all, we will make a brief analysis of the business environment in Ukraine based on World Bank data in order to prove the relevance of the solution and to explain what needs to be done to ensure a favourable business environment. Then, we will analyse the performance of Ukrainian business in terms of profitability, which will allow us to assess the efficiency of investments and the rationality of their use.

In the next part (Results and Discussion), we will test the hypotheses with several methods. On the one hand, we could identify opportunities of the accumulation of additional debt on balance sheet that arose from manipulation practices with retained earnings. However, such an analysis does not make sense in Ukraine because there are different non-consistent approaches in the preparation of separate financial statements. Therefore, we believe that a linear regression would be sufficient for our analysis. In some cases, it will be appropriate to apply a logistic regression model that allows us to reveal the percentage of correct predictions.

In order to achieve our research objectives, traditional and manipulative tools in doing business will be studied to reveal the essence of zombie business strategies in Ukraine. Based on accounting theory, we consider as traditional instruments the differentiation of inventory costing methods, the method of amortization/depreciation, financial/operating lease, the reduction of expenses, etc. On the other hand, we consider accumulated debt from the suppliers of goods and services, the state, and the employees, along with advance payments as manipulative instruments.

Therefore, we would like to test the impact of particular types of liabilities and costs on retained earnings – based on information from balance sheets and financial statements – on the selected sample of Ukrainian small enterprises in 2015-2018 (a total of 123 annual data lines). Data for the research was taken from the stock market infrastructure development agency of Ukraine. For this purpose, we will use a multiple linear regression model and the following abbreviations for the variables: current portion of long-term debt – LTD, current liabilities for goods, work and services – CL_GWS, current liabilities for insurance – CL_INS, current liabilities for labour costs – CL_LC, current liabilities for customer prepayments – CL_ADV. The models also contain such variables as administration costs (ADM_COSTS), sales costs (SALES_COSTS), financial costs (FIN_COSTS), indebtedness to the budget (IND_B), and income tax liability (ITL).

Then, assuming nonlinearity on technology markets and the improbable presentation of real financial situation in financial statements, we will use logistic regression for testing the hypotheses. The results of our investigation on the basis of linear and logistic regression approach will confirm or reject the possibility of manipulation with long-term debt and current liabilities in Ukrainian business practice.

On the other hand, in light of the overwhelming level of the informal economy in Ukraine and manipulative practices with formal and informal cash flows, we should also employ game theory models rather than make direct calculations. Such an approach was also used by Bilotkach (2006) who examines the problem of tax evasion by enterprises through underreporting activity based on equilibrium of the game between a businessman and an imperfectly monitored supervising official, in which the businessman can hide a part of his profit and offer a bribe to the official. Hence, for testing the third hypothesis, we present a payoff matrix based on the results obtained from the logistic regressions (for this purpose, we use overall percentage of correct predictions), which allows us to show the influence of traditional and manipulative tools in doing business. On the other hand, we also use payoff matrix to present the choice of a strategy by zombie firms in the case of unprofitability. The results of regression studies and payoff matrix used for reflecting a business environment present the originality of the research.

Consequently, we can state that the majority of studies on the topic mainly focuses on the loss of investment and hiring of workers by non-zombie firms or on smaller labour productivity of zombie firms. Meanwhile, we pay attention to the mechanisms and conditions related to the functioning of zombie businesses in conditions of weak market institutions on the example of Ukraine. In fact, the mentioned studies indicate the impact and consequences of the zombie business phenomenon but do not show its interaction with market institutions.

RESULTS AND DISCUSSION

Ease of doing business and profitability of enterprises in Ukraine

In Doing Business 2019, Ukraine ranked 71th among 190 countries, rising five positions compared to its 76th place rank in 2018, eighteen positions compared to its 89th place in 2017, and 66 positions compared to its 137th place in 2013. Based on the rankings presented in Table 1, we observed the changes in its positions among world economies in the last six years for 10 indicators of the 'ease of doing business'. A comparison of the economy's indicators today with those in the previous years may show where substantial bottlenecks persist – and where they are diminishing.

Table 1. The ease of doing business ranking in Ukraine, 2013-2019

Year / ranking	2013	2014	2015	2016	2017	2018	2019	Change in ranking during 2013-2019
Overall ranking	137	112	96	83	89	76	71	+66
Starting a business	50	47	76	24	20	52	61	-11
Dealing with construction permits	183	41	70	137	140	35	20	+163
Getting electricity	166	172	185	140	130	128	128	+38
Registering property	149	97	59	62	63	64	61	+88
Getting credit	23	13	17	19	20	29	37	-14
Protecting minority investors	117	128	109	101	70	81	45	+72
Paying taxes	165	164	108	83	84	43	65	+100
Trading across borders	145	148	154	110	115	119	74	+71
Enforcing contracts	42	45	43	93	81	82	63	-21
Resolving insolvency	157	162	142	148	150	149	146	+11

Source: own elaboration of the World Bank Data Catalog, Doing Business.

In assessing progress based on ten criteria in the past six years, Ukraine showed a good performance in dealing with construction permits (+163), making it easier by reducing fees; paying taxes (+100) by reducing the rate for the single social contribution tax; registering property (+88); protecting

minority investors (+72) by requiring detailed immediate public disclosure of related-party transactions; and in trading across borders (+71). Meanwhile, we observed a decrease in enforcing contracts (-21); getting credit (-14); starting a business (-11). Keeping in mind these indicators, we considered whether the institutional changes show the real state of matters or maybe just a desirable one? Our research was to answer this question. Meanwhile, we assumed that institutional environment in Ukraine is, in fact, weak and turbulent, without any effective institutional framework for productive entrepreneurship. Institutions – the framework of the competitiveness in the developed countries – are not sufficiently developed in Ukraine. This conclusions surfaces from studies by Smallbone *et al.* (2010), Tiffin (2006), and Kyselova (2015). Then, Bilan *et al.* (2019) prove the significant influence of shadow economy on the demand level in the Ukrainian investment market. The level of institutional quality in Central and East European countries and its impact on investment attractiveness is considered by Dorożyński *et al.* (2020).

According to data from the State Statistic Service of Ukraine (Table 2), by taking into account the whole business activity, we observed that profitability ratio of small enterprises is negative in 2010-2018. Low profitability primarily resulted from excessive operating costs, inadequate revenue, or in most cases, a combination of both. The highest level of profitability appeared in some sectors of Ukraine's economy, such as agriculture, forestry, transport and communications, and education. Meanwhile, the service sector and industry generally remained unprofitable.

Table 2. Profitability ratio of large, medium-sized, small and micro enterprises in Ukraine during 2010-2018

Year	Profitability ratio (operating activities), %					Profitability ratio of the whole business activity, %				
	overall	Enterprises by categories				overall	enterprises by categories			
		large	medium-sized	small	micro		large	medium-sized	small	micro
2010	4.0	3.9	5.0	1.8	-3.5	0.5	0.2	2.3	-5.7	-13.9
2011	5.9	6.2	6.0	4.2	0.8	1.8	3.3	1.2	-2.5	-8.0
2012	5.0	5.2	5.0	4.1	-0.1	1.0	0.9	2.2	-3.3	-10.2
2013	3.9	5.0	3.2	2.2	-2.3	-0.7	0.6	-0.1	-6.2	-16.1
2014	-4.1	0.7	-3.6	-17.9	-30.1	-14.2	-11.1	-12.5	-26.5	-40.2
2015	1.0	4.0	0.0	-4.2	-8.2	-7.3	-7.0	-5.0	-13.6	-20.4
2016	7.4	8.8	6.9	5.2	-0.4	0.6	2.4	0.7	-3.6	-11.7
2017	8.8	11.2	7.3	6.5	2.4	3.0	5.2	3.1	-2.0	-8.0
2018	8.1	9.1	7.0	8.3	4.7	4.5	5.2	4.6	2.7	-1.8

Source: own elaboration of the State Statistics Service of Ukraine.

The phenomenon of Ukrainian business lies in the very nature of institutional environment: the majority of small firms has no reason to 'hide' profits by using accounting methods. They work only partially in the official economy while having a lot of 'cash assets' outside of it. The long-term negative financial results do not affect them because the state does not use mechanisms to counteract such practices. It seemed appropriate to state that such firms do not pay income tax but look for additional financial resources by increasing the level of debt. In this case, it was unreasonable to consider the poorly functioning banking system, the bond market (focusing only on government bonds with extremely high yields), or the undeveloped stock market as significant factors that affect business in Ukraine. Consequently, such a special nature of business in Ukraine confirmed the relevance of our study of zombie businesses.

Simplified linear approach

To check our hypotheses, we tested the impact of particular types of liabilities on retained earnings based on annual data of financial statements for selected small enterprises (Table 3). Considering the specifics of the balance sheet data, which is not cumulative but fixed at a specific date, there was no sense to use the gain up to the previous year or to calculate the relative change of the indicator.

According to the results, all determined factors could have become tools used in manipulative practices. We noted that the determinant 'retained earnings' also included information concerning the inputs from previous periods that could significantly affect company leverage and other indicators. Considering the influence of the same factors for the 'net income', all independent variables were insignificant except for CL_ADV ($Beta\ coefficient = -0.5$, $p-value = 0.000$). It confirmed that manipulative practices can be 'effective' by using such resources for several years.

Table 3. The influence of current liabilities on the retained earnings; based on a selected sample (a total of 123 data lines) of Ukrainian small enterprises in 2015-2018

variables	LTD	CL_GWS	CL_INS	CL_LC	CL_ADV
Beta	0.192	-0.152	0.337	-0.698	-0.305
p-value	0.001***	0.135*	0.000***	0.000***	0.000***

Notes: LTD – current portion of long-term debt; CL_GWS – current liabilities for goods, work and services; CL_INS – current liabilities for insurance; CL_LC – current liabilities for labour costs; CL_ADV – current liabilities for customer prepayments. Adjusted R-square value (a descriptive power of the regression model) = 0.738. F-statistic (statistical significance of the model) = 52.288; * – significance at 10% level, ** – significance at 5% level, *** – significance at 1% level. Variance Inflation Factor does not exceed the level 'moderately correlated.' Source: own study.

Therefore, debt manipulation weakly correlated with the current level of profitability (here we draw your attention to the third hypothesis). Hence, the manipulative tools can influence business in the medium or long term. Such a situation does not pose a problem for Ukrainian firms because bankruptcy of a firm that faces several lawsuits allows it to change its form of ownership, participate in tenders and win them, conduct current business, and even receive credit. Let us note that equity was used in a wide range of financial ratios, while profitability was unlikely to be interesting as the simple result of accountant skills. If the stock market is weak, there is no risk of bankruptcy due to the prolonged official loss and widely used manipulations with costs. Then, we also tried to use the 'revenue' as dependent variable. In such a study, all independent variables were to be significant.

If we expanded the model by some traditional tools such as depreciation and operational losses – by taking into account all possible payments relative or not directly relative to the type of production before the tax profit calculation – the result of the estimation significantly differs from the previous one. The adjusted R-square crossed the mark 0.975, but the most influencing variables of the previous model lost their significance: CL_INS and CL_ADV are still significant with $p-value = 0.05$, but essentially weaker. A deeper expansion of these models was not needed for our analysis because we focused on studying the direction of using operational flows and different strategies but not the comparative influence of the particular factors.

Delta approach

In general, the linear regression approach required aggregated variables. Annual balance sheet data introduced information at the beginning and at the end of the year. Then, they did not fully reflect dynamics during the year. Thus, in the next step we tested the influence of particular determinants on 'retained earnings' by using a *delta approach* aimed at the application of average values in the analysis. The difference between the variables at the beginning and at the end of a certain period was conveyed by the following formula:

$$\Delta I_i = \frac{I_i^{end} - I_i^{beg}}{(I_i^{end} + I_i^{beg})/2} \tag{1}$$

where:

I_m^n g - particular assets or liabilities at the beginning and at the end of the reporting period.

The model extended by such independent variables as administration costs, sales costs, financial costs, indebtedness to the budget, and income tax liability – by using delta approach – introduced a significant decrease of the adjusted R-square (to the 0.194). From all determinants, the statistically significant were 'current liabilities for goods, work and services' ($Beta\ coefficient = 0.482$,

$p-value = 0.01$) and 'financial costs' ($Beta\ coefficient = 0.481, p-value = 0.003$). The variance inflation factor (VIF) remained at the level of 1 to 2, showing the absence of multicollinearity. This result confirmed our first hypothesis because the influence of current liabilities for goods, work, and services on retained earnings remained at the same level as the influence of financial costs.

Logistic regression approach

Considering a distorted presentation of the real situation in financial reports, we used logistic regression in the analysis of other hypotheses. First, we used traditional and manipulative tools in the model following the variable 'retained earnings.' The result '0' introduced a negative weak position over two years – in practice, a loss-making activity over two years is often used in bankruptcy prediction methodologies – while '1' meant a positive and relatively strong position in the same period.

According to the study, such a general model – with both traditional and manipulative tools as independent logistic variables – worked by supporting our hypothesis: $Cox\ \&\ Snell\ R^2 = 0.375$; $Nagelkerke\ R^2 = 0.507$. The most interesting coefficient was the overall percentage of correct predictions – 74% – which indicated the correctness of the model itself (88.9% for the value '0' and 51.4% for the value '1').

Secondly, by choosing independent variables reflecting a strategy based on manipulative tools, it was obvious that the coverage of our model will be highly reduced, but it remained significant ($Cox\&Snell\ R^2 = 0.196$; $Nagelkerke\ R^2 = 0.264$), while the overall percentage of correct prediction was 69.2% (97% for '0'and 37.8% for '1').

Thirdly, the result was to be similar ($Cox\&Snell\ R^2 = 0.187$; $Nagelkerke\ R^2 = 0.253$) in the case of independent variables reflecting a strategy based only on traditional tools in the model, while the overall percentage of correct prediction was 65.6% (91.1% for '0'and 27% for '1').

Nash equilibrium

We assumed that the market involves two groups of 'players:' traditionalists and manipulators. The former group covered firms on the market that reflects profitability, while the latter comprised firms with a negative weak position during at least two years. Manipulative strategy was applied by a 'player' if s/he used such tools as advance payments or accumulated debt from the suppliers of goods and services, the state, or the employees. Traditional strategy meant the use of the following tools: the differentiation of inventory costing methods, the method of amortization/depreciation, financial/operating lease, and the reduction of expenses. If we assumed that profitability is the desirable result, the choice between two strategies of using manipulative/traditional tools allowed us to determine the acceptability of a particular market model (traditional/manipulative/mixed) to describe the current situation and the effectiveness of selected models to achieve equilibrium. Consequently, Tables 4 and 5 introduced a payoff matrix based on the obtained results of logistic regressions – based on the overall percentage of correct predictions – concerning the influence of traditional and manipulative tools in doing business. Table 4 showed that firms would like to reach a desirable level of profitability, while Table 5 introduced the Nash equilibrium in the case of unprofitability.

We built a payoff matrix in the following way. The 'players' (traditionalists/manipulators) had to choose a target market according to the character of doing business. If 'players' selected the strategy of using manipulative tools, the validity of our model becomes the following: 97% – manipulative strategy led to loss ('0'– is the value of the logistic variable); 37.8% – traditional strategy led to profitability ('1'– is the value of the logistic variable in this case). Assuming that the retail industry operates only with manipulative tools, then the 'player'(the manipulator) who used manipulative strategy would operate at a loss – with the overall percentage of correct prediction being 97% – while able to reach profitability only with the overall percentage of correct prediction: 3%. If the 'player' (the traditionalist) selected the traditional strategy of doing business – by using different approaches in inventory accounting, depreciation, 'just in time', etc. – and did not use manipulative tools in this market, s/he would reach profitability with the overall percentage of correct prediction: 37.8%. Since this model introduced the case of seeking profitability, we formed a couple of [3%; 37.8%] in the cell of the table. We filled the other cells in similar

manner. Thus, in the case of seeking desired profitability, the Nash equilibrium in the Ukrainian market (Table 4) combined manipulative and traditional instruments [11.1%; 51.4%].

Table 4. Nash equilibrium in the case of searching profitability based on a selected sample: the total of 123 data lines of Ukrainian small enterprises in 2015-2018

Part of market working in accordance with (i.e. competitors):		Traditionalist (traditional way of doing business)			
		Manipulative principles		Traditional principles	
Manipulator (manipulative way of doing business)	Manipulative principles	3%	**37.8%**	**51.4%**	11.1%
	Traditional principles	**11.1%**	**51.4%**	8.9%	27%

Source: own elaboration based on the results obtained from the regressions above.

Therefore, in the case of cell (traditional principles, manipulative principles), 100% – 88.9% = 11.1%. Since the goal was profitability, the hypothesis was not fulfilled. The percentage of correct predictions (51.4%) remained unchanged according to the results of logistic regression. When we rejected at least one of the tools, the hypothesis in the mixed market with both types of instruments did not fully work. In the case of cell (traditional principles, traditional principles): 100% – 91.1% = 8.9% and 27%, the percentage of correct predictions also remained unchanged.

Then, the manipulator selected e.g. a part of the market in which generally all firms work in accordance with manipulative principles, while the traditionalist chose the one in which all firms work in accordance with traditional principles. If they interacted within one common market, we received a situation of the upper right corner of the payoff matrix (51.4%; 11.1%). In this case, competitors obviously differed in their business strategies. In the case of the same principles of doing business, we received the situation of the upper left (3%; 37.8%) or lower right corners (8.9%; 27%).

Taking into account the possibility of changing the roles of manipulator and traditionalist – in the case of considerable political turmoil – the equilibrium could be obtained in only one cell out of two. This referred to the situation when e.g. a political force to which they remained loyal won the election, which led to the reduction of inspections, selective commitment to customs control, etc. In the economy where market institutions operate only in part, and the level of profitability reflects a 'healthy' business, market equilibrium appears by the use of strategies based partly on manipulative and traditional tools.

The other case we wanted to analyse, was the situation when unprofitability was not a problem (Table 5), while the institutional environment based on traditional principles along with the possibility of the hidden use of some manipulative principles (e.g. a failed procedure of bankruptcy). The Nash equilibrium in this case was received in the position of using traditional tools (91.1% – for '0'; 27% – for '1'), hence in the cell (91.1%; 73%).

Table 5. Nash equilibrium in the case of unprofitability based on selected sample: the total of 123 data lines of Ukrainian small enterprises in 2015-2018

Part of market working in accordance with (i.e. competitors):		Traditionalist (traditional way of doing business)			
		Manipulative principles		Traditional principles	
Manipulator (manipulative way of doing business)	Manipulative principles	**97%**	62.2%	48.6%	**88.9%**
	Traditional principles	88.9%	48.6%	**91.1%**	**73%**

Source: own elaboration based on the results obtained from the regressions above.

The same approach was used for other cells. Consequently, under such conditions, a firm working in accordance with the manipulative strategy (manipulator) calmly competed with firms using traditional business strategies, and their interaction was in equilibrium due to the inefficiency of market institutions.

Therefore, cannot fully confirm the second hypothesis of our study, but we can confirm the third one because the manipulator in the described situation was only able to reach equilibrium in the market with traditional tools. The second hypothesis is not proved probably because foreign capital works – though in insignificant volume – in the Ukrainian market and traditional accounting approaches were strictly regulated by foreign parent companies. Therefore, two types of strategies can be easily identified. In the case of unprofitability, we observed that the use of traditional accounting

technologies allowed businesses to be in equilibrium. Therefore, the use of manipulative instruments does not ensure any additional 'advantage.' In this case, as we assumed, traditional tools were used by both firms that prefer manipulative tools and those forced to use traditional ones. Under such conditions, corporate income taxation becomes a fiction, while corporate tax revenue was simply negligible. For such a market, even a deeper approximation of national and international accounting standards would not lead to the increase of tax collection.

Therefore, without fundamental changes in the institutional environment, the incentive to abandon manipulative tools in doing business will not have a significant effect, as the business is in equilibrium partly by using this strategy (Table 4) that will create obvious resistance or not used at all (Table 5); e.g. changing the priorities of the banking system from the state bond market to the real business lending, the protection of property rights, the effective procedure of bankruptcy, the unification of tax and financial accounting, the illegality of all types of tax evasion.

CONCLUSIONS

Although this study is not the first attempt to conduct a comprehensive analysis of zombie businesses, it is one of the first attempts to apply this approach to a wide range of advanced manipulative tools of financial statements by applying game theory models. Considering the extremely dangerous influence of zombie business for the economy, our research focused on the problems of small enterprises in the Ukrainian market.

On the basis of the logistic regression approach, we found that if players are working on the market with only manipulative instruments, the validity of our model was 97% and manipulative strategy led to a loss; 37.8% - traditional strategy led to profitability. Meanwhile, if players are working on the market with only traditional instruments, the validity of our model was 91.1% and manipulative strategy led to a loss; 27% - traditional strategy led to profitability. Finally, if players are working on the market with traditional and manipulative instruments, then the validity of our model was 88.9% and manipulative strategy led to a loss; 51.4% and traditional strategy led to profitability.

Under the conditions of Ukrainian institutional environment our hypotheses are partly proved. We can state that such elements as the high level of informal institutions on the market, the simulation of bankruptcy procedures, the imperfections of audit practice, and stock market instruments led to extremely negative processes in domestic business. The lack of adequate sources of external investment forced businesses to deform their financial statements and seek investment funds in a completely inadequate way. Thus, our first hypothesis is completely confirmed.

The second hypothesis is not completely working because of the coexistence of foreign companies and domestic companies under adverse conditions in the market. The former are expected to consolidate their financial reporting with parent companies, while the latter can safely exist in a formal or informal market. Such a situation in the Ukrainian market creates a special type of zombie businesses created by ineffective government policy, in which a zombie bank – as a source of external financing – becomes an unnecessary link for such weak businesses. Solving such a problem is an extremely complex task and exceeds the horizon of the bank-enterprise relationship. On the other hand, such a situation in Ukraine results from the continued phenomenon of all-encompassing zombie banking sector.

In the case of unprofitability, the equilibrium among adherents of traditional principles and manipulative principles is reached in the market in which traditional strategies prevail. Under such conditions, even the use of manipulative principles loses its sense. The position of equilibrium is possible for the 'manipulator' only in the fully traditional market. But we do not see such a market in Ukraine. This explains why there are so many additional rules in Ukraine regarding what may be qualified as costs. There is no confidence in the market in terms of profitability or loss. If the market is in equilibrium in which players apply their strategies, the reforming, prohibition, or transformation of such a market will cause obvious resistance. If the accounting system does not have appropriate working mechanisms, there is no sense in taking care of the quality of standards. This is another reason for the approval of the third hypothesis.

Therefore, our study reveals the essence of zombie business in Ukraine and informs about its risks and economic effects. We emphasize the undeniable fact that small business is totally unprofitable when run officially. We show the main business strategies used in business activity (manipulative and traditional). However, our study has its limitations as it could be the basis for a deeper analysis of business environment in Ukraine and ways for its improvement. Future research may also include a comparison of zombie businesses among different states. Thus, we recommend focusing on solving the challenges related to weak institutional environment and public policies.

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Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Drivers of entrepreneurial intention among economics students in Indonesia

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A B S T R A C T
Objective: The objective of the article is to investigate the impact factors on entrepreneurial intention among economics students in Indonesia. It examines how culture, attitude, and entrepreneurship education affect students' entrepreneurial intention.
Research Design & Methods: The study applied a quantitative method using structural equation modelling. A questionnaire survey was done using a sample of 376 economics students in Malang of East Java, Indonesia.
Findings: The findings confirmed that entrepreneurial culture and attitude have successfully affected students' intention of being entrepreneurs. The results of this study indicated the essential role of entrepreneurial attitude in mediating the relationship between entrepreneurial culture, entrepreneurial education, and intention to become an entrepreneur.
Implications & Recommendations: These findings suggest several actions for both universities and the Indonesian government to elaborate the entrepreneurship education model, which applied more practical experience instead of classroom theories.
Contribution & Value Added: The study further elaborated the scholarly understanding of driving factors of students' intention to become entrepreneurs.

INTRODUCTION

In the recent few decades, awareness has grown about the role of entrepreneurship. For instance, the types entrepreneurship career have remained a trend in current research (Pruett *et al.*, 2008; Zamrudi & Yulianti, 2020). Some scholars consider a model of entrepreneurial determination that identifies several factors shaping decisions in entrepreneurship (Schlaegel & Koenig, 2014; Diegoli *et al.*, 2018; Şeşen & Pruett, 2014; Zampetakis *et al.*, 2011). The reason for the increasing attention of scholars is the essential role of entrepreneurship in job creation, poverty alleviation, and the economic growth of nations (Engle *et al.*, 2010; Zampetakis *et al.*, 2008; Udayanan, 2019).

Indonesia faces a big challenge of reducing poverty and unemployment rate (Nagib & Ngadi, 2008). To deal with that issue, the Indonesian government in collaboration with universities provides a program to enhance knowledge, skill, and attitude towards entrepreneurship based on technology and information. The program was intended to change students' mindset toward becoming entrepreneurs, which should create new job opportunities and lower the unemployment rate. Hence, entrepreneurial

intention is crucial for an individual and must be continuously presented to the students (Syuhada & Gambett, 2013; Wibowo *et al.*, 2018).

A prior study by Cheng *et al.* (2009) reveals that students who experienced developing various technical skills and training are more confident to become entrepreneurs. Unfortunately, the finding shows an insignificant relationship between entrepreneurial knowledge and interest in starting a business due to ineffective entrepreneurial learning methods used. Entrepreneurial attitude is an agent of change that leads productivity and profitability (Borasi & Finnigan, 2010). Attitude is a tendency to like or dislike objects, people, institutions, and events (Küttim *et al.*, 2014); it is evaluative, that is related to someone's evaluation of an object. If the object is considered to be beneficial, then someone will be supportive, and vice versa.

On the other hand, Hofstede (2001) underlines culture as an embodied mind programming that differentiates elements of one group from other groups. Hayton and Cacciotti (2013) define concepts as expected values, beliefs, and behaviours that are quite common among people in certain geographical areas. Moreover, some scholars argue that the cultural sense will drive uncertainty tolerance and risk-taking, as these are forecasted to support creativity and innovation that underlie entrepreneurial action (Kreiser *et al.*, 2010). The findings of Zahra and George (2002) confirm that entrepreneurial action is incorporated either by beliefs or values shared culturally that support or hinder the required behaviour. Similarly, Karayiannis (1993) mentions that entrepreneurs form their beliefs through cultural heritage and direct life experience. This implies that entrepreneurial culture impacts entrepreneur education conditioning (Şeşen & Pruett, 2014; Adekiya & Ibrahim, 2016).

Culture influences values, attitudes, and beliefs (Adekiya & Ibrahim, 2016). Some literature continues to develop this thread by arguing that culture is one of the crucial factors of a country's economic level (Porter, 1990) and the development of entrepreneurship (House *et al.*, 2002). Hence, national culture is linked with the level of entrepreneurship either through cultural benefit that is part of a community (Triandis, 1982) or through an organization that represents that culture (Ahlstrom & Bruton, 2002; Dickson *et al.*, 2004). Expanding this reason motivates the proposition that the higher the density of entrepreneurial orientation among a country's residents, the larger the presence of possible entrepreneurs and the higher the level of new business generation (Mueller & Thomas, 2001).

Besides entrepreneurial studies, what also recently gained importance is the study of causality between entrepreneurial culture and entrepreneurial intention. For instance, Ao and Liu (2014) and Şeşen and Pruett (2014) state that entrepreneurship culture influences entrepreneurial intention. Their findings show that culture is essential in every dimension of entrepreneurship because it determines individual attitudes towards entrepreneurship initiation. Despite the growing interest in whether entrepreneurial culture impacts entrepreneurial intention, researchers overlook how culture impacts entrepreneurial behaviour (Hayton *et al.*, 2002; Zahra *et al.*, 1999). Most studies ignore testing the effect of variable entrepreneurial attitude, entrepreneurial intention, and the mediating role of entrepreneurial attitude and entrepreneurial education.

The contribution of this article is twofold. First, this study overviews current literature in entrepreneurship studies from the perspective of culture and attitude. A preliminary study by Matlay *et al.* (2012) introduced the term of 'culture' as 'shared believes and attitudes.' In this study, we provide a different indicator and meaning of culture that brings different knowledge. Moreover, we elaborated entrepreneurial attitude that is missing in previous studies. Secondly, Indonesia has a unique culture, which is well known as a mutual cooperation (*gotong royong*) society. Since this finding shows a correlation between culture, intention, and attitude, it elaborates the cultural values for increasing entrepreneurs in Indonesia. The study on entrepreneurship in Indonesia is crucial due to the lack number of entrepreneurs compared to the rest of population. Indonesia ranks 94th in the level of entrepreneurs compared to other countries such as Singapore (27th), Brunei (53rd), and Malaysia (58th) (Acs *et al.*, 2017).

The article is divided into five sections. The introduction section is followed by the literature review, which highlights the addressed research gap in the context of Indonesia. The next section concerns methodology. The fourth section involves findings and statistical calculations, followed by conclusions that cover the implications, limitations, and recommendations of the study.

LITERATURE REVIEW

Entrepreneurial intention is closely linked to the theory of planned behaviour (TPB) introduced by Ajzen (1991). The TPB is a development and refinement of the reason action theory (TRA) proposed by Fishbein and Ajzen (1975). These two theories have share the focus on individual's intention to present a behaviour. Based on the TPB and TRA, intention can be applied to understand and predict the factors that affect individual behaviours. Entrepreneurial intention involves the cognitive process of the behaviour applied by an individual either to establish a new business or to produce new value in a company (Fini *et al.*, 2012; Karimi *et al.*, 2016). Emrah *et al.* (2013), Ibrahim and Mas'ud (2016), and Jena (2020) note that there are three factors affecting entrepreneurial intention, which are personality, the environment, and demography. Personal characteristics include traits and backgrounds, while environmental factors include entrepreneurship education as a determinant of entrepreneurial intentions.

Entrepreneurship education links teaching and learning about entrepreneurship, which seek to enhance the personal knowledge, skills, attitudes, and character of students according to their age and capabilities (Ayalew & Zeleke, 2018; Oosterbeek *et al.*, 2010; Solesvik *et al.*, 2014; Gerba, 2012). Moreover, Bergmann *et al.* (2018), Wach and Wojciechowski (2016), and Kirkwood *et al.* (2014) note that the factors influencing students' entrepreneurial intentions are belief in the current condition and prospects for entrepreneurship in the future. Generally, entrepreneurship education is intended to reinforce students' recognition of entrepreneurship as a career opportunity and foster their understanding of inaugurating and managing new business (Linan *et al.*, 2017). However, Kusmintarti *et al.* (2014) indicate that entrepreneurship education insignificantly affects entrepreneurial attitude when emphasis lies solely on the theoretical aspects.

Besides entrepreneurial education, the entrepreneurship concept results from the influence of individual circumstances in local context or culture (Reynolds *et al.*, 2007; Kibler, 2013). Hofstede (2001) and Collins *et al.* (2004) assert that culture is concerned with the suffusive organizing of the mind that differentiates members of one group from members of another. Culture is a feature that can promote career opportunities decisions (Iakovleva & Solesvik, 2013), and provide or hinder company establishment (Kreiser *et al.*, 2010; Akcay *et al.*, 2014; Ao & Liu, 2014; Vargas-Hernández *et al.*, 2010). Previous studies by Ao and Liu (2014) and Şeşen and Pruett (2014) reveal that entrepreneurial culture affects entrepreneurial intention. However, those studies did not find the influence of entrepreneurial education on entrepreneurial culture.

Several theoretical approaches and empirical evidence show that attitude cannot occur when considered as a one-dimensional construction, because its evaluation contains two inseparable components, one being instrumental or cognitive and the other being experiential or affective (Botsaris & Vamvaka, 2016). The instrumental element refers to considerations that are more cognitive instead of a behaviour that seeks something beneficial and in accordance with thoughts, knowledge, and perceptions. The affective component refers to emotions, feelings (e.g. excitement, satisfaction), and impulses generated by chances of individual behaviour (Ajzen, 1991; Botsaris & Vamvaka, 2016; Fayolle & Gailly, 2015; Yan, 2014).

Scholars long debated that cognition has a reciprocal influence in shaping instrumental and affective attitudes as causal to each other (Fernandes & Proença, 2014). Longitudinal data are required to initiate a causal correlation between these two elements of attitude. Wach and Wojciechowski (2016) indicated that there is a robust connection between entrepreneurial attitude and the intention to become an entrepreneur. Taormina (2019) states that attitudes and environments may influence entrepreneurial intentions. Measured by psychological characteristics, attitudes have a substantial effect on entrepreneurial potential. At the same time, the environmental factor – which includes social, economic, political, and infrastructure development – has a strong influence on entrepreneurial success. Intention remains the crucial and unbiased predictor of career options (Hackett, 2018; Sajjad & Dad, 2010; Miranda *et al.*, 2017). Previous research results state that entrepreneurial attitudes have a significant and robust consequence for entrepreneurial intentions (Guerrero *et al.*, 2008; Hsu *et al.*, 2016; Hussain & Norashidah, 2015; Liñán, 2008). The above findings allow us to assume the following research hypotheses:

H1: Entrepreneurial culture positively influences entrepreneurship education.

H2: Entrepreneurial culture positively influences entrepreneurial attitude.

H3: Entrepreneurial education positively influences entrepreneurial attitude.

H4: Entrepreneurial attitude positively influences entrepreneurial intention.

H5: Entrepreneurial culture positively influences entrepreneurial intention.

H6: Entrepreneurial attitude mediates the impact of entrepreneurial culture and entrepreneurial intention.

H7: Entrepreneurial attitude mediates the impact of entrepreneurship education and entrepreneurial intention.

RESEARCH METHODOLOGY

Research Methods

This study applied a quantitative method using structural equation modelling to comprehensively understand the relationship among variables. The study involved a cross-sectional survey of economics faculties from several universities in Malang of East Java, Indonesia. To attain the objectives, this study develops a structured online questionnaire. This study engaged several variables, including the intention to become an entrepreneur, entrepreneurship education, culture, and entrepreneurial attitude. The framework of the research is provided in Figure 1.
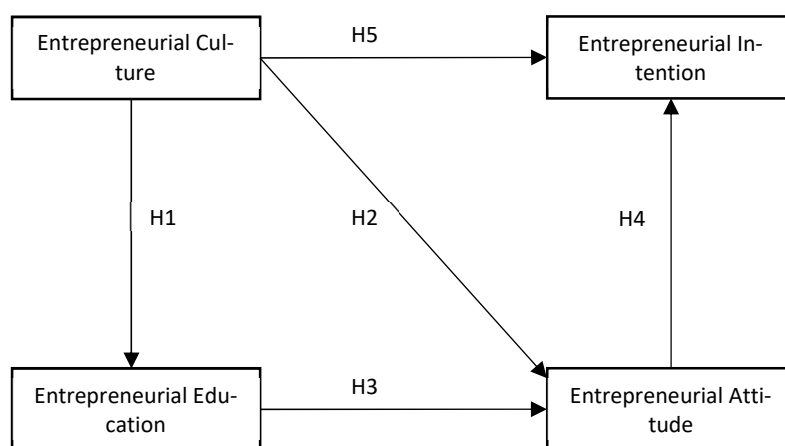
Figure 1. The theoretical framework methodology
Source: adapted from Krueger *et al*. (2000); Linan & Chen (2009); Mathisen & Arnulf (2013); Ackenzie *et al.* (2011); Ireland *et al.* (2009); Denanyoh *et al.* (2015).

Population and Sample

An online questionnaire was used to gather information from volunteers from September to December 2019. The sample in this study was determined through a convenience sampling technique following Sekaran and Bougie (2009) and Malhotra (2010). The total of 425 questionnaires were provided online, and approximately 373 were usable in the following analysis. The response rate of 88.47% was relatively high. The rationale for using economic faculty students as respondents was that they received entrepreneurship education and conducted various entrepreneurial training and practices organized by universities, ministries of higher education, and SMEs in collaboration with universities. The respondents demographic in this study consisted of 127 men (33.77%) and 246 women (65.42%) The study was conducted among first-year, second-year, and third-year undergraduate students and students in the final year of their graduate studies. In more detail, class 2014 numbered two students (0.53%); class of 2015 – 5 (1.34%); class of 2016 – 98 (26.06%); class of 2017 – 249 (66.22%); class of 2018 – 10 (2.66%); class of 2019 – nine (2.39%).

Research Instruments

All the construct's calculation was adapted from preliminary works with a slight modification for the Indonesian context. The questionnaire included 35 questions framing each participant's profile and variables to be examined. The seven-items questionnaire was adapted from Krueger *et al.* (2000) and Liñán and Chen (2009) to measure entrepreneurial intention, while another seven-items questionnaire was expanded from Mathisen and Arnulf (2013) to understand the entrepreneurial mindset. Moreover, to measure the entrepreneurial culture, we adapted 10 indicators from Mackenzie *et al.* (2011) and Ireland *et al.* (2009), while to measure entrepreneurial attitude, we adapted five indicators from Linan and Chen (2009). Finally, to calculate entrepreneurship education, the authors engaged six indicators from Denanyoh *et al.* (2015). A five-point Likert scale was employed for each variable from 1 for 'strongly disagree' to 5 for 'strongly agree.'

RESULTS AND DISCUSSION

In the initial stage, we tested an exploratory factor analysis using SPSS to validate data, evaluate dimensions, preserve firm indicators (Allen & Bennett, 2010), and pursue a reliability test with the criteria of Cronbach's alpha of 0.6 or higher (Hair *et al.*, 1998). The second stage was the confirmatory factor analysis with AMOS 25. To obtain the fitting model, it had to satisfy certain criteria and cut-off values, namely $p > 0.5$ (Schermelleh-Engel *et al.*, 2003), CMIN / DF of < 2 (Tabachnick & Fidell, 2007), and RMSEA of ≤ 0.06 (Hu & Bentler, 1999).

Exploratory Factor Analysis

According to the calculation of exploratory factor analysis, there generally are 38 factors that consist of Entrepreneurial Intention (6), Entrepreneurial Attitude (5), Entrepreneurial Culture (19), and Entrepreneurial Education (6). All factors have Cronbach's alphas ranging from 0.599 to 0.975, and they are considered reliable for inclusion in further analysis.

Hypotheses Testing

According to Structural Equation Modeling (SEM) analysis, a fitting model was obtained with a probability score of 0.069, a CMIN / DF score of 1.270, a CFI score of 0.995, and an RMSEA score of 0.027. As presented in Tables 1, H1, H2, H3, H4, and H5 were significant with CR scores of 17.937, 2.823, 2.161, 11.586, 3.584, respectively. Furthermore, H6 and H7 also satisfied the criteria with CR scores of 2.124 and 2.742 (see Table 1 and Figure 2).

Table 1. Result summary of theoretical framework testing

Hypotheses	Impact	CR	P	Decision
H1	EC → EE	17.937	0.000	Accepted
H2	EE → EA	2.823	0.005	Accepted
H3	EC → EA	2.161	0.031	Accepted
H4	EA → EI	11.586	0.000	Accepted
H5	EC → EI	3.584	0.000	Accepted
H6	EC → EA → EI	2.124	0.006	Accepted
H7	EE → EA → EI	2.742	0.006	Accepted

Note: EC = entrepreneurial culture; EE = entrepreneurial Education; EA = entrepreneurial Attitude; EI = entrepreneurial intention. Source: own study.

The Relationship Between Variables

The results of this work address the seven proposed hypotheses. The first hypothesis (H1) shows that there is a positive impact of entrepreneurial culture on entrepreneurial education with a CR score of 17.937. This is due to the fact that culture in university and community environment makes students have to learn about entrepreneurship. With the support of culture, students are more confident in

learning entrepreneurship material. There are examples of young entrepreneurs who successfully presented at universities as practitioners. The result of this study is indifferent of the prior studies by Ao and Liu (2014), Holmgren and From (2005), Jack and Anderson (1999), Mueller and Thomas (2001), Jabeen *et al.* (2017), and Jack and Anderson (1999).
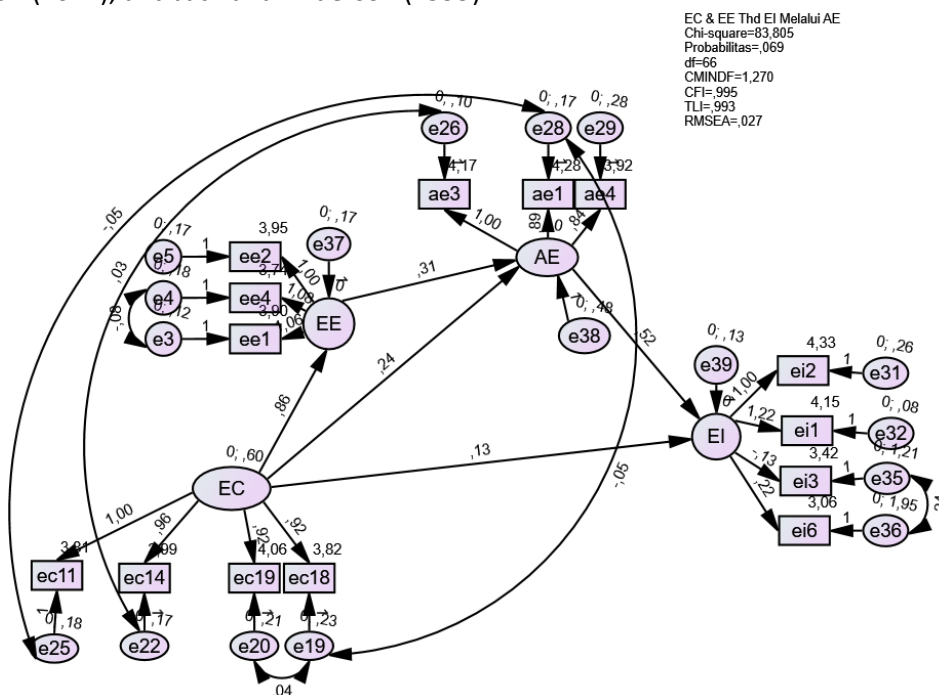
Figure 2. The structural equation model estimation
Source: own elaboration.

Moreover, based on the previous analysis, we found a significant effect between entrepreneurial culture and entrepreneurial attitude, with a CR score of 2.823 and *p*-value of 0.005. This implies that entrepreneurial culture within the student environment could form attitudes towards entrepreneurship. Culture is important in every dimension of entrepreneurship because it determines individual attitudes towards entrepreneurship initiation. This finding suggests that culture is the most effective constant for entrepreneurs. A good cultural value also leads to intentions of becoming an entrepreneur. The result of this study is in agreement with prior research by Aloulou (2016), Holmgren and From (2005), Şeşen and Pruett (2014).

The third hypothesis (H3) argues that there is a direct positive impact of entrepreneurial education on entrepreneurial attitude. This study confirmed previous research by Fayolle and Gailly (2015), Florin and Rossiter (2015), Potishuk and Kratzer (2017), Schwarz *et al.* (2009), Şeşen and Pruett (2014), and Zhang and Espinoza (1998). Students who enrolled in this study considered that the results of entrepreneurial learning could form attitudes able to foster their entrepreneurial spirit. Due to its moderate CR score, the entrepreneurship material from this time is considered in need of improvement because of the limited lecture time, which only gives three credit semesters in one semester during the study period. Entrepreneurship curriculum on campuses has more theoretical material than practical exercises.

Furthermore, this study also showed the significant effect of entrepreneurial attitude on entrepreneurial intention. In this study, students who participated stated that entrepreneurial intentions can be formed if students consider that a career as an entrepreneur is exciting. Many opportunities can be obtained through entrepreneurship. The need for seriousness in conducting an entrepreneurial career happens through exploring all existing business processes. These students can also create business ventures in the future. This implies that high motivation and intention toward entrepreneurship can drive students' success in running a business. The finding supports prior research conducted by Ayalew and Zeleke (2018), Fayolle and Gailly (2015), Krueger *et al.* (2000), Potishuk and Kratzer (2017), Schwarz *et al.* (2009), and Zampetakis *et al.* (2008).

The next hypothesis is that there is a positive direct impact on entrepreneurial culture and entrepreneurial intention. The study found that H5 was significant with a CR score of 3.584, which implies that entrepreneurial culture positively affects entrepreneurial intention. In this study, there is evidence from some students who believe that entrepreneurial culture in an institution was important in supporting their confidence gain. Noticeable students also began to open to changes in teaching and learning models. Some students became open to an organization's vision of the future. Institutions began to increase mutual trust and respect among students. Support from the academic community during a crisis is what students who start businesses need. Nevertheless, this finding confirmed the results of preliminary studies by Ao and Liu (2014), Bogatyreva *et al.* (2019), Şeşen and Pruett (2014), Solesvik *et al.* (2014), Gerba (2012).

The sixth and seventh hypothesis sought to understand the mediating role of entrepreneurial attitude. Based on statistical calculation, the variable of entrepreneurial attitude was successful in mediating entrepreneurial culture towards entrepreneurial intention. The results of this work support the results of Bogatyreva *et al.* (2019), Sajjad and Dad (2010), Solesvik *et al.* (2014), Ayalew and Zeleke (2018), Díaz-García and Jiménez-Moreno (2010), Mahendra *et al.* (2017), Shao-Hui *et al.* (2011). This is evidenced by the attitude towards good entrepreneurship from students who intend to become better entrepreneurs with the support of the entrepreneurial culture of their environment. This finding is reasonable because the entrepreneurial culture built at universities will form an entrepreneurial attitude and a strong intention to become an entrepreneur. The Indonesian government, through the Ministry of Higher Education, has instructed all universities – both public and private – to foster entrepreneurial culture in order to increase the number of entrepreneurs born from the world of higher education.

The study also confirmed that entrepreneurial attitude can mediate the relationship between entrepreneurship education and entrepreneurial intention. This agrees with the numerous findings by Hussain and Norashidah (2015), Kalyoncuoğlu *et al.* (2017), Piperopoulos and Dimov (2015), Souitaris *et al.* (2007), Tiwari *et al.* (2017), Ayalew and Zeleke (2018), Díaz-García and Jiménez-Moreno (2010). Thus, our study implies that entrepreneurship education plays a crucial role in promoting students' entrepreneurial intention. Hence, universities should explore models of entrepreneurship education at all levels of education, e.g. by providing more practical courses instead of theoretical ones and by elaborating existing curricula to follow the rapid global changes.

CONCLUSIONS

This study aimed to evaluate the influence of entrepreneurial education, entrepreneurial culture, and entrepreneurial attitude on entrepreneurial intention. The above analyses allow us to surmise that entrepreneurship education positively influences entrepreneurial attitude. Similarly, entrepreneurial culture impacts entrepreneurial attitude, entrepreneurship education, and entrepreneurial intention. Moreover, entrepreneurial attitude affects the intention to become an entrepreneur. Furthermore, entrepreneurial attitude can explain both the connectivity between entrepreneurship education and entrepreneurial intention – or entrepreneurial culture – and students' intention to become entrepreneurs.

Thus, the study confirmed that entrepreneurship and cultural education play an essential role in the intention to become an entrepreneur. Therefore, universities not only update and revitalize entrepreneurship curricula but also create a strong entrepreneurial culture. This entrepreneurial culture can be adapted to the characteristics of each campus. An entrepreneurial culture can be built e.g. by holding meetings of young entrepreneurs from both campus and outside, seminars, conferences, festivals, and fairs; and by using printed media in the form of brochures, banners, and magazines.

The main limitation of our study lies in the fact that the data was gathered solely from several universities in Malang of Indonesia, so the results cannot be generalized to represent real conditions in all universities in Indonesia. Future scholars should involve all universities in Indonesia so as to provide results that could be generalized. Moreover, this study only tested three independent variables and one dependent variable. Future studies should investigate other dominant factors that influence students' intention to begin a business activity. Research using the mixed method is very suitable to develop this study in the future.

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Ludi Wishnu Wardana (25%) and Agus Wibowo (15%) devised the project, the main conceptual ideas, and proof outlines. Thusy Tiara Saraswati (15%) and Fitriana (15%) provided the technical details and performed the research. Bagus Shandy Narmaditya (15%) and Riza Indriani (15%) wrote the entire paper, later translated and proofread by Bagus Shandy Narmaditya.

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Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

What is the most effective antecedent for developing entrepreneurial intention among Muslim youth in Indonesia?

Gunawan Baharuddin, Asmak Ab Rahman

A B S T R A C T
Objective: The objective of the article is to examine the dominant antecedent (characteristic) for youth in Indonesia to become entrepreneurs, by using the theory of planned behaviour (TPB) model.
Research Design & Methods: This work is a quantitative study with a deductive approach. It was conducted by surveying 727 undergraduate students from universities in Indonesia to measure both indicators for every construct (analysis factors) and correlation effects on other constructs (path analysis). All data obtained were analysed through partial least square structural equation modelling (PLS-SEM).
Findings: Among the three exogenous driver constructs, Subjective Norms has the strongest effect on Intention (0.152), followed by Perceived Behavioural Control (0.040) and Personal Attitude (0.011).
Implications & Recommendations: Knowing the potential character of youth who become entrepreneurs enables policymakers to effectively plan targeted programs and policies. This article suggests several recommendations that focus on support from surrounding people such family, friends, and role models, who could approve young people's decisions to start own businesses.
Contribution & Value Added: This research supports and strengthens the work of several researchers on the cultural and value factors that influence intentions with the additional element of religious values and virtues.

Article type:	research article
Keywords:	entrepreneurship; intention; youth; Theory of Planned Behaviour
JEL codes:	G41, L26, O15

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INTRODUCTION

In the new global economy, the youth has become an instrumental issue in the field of empowerment; accordingly, youth empowerment is extensively studied in fields such as education, health care, sociology, psychology, and economics. Youth empowerment enhances the development of citizens during their transition to adulthood (Jennings *et al.*, 2006). This task creates job opportunities and is thus a priority for every nation.

Indonesia is currently experiencing a demographic bonus, by which the age of the productive population (15-64 years old) is double than that of the unproductive population (lower than 15 and over 65); this "bonus" will continue until 2035 (BPS, 2018). Meanwhile, the entrepreneurial sector in Indonesia proved its robust nature during the 1998 worldwide monetary crisis. Small and medium enterprises (SMEs) proved their resilience and ability to recover from the impact of that crisis quickly. This was because the SMEs base on domestic markets and provide employment for about 91.8 million people, or 97.3% of the labour force in Indonesia, and contribute as much as 53.6% to the gross domestic product (GDP; Azis & Haerani, 2009). Due to these experiences, entrepreneurship has become the

central focus of many stakeholders in Indonesia, including higher education institutions. Most universities now offer an entrepreneurship curriculum, and some have established dedicated departments to promote entrepreneurial culture (Mat, Maat, & Mohd, 2015). Consequently, Indonesia has an increasingly encouraging atmosphere for entrepreneurship. Reports state that the growth ratio of SMEs was 14.92% from 2010 to 2017, an increase of approximately 10 million SMEs (Ministry of Cooperatives and SMEs, 2018; Ministry of Cooperatives and SMEs, 2016). The owners of those SMEs are mostly aged 27-35, as reported by the Directorate of Cooperatives and SMEs Development (2016).

However, this is not an entirely positive situation because 11.41% of school graduates were unemployed at the time and not continuing their studies at a higher level (*Indonesia Youth Statistic Report*, 2017). Moreover, a survey reports that school leavers prefer employment in the government sector, followed by multinational companies and large domestic firms. Only a small fraction of youth is interested in starting their own business or finding a job in a small private domestic firm (Hutapea, 2017). Unemployment in 2018 amounted to seven million people in August 2018 compared to 6.87 million in February 2017 (Databoks, 2018). Based on this fact, this study will examine the youth perception to become entrepreneurs, especially university students after graduation. Previous studies imply that intentions towards entrepreneurial behaviour should explore more contextual factors to obtain better results and a broader perspective. Therefore, this study attempts to observe the dominant characteristics of Muslim youth in Indonesia in order to enhance our understanding of their entrepreneurial intention by using the theory of planned behaviour (TPB) model, along with the new latent variable of moral (religious) aspect included in intention variables.

To achieve its objective, this study employed an empirical approach using partial least square structural equation modelling (PLS-SEM) data analysis to measure the correlation between the tested variables: personal attitude, subjective norms, perceived behavioural control, and entrepreneurial intention. The TPB model is believed to provide a better explanation of how the development of entrepreneurial intention compared to other models. Likewise, PLS-SEM seemed most appropriate to measure the influence of each variable and the path relationship between the tested variables. Regardless of the object of study, Indonesia – with the largest Muslim population in the world – is a very significant sample for understanding the entrepreneurial intention of Muslim youth after graduation. Previous studies also use Indonesian student samples, e.g. Zamrudi and Yulianti (2020) and Patricia and Silangen (2016), but a specific focus on Muslim youth is rare.

The contribution of this article is twofold. Firstly, it enriches the literature of entrepreneurial intention using the theory of planned behaviour (TPB), particularly in Indonesia with the largest Muslim population in the world. The second contribution is empirical: while the TPB model is commonly used in this field, employing Muslim youth in the context of Indonesia provides a more extensive empirical perspective. The results of this study are expected to give a worthwhile perspective for reformulating entrepreneurship programs and curricula at Indonesian universities so that a stronger entrepreneurial culture can be created among the youth. In the Global Entrepreneurs Index (2018), Indonesia ranks 94th out of all 137 countries listed and seventh among the ASEAN countries.

The next sections and sub-sections are organised as follows. The literature review thoroughly discusses themes of entrepreneurial intention; models presentation and hypothesis development is the last part of the subsection. The third section discusses the methodological aspect of the empirical studies, including the development of the research instrument, the procedure to determine the sample from its population, and SEM-PLS as the tool for data analysis. The fourth section presents empirical results and discussion. The last section concludes with final remarks that review all the content of this research, how it can contribute, and the limitations of the study.

LITERATURE REVIEW

In recent years, studies about individuals and behaviour have emerged as an important approach for explaining the entrepreneurship phenomenon. Psychologists claim that intention effectively predicts subsequent behaviour (Ajzen, 1991), while some researchers substantiate that claim (Kolvereid, 1996b). Intention towards a behaviour reflects the motivation and enthusiasm of a person to perform

the behaviour. Entrepreneurship is exactly a type of planned behaviour and there is vast literature discussing intention towards entrepreneurship.

Generally, entrepreneurship curricula are concerned with the development of entrepreneurial attitudes and inspiring creative thinking (Żur, 2014). Attitudes towards this behaviour refer to the degree to which the individual attaches a positive or negative personal value to being an entrepreneur (Ajzen, 2002). Interest in being an entrepreneur can be driven by many factors that vary among individuals: motivations of wealth, freedom, and personal autonomy (indicator level). Indeed, a number of studies conducted on students who partook in entrepreneurship classes or programs revealed that attitude is the strongest factor influencing their intention to start own businesses. Among such studies are Wibowo (2017), Husain (2017), Saheed and Kavoos (2016), Robledo *et al*. (2016), Soon, Rahman, and Nadia (2016), and Hussein (2015).

For subjective norm constructs, earlier studies often indicate that this antecedent fails to measure entrepreneurial intention (Autio *et al*., 2001; Krueger *et al*., 2000; Sparks & Shepherd, 1992). However, Linan (2008) argues that the samples in those studies used are very socially homogeneous, thus generating a premature result. Among studies that support the argument of Linan is the one by Zamrudi and Yulianti (2020), who find that subjective norms are one of the main points that could increase a student's motivation to establish their own business. This study surveys both undergraduate and postgraduate student from 28 universities in Indonesia. Awang *et al*. (2016) study university graduates to find that to ensure more start-ups in Malaysia, serious attention should focus on their expectations of strong support from their university, family, friends, and peers, but also strengthening and reinforcing a proactive personality and risk-taking propensity. The agriculture faculty of Srilanka State University shows that subjective norms are the greatest factors influencing entrepreneurial intention (Wijerathna, 2015). The study by Yurtkoru, Kabadayı Kuşcu, and Doğanay (2014) finds that relational support is the most influential factor determining student entrepreneurial intention in Turkish universities. Similar studies find that individuals tend to be more influenced by the opinion of others (e.g. Moriano *et al*., 2011; Kolvereid, 1996; Tkachev & Kolvereid, 1999).

These results follow the division of subcultures by Hofstede *et al.* (2010) that separates individualism and collectivism. In an individualistic subculture, attitudes become more important in shaping entrepreneurial intentions than social norms, in contrast to collective subcultures, in which social norms become very important when every individual has a strong orientation towards acceptance, approval, and conformity to their environment. Therefore, Indonesia can be classified as a collective group or communal culture. Hence, we may assume that social norms play an important role in the formation of entrepreneurial intentions in Indonesia. After all, some studies foreground that individualistic cultures generally fail to find an effect of social norms on entrepreneurial intention (Robledo *et al*., 2015; Dabic *et al*., 2012; Shiri *et al*., 2012).

Religion has also been linked to entrepreneurial intention as religiosity has a significant influence in shaping daily life decisions. The connection between entrepreneurship and religion is addressed in the context of all religious traditions (Deutschmann, 2001; Garvey, 2003; Klay & Lunn, 2003). According to Pearce, Fritz, and Davis (2009), religions might promote acts of entrepreneurship. Similarly, Salimath and Cullen (2010) argue that levels of religiosity are positively related to entrepreneurial outcomes when moral virtues are pursued not for the sake of generating profit but as an end in themselves (Cheung & King, 2004). Moreover, the Buddhist doctrine of right livelihood plays a significant role in evaluating and exploiting entrepreneurial opportunities (Valliere, 2008) as being a religious activity and striving to succeed in entrepreneurship is to give success in the afterlife (Lucky, 2011).

Some studies in Indonesia observe entrepreneurial intention among Muslim students using the TPB model. The work of Wibowo (2017) reveals that religious groups have stronger entrepreneurial intentions with lower dispersion than students who are not religious. The categorisation of religious or irreligious respondents was based on their view about the importance of religiosity in daily life. The lowest range of average for the irreligious group is less than or equal to 2 on a Likert scale, while the religious group averaged answers of 5 to 6 on a 7 Likert scale; those whose average value was around 2 to 5 on a Likert scale were categorised as swinging religious persons with an unstable view of the importance level of religiosity in daily life. Wibowo sampled 412 Muslim students at the Faculty of

Economic and Business at the University of Indonesia. Another study by Rokhman and Ahamed (2015) of 300 undergraduates from four different faculties at the Islamic College of Kudus in Central Java, Indonesia, reveals that family background and social status are prominent and significantly influence the youth to become entrepreneurs. Therefore, the hypothesis to be tested in this study is:

   H: Subjective norms are dominant antecedents that influence the entrepreneurial intention of Muslim youth in Indonesia.

This hypothesis is supported by Moriano *et al*. (2011) and Hofstede *et al*. (2010) who indicate that Indonesia tends to be a collective group or communal culture, in which social norms are an important factor in making daily decisions. However, religiosity makes people more independent, self-confident, and creative.

RESEARCH METHODOLOGY

Instrument development

This study employs an empirical study using an explanatory approach for the purpose of finding student intention regarding entrepreneurship. The theory of planned behaviour (TPB) is widely used to model the intention formation process and manifestation (Ajzen, 1991) not only in the field of entrepreneurship but also in other fields, such as consumption behaviour (Nejati *et al*., 2011), dental visits (Elyasi *et al*., 2020), physical activity among children (Wang & Wang, 2015), and many other intention-based research.

Since the 1980s, there have been six major models to measure a person's intention to become an entrepreneur: (1) the entrepreneurial event model (EEM); (2) the entrepreneurial intention model (EIM); (3) the revised EIM with self-efficacy; (4) the theory of planned behaviour (TPB); (5) the economic-psychological model (EPM); and (6) the structural model of entrepreneurial intention (SMEI). From these, the EIM, EPM, and SMEI lack empirical tests for entrepreneurial studies, while the EEM, revised EIM, and TPB are the dominant intention models in the field (Tung, 2011). The revised EIM has received the least empirical support and is yet to be validated (Drnovsek & Erikson, 2005), while the EEM and TPB models have been well tested. Although the mediating role of self-efficacy between background factors and intention has been well tested (Wilson, Kickul, & Marlino, 2007; Zhao, Seibert, & Hills, 2005), the entire revised EIM model has not been empirically tested. Therefore, the revised EIM is less appropriate than the other models. Furthermore, Tung (2011) explains that the revised EIM and EEM lack information on the factor of subjective norms. In the revised EIM and EEM, attitudes towards creating a new business are considered a broad concept wherein merge both personal and social factors that influence one's desirability or willingness. However, the TPB distinguishes between attitudes pertaining to personal interest or attraction regarding the entrepreneurial behaviour (personal level) and attitude due to social influence (social level). Such a separation of attitudinal antecedents is meaningful and necessary as it provides more detailed information than the other two models. Only the TPB extends the antecedents of entrepreneurial intention to a social level. The model includes a subjective norm factor, which is reflected in attitudes that arise from opinions of important people. This factor has a direct impact on entrepreneurial intention. Thus, the TPB provides a clearer picture of how entrepreneurial intention is formed, with a detailed basis on how to investigate the entrepreneurial intention of youth.

Three types of individual beliefs influence the process of intention: the beliefs in the consequences that may arise from an action (behavioural belief); the belief in the expectations of others (normative beliefs); the belief in the existence of certain elements that can inhibit the emergence of certain actions (belief control). Thus, these three factors of confidence produce intention factors such as personal attitudes, social norms, and perceived behavioural control.

The antecedents of personal attitude (PA), subjective norm (SN), and perceived behavioural control (PBC) are corresponding beliefs that reflect the underlying cognitive structure. These three motivational factors that influence behaviour are explained as follows. Attitude towards a behaviour refers to the degree to which the individual has a positive or negative personal valuation about being an entrepreneur (Ajzen, 2002; Kolvereid, 1996). Perceived social norms measure the perceived social

pressure to conduct an entrepreneurial behaviour or not. Perceived behavioural control would be defined as the perception of the ease or difficulty in the fulfilment of a behaviour of interest (i.e. becoming an entrepreneur).
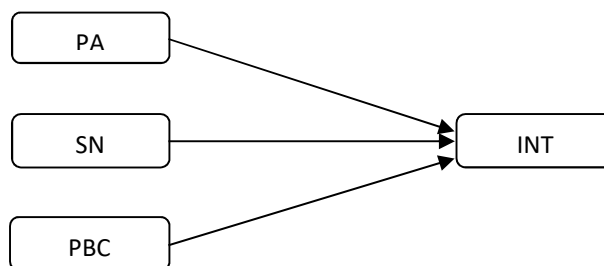
Figure 1. The Theory of Planned Behaviour Model by Ajzen
Note: PA – Personal Attitude; SN – Subjective Norm; PBC – Perceived Behavioural Control; INT – Intention.
Source: Ajzen, 1991, p. 182.

The questionnaires in this study used seven-point Likert scales, ranging from "strongly agree" to "strongly disagree." The reason behind using a seven-point scale is that it reduces inaccuracy, provides more alternatives for respondents, and produces a less skewed distribution (Burns & Bush, 2000). For personal attitude measurement, this study adopted construct questions from Shinnar *et al.* (2012), which uses four latent constructs under the exogenous driver of behavioural belief: autonomy, money, challenges, and life-work balance. For subjective norms measurement, this study adopted construct questions from Carsrud and Braannback (2011), with three dimensions of social norms: role model, entrepreneurial experience in the family, and environment support. Finally, for perceived behavioural control measurement, this study adopted construct questions from Muller (2009), in which four latent dimensions of the control belief – self-competency, business connection, capital, and government support – are asserted to construct this variable. The entrepreneurial intention was measured by six questions adapted from Linan and Chen (2009) with slight adjustment by incorporating virtue and moral aspects; for instance, "I want to be an entrepreneur so that I can help others by creating new jobs" and "[b]y becoming an entrepreneur I can freely worship and help others both materially and spiritually." Hence, 35 questions investigated the conviction of an individual towards venture creation.

In order to achieve the objective of this study, PLS-SEM seemed most appropriate because it can measure both indicators for every construct (analysis factor) and correlation effects on other constructs (path analysis).

Sample and data collection

Youth is best understood as a period of transition from the dependence of childhood to adulthood's independence. For statistical purposes, they are people between the ages of 15 and 24 years, without prejudice to other definitions by the member states of the United Nations (UN, 2019). Shinnar *et al.* (2012) state that a student sample is very suitable for the study of entrepreneurship intention because students directly face the problem of career options after graduation; during their university life, they are continuously considering various career possibilities.

This study set the age of youth between 19 and 24 years as the students in the sample who are currently studying at universities. The estimated population of Muslim students in Islamic universities all over Indonesia is 775 517, according to the Ministry of Religion Affairs (Indonesia Statistic Agency, 2015). Samples were determined by a purposive sampling method from the top five provinces with the highest number of Muslim students in Indonesia: East, West, and Central Java, South Sulawesi, and Aceh. Considering that the three former provinces are on the same island (Java), Central Java was chosen as representative of the middle part of Indonesia, South Sulawesi – the eastern part, and Aceh – the western part. By using the sample size table with a confidence level of 95% and a 5% margin of error, this research required the minimum of 663 students for an ideal sample. However, before the data was collected, a pilot study had been deployed with 153 samples from public universities in order to ensure that all the questions were valid and reliable.

The data was collected through an online survey via Google forms. We obtained help from lecturers at selected universities in distributing questionnaires to their students. The lecturers distributed the online questionnaire in classes or via WhatsApp groups. However, questionnaire distribution before classes proved more effective than via WhatsApp Group because the lecturers could directly ask the students to complete the questionnaire. This method was quite effective and efficient for our study, ensuring 740 responses collected in just two months; although 13 were disregarded as invalid. In the end, 727 valid responses were available for this study.

Data analysis

Structural equation modelling comprises two phases of analysis: measurement analysis, which specifies the relationship between construct and indicator, and structural analysis, which determines the relationship between one construct to another construct. In the measurement analysis stage, validity allows for the assessment of the degree of measurement error, and it subsequently attempts to minimise any errors in the entire process of study (Pallant, 2011). In the structural measurement model, three main assessment criteria are necessary: internal consistency reliability, convergent validity, and discriminant validity.

Ramayah *et al*. (2018) suggest that using composite reliability for internal consistency reliability is more appropriate and applies to the accepted values range of 0.60-0.90. For the measurement of convergent validity, loading values (average variance extracted or AVE) equalled or were greater than 0.4, which was acceptable if the summation of loadings resulted in high loadings scores, contributing to AVE scores greater than 0.5 (Hulland, 1999). In the next stage of cross loading, Fornell Larcker's criterion and the Heterotrait-Monotrait Ratio of correlations (HTMT) were employed to measure discriminant validity. A few requirements were necessary for it to pass: loadings of each indicator should have been the highest for their designated constructs; the square root of average variance extracted (AVE) for a construct should have been greater than the correlation between the construct and other constructs in the model; and for HTMT criterion, if the value below 0.85 means that there is no discriminant issue between two reflective constructs. Further steps were applied to assess the structural model: checking for collinearity issues; the significance and relevance of the structural model relationship; and the coefficient of determination.

In this study, all data were screened for the assessment of the measurement analysis and the structural model. The structural model analysis required VIF values to equal 5 or more. Path coefficient values were standardised on a range from -1 to +1, R^2 aims to measure the accuracy of the model's prediction, where 0.26, 0.13, and 0.02 respectively described substantial, moderate and weak levels of predictive accuracy (Cohen, 1988; qtd. in Hair *et al.,* 2017).

RESULTS AND DISCUSSION

With respect to gender, there were slightly more female (370) than male (357) respondents. According to Table 1, this study found that male students had slightly more entrepreneurial intention than female students, which was reflected in mean values of 36.21 compared to 35.92, respectively. In contrast with the personal attitude antecedent, young Muslim women had a higher mean value with 80.53 compared to 79.85 for men, which may indicate that young women hold a more positive personal valuation about being entrepreneurs. However, masculinity typically is a more likely attribute of an entrepreneurial professional (Shinnar *et al.*, 2012; Diaz-Garcia & Jimenez-Moreno, 2010).

For the remaining antecedents of intention – the subjective norm and perceived behavioural control – this study found insignificant differences between male and female students. This may indicate that social pressures and the perception of the ease of fulfilling behaviour equally motivate both genders to become entrepreneurs, which is shown by the mean value of 37.55 compared to 37.40 for subjective norm and the mean value of 50.21 compared to 50.14 for perceived behavioural control.

By using the Smart PLS application, *t* values and *p* values were obtained to measure the impact of observed constructs on the independent variable in this study. Figure 2 and Table 2 summarise the results of the data analysis. Since the significance level set in this study was 5%, the critical *t* values for

a two-tailed test were thus 1.96 ($t > 1.96$) or – alternatively – by examining the p value, which should have been lower than 0.05 ($p < 0.05$).

Table 1. Gender comparison on entrepreneurial intention and the TPB

Construct	Gender	Mean	Std. Deviation
Intention	Male	36.21	31.60
	Female	35.92	33.20
Personal Attitude	Male	79.85	6.699
	Female	80.53	6.051
Perceived Behavioural Control	Male	50.14	8.815
	Female	50.21	8.020
Subjective Norm	Male	37.55	3.036
	Female	37.40	3.035

Source: own elaboration of SPSS output, 2019.
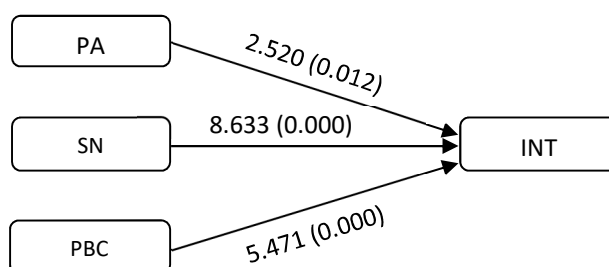
Figure 2. Model path assessment
Note: PA – Personal Attitude; SN – Subjective Norm; PBC – Perceived Behavioural Control; INT – Intention.
Source: own elaboration of Smart-PLS output, 2019.

Figure 2 illustrates that the path coefficient of personal attitude to intention has positive influence towards behaviour to become an entrepreneur, even though the effect size of personal attitude in this study was quite small (Table 3) as revealed by the value of p (0.012, slightly below the threshold of 0.05) and its t value (2.52, slightly above the threshold of 1.96). This implies that personal attitude cannot determine the intentions of entrepreneurs. This result is similar with the work of Ridha and Wahyu (2017) and Arisandi (2016).

The second antecedent was subjective norms towards the entrepreneurial intention of youth. This result implies that subjective norm has a significant influence on their intention to start their own business, evidenced with the t value of 8.633 (>1.96) and p value of 0.000 (< 0.05). This result is similar to that in Zamrudi and Yulianti (2020), Awang *et al*. (2016), and Wijerathna (2015).

Table 2. Structural analysis for TPB antecedents

Path Analysis on Variables	T-statistics) |O/stdev|)	p-values
PA → INT	2.520	0.012
SN → INT	8.633	0.000
PBC → INT	5.471	0.000

Note: PA – Personal Attitude; SN – Subjective Norm; PBC – Perceived Behavioural Control; INT – Intention.
Source: own elaboration of Smart-PLS output, 2019.

The third antecedent assessed the influence of perceived behavioural control on the entrepreneurial intention of youth. With the t value of 5.471 (>1.96) and p value of 0.000 (< 0.05), the empirical analysis in this study confirmed that perceived behavioural control significantly influences the variable of entrepreneurial intention. This result suggests that an increase in young people's perceived self-efficacy towards self-employment will increase their entrepreneurial intentions. Moreover, research

in this area has shown that the higher one's confidence in the ability to perform the behaviour necessary to be successful, the more one's behaviour will be influenced, which does not depend on what skills one possesses but on belief in one's abilities.

Therefore, with the above results, this study asserted that the proposed hypothesis is accepted, thus confirming the dominant antecedent that enhances the intention of Muslim youth to become entrepreneurs in Indonesia is subjective norms, followed by antecedents of perceived behavioural control and personal attitude. Entrepreneurial intention emerged as positively correlated with extraversion, openness, and the support of near people who are part of the subjective norm factor. Furthermore, the inclusion of this construct supports the social learning theory, which suggests that individuals are more likely to adopt behaviour observed in family and among close friends or from mentors, especially if the outcomes of such a behaviour are valued (Bandura, 1977).

The influence magnitude of the dependent variable on the independent variable can be seen from the measurement of f^2. Guidelines for assessing f^2 are that values of 0.02, 0.15, and 0.35 represent small, medium, and large effects (Cohen, 1988; qtd. in Hair *et al.*, 2017) of the exogenous latent variable, respectively. Effect size values of less than 0.02 indicate that there is no effect. Therefore, among the three exogenous driver constructs, subjective norms have the strongest total effect on intention (0.152), followed by perceived behavioural control (0.040) and personal attitude (0.011). These results concur with the study conducted by Awang *et al.* (2016), which concludes that subjective norms and perceived behavioural control are the best predictors of entrepreneurial intention among students, and that the factor of attitude tends to be disqualified from the TPB model.

Table 3. Effect size for each construct

Variables	f^2
Personal Attitude	0.011
Subjective Norm	0.152
Perceived Behavioural Control	0.040

Source: own elaboration of Smart-PLS output, 2019.

This study shows Indonesian youth is having higher confidence in their ability to become future entrepreneurs. Other constructs under this antecedent, such as business assistance, access to capital, and government support, are believed to be easier accessible than before, and the government has more influence in this matter. Moreover, recent years have shown a positive development in financial access, namely crowdfunding, which is a method of connecting – through internet-based intermediary entities – entrepreneurs who want to increase their capital with investors who have funding sources. There were 14 active crowdfunding platforms in Indonesia in January 2020, consisting of 151 platforms that are conventional lending-based, while the rest are shariah lending-based (OJK, 2020). This shows that the development of funding platforms brings positive progress to the development of micro, small-sized and medium enterprises (MSMEs) in Indonesia.

CONCLUSIONS

This study focused on a specific context, and it was conducted to provide a better perspective and understanding of entrepreneurial intention among Muslim youth in Indonesia. Universities are expected to be the main driving force in creating effective programs to increase the intention of young people to start own businesses, be it independently or by cooperating with community organisations or the government. With the largest Muslim population in the world, Indonesia should be able to exploit this potential to develop strong, stable, and sustainable economic conditions. The higher the entrepreneurial activity, the more job opportunities for multiplier effects in the economy provide by stimulating consumption and production. According to the World Bank, the ideal level of entrepreneurship in Indonesia is 4% for it to become a developed country; its current total entrepreneurship is still roughly 1.6%, compared to other ASEAN countries, such as Singapore, Malaysia, Thailand, which show levels of 7%, 5%, and 4.3%, respectively, with Vietnam and the Philippines being above 3%.

Therefore, this study opens a wider understanding regarding what factor is the most significant in increasing the youth's intention to become entrepreneurs, thus the gap in the number of entrepreneurs recommended by the World Bank can be minimised.

This study finds that subjective norms are the dominant factor among the three antecedents of the TPB model towards intention, followed by the factor of perceived behavioural control. The factor of subjective norms represents support from people such as family and friends, and it is the most effective factor for developing the entrepreneurial intention of Muslim youth. The antecedent of perceived behavioural control is the second-best construct, so concerns of self-competency, capital access, and government support have a significant impact in heightening the entrepreneurial intention of the youth. The government should provide incentives for those who are willing to form a start-up after graduating, such as free registration fees for business legal administration, managerial consultancy from practitioners or entrepreneurs, and capital assistance.

In accordance with the results presented in this study, the following are recommended for stakeholders in Indonesia to formulate effective programs and policies:

– Universities and the government should involve family members, in particular students' parents, to educate them that being an entrepreneur can be a promising profession with a bright future. The mindset of parents in Indonesia is generally for their children to become government employees or work in large private companies because this profession is considered to have a minimal risk of failure.
– Create a joint program between universities or government institutions and mosque organisation committees in each region to provide business incubator programs for Muslim youth. Financial aid also might come from charity funds or endowment of communities around mosques.
– Forming a team of fellow young Muslim entrepreneurs. As well as action at the university level, mosques can play a role in shaping the character of youth, not only in religious aspects but also in economic aspects, such as having an entrepreneurial character.
– Create programs for business start-up competitions between mosques so that they can stimulate creative ideas among the youth. Such a program also opens opportunities for financial access from the public.
– Create training and mentoring programs by start-up entrepreneurs who have successfully built their businesses from scratch to allow young people find role models that could continue to motivate them in building their own businesses.

This research also contributes to the sphere of knowledge and theory. Our results support and reinforce research into cultural and value factors that influence personal intentions. Moreover, contexts such as the Muslim youth population in Indonesia can be another avenue for future research, especially examining the driving factors towards intention enhancement.

This research does have several limitations. Firstly, it used Muslim youth in general to measure entrepreneurial intentions. Better and more precise results will be gained when specifically conducted for Muslim youth who took entrepreneurship courses at universities. Secondly, elements of religion and virtue inserted into the model were only partially included in the intention variable. This article recommends that future research use the variable of *maqasid al-shariah* ("the objective of Islamic law") as a mediator variable in the TPB model. There are five drivers under *maqasid al-shariah* for a Muslim to achieve well-being: faith, intellect, health, progeny, and wealth.

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Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

The influence of transformational leadership on Malaysian students' entrepreneurial behaviour

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A B S T R A C T
Objective: The objective of the article is to understand entrepreneurial abilities of students in Malaysian higher education system. Hence, the role of transformational leadership, psychological empowerment, and knowledge sharing in inducing this behaviour are imperative to ensure that students are inclined to and familiar with entrepreneurial activities during their studies.
Research Design & Methods: This research focused on Malaysian undergraduate students' entrepreneurial behaviour and related antecedents. A group of 177 undergraduate students from various engineering programs was collected. A partial least square structural equation modelling (PLS-SEM) was conducted to analyse the relationship between entrepreneurial behaviour and related antecedents.
Findings: The results show that among the four transformational factors, inspirational motivation is deemed to be the strongest predictor of both knowledge sharing and entrepreneurial behaviour. This is followed by an individualised consideration which tracks full significant impact and partial impact on knowledge sharing and entrepreneurial behaviour. On the other hand, idealised influence and intellectual stimulation show no effect, while psychological empowerment and knowledge sharing show a significant impact on entrepreneurial behaviour.
Implications & Recommendations: The outcomes of this study would benefit stakeholders in implementing entrepreneurial activities and foster successful implementation in the curriculum of the Malaysian higher education system.
Contribution & Value Added: This study contributes to the body of knowledge in the relationship of knowledge sharing, transformational leadership style, and entrepreneurial behaviour of students in Malaysian higher education institutions.

INTRODUCTION

Reduced job offers and an overabundance of graduate students every year led to global unemployment problems (Pittaway & Cope, 2007). The issue poses a domino effect that may lead to other socioeconomic issues in the community, especially among the youth, unless we introduce preventive measures and solutions. Hence, many higher education institutions now offer courses in entrepreneurship to equip potential individuals to become owner of their own businesses rather than becoming conventional workers (Martin, McNally, & Kay, 2013). This issue is relatively important as the world moves forward, while traditional jobs for which one applies and waits for interviews may one day become irrelevant. Thus, the burden and task of equipping students with the right abilities became universities' major concerns and responsibilities. In this regard, universities can offer entrepreneurship

courses or make them compulsory requirements for graduation. Despite the importance of entrepreneurial curriculum in universities, there has been no in-depth study to study the critical factors that can facilitate and enhance entrepreneurship behaviour and abilities of students in universities.

In terms of leadership practice, transformational leadership is known to be positively related to various stimulations of positive behaviour (Lan & Chong, 2015). Transformational leadership theory first emerged in Western countries, with its most notable model being the Multi-factor Leadership Questionnaire (MLQ; Avolio, Bass, & Jung, 1999). The earliest systematic study on transformational leadership was made by Bass (1985) who scrutinized the four dimensions of transformational leadership. This theoretical formulation of transformational leadership was established as the basis for interpersonal behaviour (Salamzadeh, 2020).

The four dimensions are (1) inspirational motivation, namely the level of inspirational vision from leaders towards followers, by optimistically communicating about future goals and vision and equipping reasonable meaning to current tasks; (2) individualised consideration, meaning a leader who acts as a mentor or personal coach assists in tasks appointed to the follower; (3) intellectual stimulation, in which the leader empowers, encourages, and stimulates activities, while followers fulfil tasks; (4) idealised influence, that is the charisma possessed by leaders that can emphasise the importance of purpose, commitment, and the result of a decision from an ethical perspective (Li, Zhao, & Begley, 2015).

Leadership style is an essential variable with a significant impact on knowledge sharing (KS) innovation. After all, leadership facilitates organisations to share, integrate, and practically use knowledge for their development and benefits (Liu & DeFrank, 2013; Mushtaq & Bokhari, 2011). Scholars especially consider the two most influential leadership styles: transformational and transactional (Masa'deh, Obeidat, & Tarhini, 2016). Transactional leadership is better in predicting task performance of individuals as prescribed by task and role, while transformational leadership is better in predicting contextual performance (Wang, Tsui, & Xin, 2011; Baytok, Kurt, & Zorlu, 2014). Both styles promote self-efficiency but contrast with the method of motivation and the way to achieve goals in organisations (Tyssen, Wald, & Spieth, 2014). As the literature indicates, transformational leadership can better improve discretionary behaviours and innovativeness as compared to transactional leadership (Nam Nguyen & Mohamed, 2011; Wang et al., 2011). Others find that the former better influences organisational performance than the latter (Birasnav, 2014). Hence, this study is formulated by incorporating the transformational style and critical component of knowledge sharing, along with psychological empowerment infused within organisations.

This study will empirically show how subordinates are indirectly inspired when achieving the highest levels of excellence by doing extra work effort rather than only completing assigned duties by superior, contributed by the transformational leadership style (Afsar, Badir, Saeed, & Hafeez, 2016). Through the four dimensions of transformational leadership (idealised influence, inspirational motivation, intellectual stimulation and individualised consideration) this study will reveal and discern the important of transformational leadership together with psychological empowerment and knowledge sharing towards entrepreneurship behaviour.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Entrepreneurial behaviour

Entrepreneurial skills of individuals should be developed when they are young, and university can be regarded as the best setting for these particular skills to be nourished. Honing students' entrepreneurial skills is a very difficult task on its own. Hence, it must be supported by other critical components that can be infused within campus life. With entrepreneurial activities supported by the university, there are several vital components of factors that can play a part in realising this, such as leadership styles (Jauhari, Singh, & Kumar, 2017; Han, Seo, Yoon, & Yoon, 2016), psychological empowerment (Coun, Peters, & Blomme, 2018; Farrukh, Lee, & Shahzad, 2019), and knowledge sharing (De Clercq, Dimov, & Thongpapanl, 2013; Hormiga, de Saa-Perez, & Diaz-Diaz, 2016).

Transformational leadership

Transformational leadership is defined as a leadership style that transforms followers to value the group over self-interest based on their ideals and morale by motivating them to perform better than expected (Bass, 1985; Zbierowski, 2016). In contrast, transactional leadership is based on an exchange relationship between a leader and followers in which the leader prepares predefined goals that followers must achieve (Pieterse, Van Knippenberg, Schippers, & Stam, 2010). The four dimensions of transformational leadership are idealised influence, inspirational motivation, intellectual stimulation, and individualised consideration (Bass & Avolio, 1994).

This study is based on antecedents of transformational leadership from endogenous variables of psychological empowerment, knowledge sharing, and entrepreneurial behaviour. We propose 11 hypotheses to understand the relationship between these variables.

Idealised influence. Idealised influence is known as the leader's charisma (Giltinane, 2013). The term "charisma" was used in early studies of transformational leadership but was then changed to "idealised influence" as the original notion appeared incompatible with transformational ideas (Barbuto, 2005). This charismatic feature forms an attraction of followers through an emotional bond created by which the idealised behaviour of the leader forms collective organisation values translated into actions. Leaders high in idealised influence are to be role models, focused on, oriented towards, and persistent in achieving targeted goals (Gabel, 2012). In achieving the vision, followers would show dedication and commitment based on the influence of the leader's charisma.

H1: Individualised consideration will have a positive impact on students' knowledge sharing behaviour.

H2: Individualised consideration will have a positive impact on students' entrepreneurial behaviour.

Inspirational motivation. In ensuring followers to perform their best in completing a certain task, a leader can motivate their followers by inspiration and motivation (Long, Yusof, Kowang, & Heng, 2014). Leaders spread their message by inspiring and stimulating a sense of belief and bestowing challenges in achieving organisation goals and targets. By this, team spirit is harnessed with the belief of followers, which result in the followers showing eagerness and positive thinking. Leaders with high inspirational motivation can motivate followers beyond their expectation (Mittal & Dhar, 2015). Together with idealised influence, inspirational leaders are largely influenced by emotions (Deinert, Homan, Boer, Voelpel, & Gutermann, 2015).

H3: Inspirational motivation will have a positive impact on students' knowledge sharing behaviour.

H4: Inspirational motivation will have a positive impact on students' entrepreneurial behaviour.

Intellectual stimulation. Intellectual stimulation is a form of motivating behaviour that provides followers with meaning in doing their task, which transforms into fostering optimism through leader behaviour. Thus, followers will be inspired through the leader's symbolic actions (Deinert *et al.*, 2015). Leaders that can stimulate the intellect of subordinates can increase their interest in problem-solving, along with ability and competence to think in new and creative ways (Carreiro & Oliveira, 2019). Leaders can empower their followers by strengthening their willpower and confidence, which would ignite the followers' cognitive capability in solving problems creatively (Al-Husseini & Elbeltagi, 2018). Followers would avail themselves to discuss their problems openly and disclose matters pertaining work, which may be perceived as critical and essential to an organisation's growth.

H5: Intellectual stimulation will have a positive impact on students' knowledge sharing behaviour.

H6: Intellectual stimulation will have a positive impact on students' entrepreneurial behaviour.

Individualised consideration. Transformational leaders treat individuals on a one-to-one basis, that is as individuals and not as replaceable components in a machines. The leader's personalised attention

will show appreciation and acknowledgment towards the followers. By individualised consideration, leaders connect with followers to form a bond of relationship (Martin, 2017). Individual goals and needs are made to know and work together to achieve subordinates' career objectives. The individualised consideration of leaders promotes the sharing of power and induces subordinates to express positive belief in upholding their abilities, proactive encouragement, and developing good behaviours (Chen, Davison, Mao, & Wang, 2018). Similar to intellectual stimulation, leaders who can focus on individual followers would achieve an emotional bond that can encourage followers to live up to their potential, which can in return benefit the organisation.

H7: Individualised consideration will have a positive impact on students' knowledge sharing behaviour.

H8: Individualised consideration will have a positive impact on students' entrepreneurial behaviour.

Knowledge sharing

Knowledge sharing has been the peak achievement in the field of knowledge management (Fauzi, Tan, & Thurasamay, 2018b). Studies show that knowledge sharing is an important aspect that motivates individuals to enhance entrepreneurial behaviour (Hormiga *et al.*, 2016; De Clercq *et al.*, 2013; Castro, Nagano, & Ribeiro, 2019). Many argue that knowledge sharing should be practiced and developed into a culture and norm in higher education as it is the place where knowledge is disseminated and celebrated (Fauzi, Tan, Thurasamy, & Ojo, 2019c). All the four variables of transformational leadership are predicted to have positive significant impact on knowledge sharing. Hence, we describe the four variables below.

Psychological empowerment

Psychological empowerment is defined as motivation that is experienced by an individual based on his or her work role (Spreitzer, 1995). Psychological empowerment is primarily identified by subordinate's autonomous motivation, i.e. the perception of meaning, self-determination, competence, and impact (Sun, Zhang, Qi, & Chen, 2012). A person with a high level of empowerment would perform more than required and beyond expectations (Spreitzer, 2008). Psychological empowerment is a distinct characteristic of internal motivation. This is because psychological empowerment is driven by active motivation from the individual self, unlike general intrinsic motivations that are passive (Kang, Lee, & Kim, 2017). The internal motivation from the enactment of psychologically empowered persons is required when one must deal with entrepreneurial activities.

Scholars categorise psychological empowerment into four domains: 1) meaning (fitting one's belief system and goals to a task requirement), 2) competence (capability in performing the task), 3) impact (ownership and personal influence on the outcome of a group's work), and 4) self-determination (the sense of looking through task processes and actions; Houghton, Pearce, Manz, Courtright, & Stewart, 2015). Recent studies find through meta-analyses that these four domains represent an active motivation to an individual's work relationship (Seibert, Wang, & Courtright, 2011; Zhu, Sosik, Riggio, & Yang, 2012). There appeared various studies on psychological empowerment in the workplace (Cicolini, Comparcini, & Simonetti, 2014) that show a strong supportive empirical evidence of its importance in the study of human behaviour. Hence, psychological empowerment is expected to have a positive influence on knowledge sharing and entrepreneurial behaviour respectively, which we indicate in the below hypotheses:

H9: Psychological empowerment will have a positive impact on student's knowledge sharing behaviour.

H10: Psychological empowerment will have a positive impact on student's entrepreneurial behaviour.

Similarly, knowledge sharing would entail a positive influence on entrepreneurial behaviour, as we posit:

H11: Knowledge sharing will have a positive impact on student's entrepreneurial behaviour.

The research model with the exogenous and endogenous variables form the 11 hypotheses, as shown in Figure 1 below.
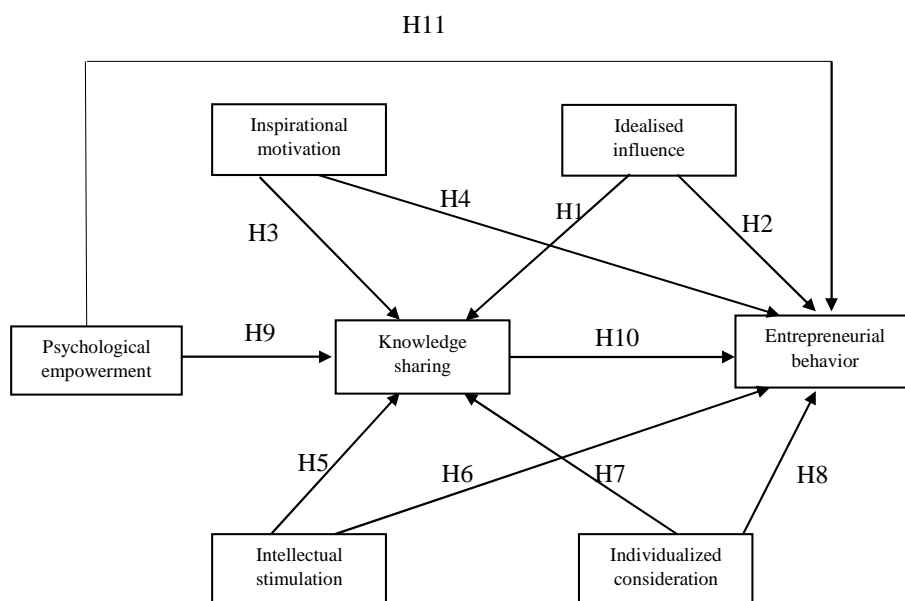
Figure 1. Research model
Source: own elaboration.

RESEARCH METHODOLOGY

This study is based on a self-administered survey sent to undergraduate engineering students in a public university in Malaysia. We decided on the quota non-random sampling method in choosing an equal portion of engineering students. In analysing the relationship between the variables, we applied SmartPLS 3.2. Partial least square structural equation modelling was suitable in testing the relationship as this study is considered to be explorative (Henseler, Ringle, & Sarstedt, 2015).

Item development

The questionnaire used in this study was adapted from previously validated studies. In distributing the questionnaire, items from validated studies required us to ensure that the validity of the items was proven. However, some of the wordings were changed to suit the context of the current study. In ensuring the survey questions are suitable and understandable by potential respondents, it was sent to two expert reviewers in accomplishing face validity and content validity of the instrument.

Transformational leadership. The 20 items of transformational leadership were adapted from Bass and Avolio (1995) on the MLQ multifactor leadership questionnaire. Each of the items was divided into the four components of transformational leadership. Students were instructed to answer the questionnaire based on a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). The sample items for idealised influence were "My leader instils pride in me when associated with others" and "My leader talks about my most important values and beliefs." Sample items for inspirational motivation were "My leader considers moral and ethical consequences of decisions" and "My leader displays a sense of power and confidence." Sample items for intellectual stimulation were "My leader articulates a compelling vision of future" and "My leader seeks differing perspectives when solving problems." Sample items for individualised consideration were "My leader spends time coaching, teaching, and mentoring his/her followers" and "My leader treats others as individuals rather than just as a member of a group."

Psychological empowerment. The eight items for psychological empowerment were adapted from Spreitzer (1995). Even though psychological empowerment is divided into four aspects – meaning,

competence, self-determination, and impact – this study aims to examine psychological empower-ment as a single variable. The relationship between the four components of transformational leader-ship was designed as the required relationship to be studied within the current context that consists of a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). The sample item included was "I have considerable opportunity for independence and freedom in how I do my job."

Knowledge sharing. The six items of knowledge sharing were originally adapted from Akhavan, Hosseini, Abbasi, and Manteghi (2015). To suit the current context of the Malaysian higher education system, the most current version of items for knowledge sharing were taken from Fauzi *et al.* (2018a) and Fauzi, Tan, Thurasamy Ojo, and Shogar (2019b). The sample items included were "I share my knowledge and experience with my friends" and "I share the results of my activities with my friends." A seven-point Likert scale was adopted, ranging from 1 (strongly disagree) to 7 (strongly agree).

Entrepreneurial behaviour. The nine items of entrepreneurial behaviour were adapted from Afsar *et al.* (2016). The items were arranged on a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). The sample items included were "This university displays an enthusiasm for acquiring new skills" and "This university quickly changes course of action when results are not achieved."

RESULTS AND DISCUSSION

The demographic data are shown in Table 1. The percentage of male and female students is 59.32% and 40.68%, respectively. As for nationality, Malay students top the list with 84.75%, followed by Chinese with 7.91%, and Indian with 1.69%. The number of Malay students is usually higher than other national-ities in Malaysian public higher education institutions because of their mostly low socioeconomic back-ground, which depends on the enrolments in public higher education institutions, which result in the high number of Malay students. All the students are studied engineering, specialising in different majors: electrical (31.64%), mechanical (27.12%), manufacturing (24.29%), and technology (16.95%).

Table 1. Demographic information

Measure	Items	Frequency	Percentage
Gender	Male	105	59.32
	Female	72	40.68
Race	Malay	150	84.75
	Chinese	14	7.91
	Indian	3	1.69
	Others	10	5.65
Major	Electrical	56	31.64
	Mechanical	48	27.12
	Manufacturing	43	24.29
	Technology	30	16.95

Source: own study.

Measurement model

In the first stage of assessment with the PLS-SEM method, we computed a measurement model. The internal consistency reliability for this study was established by measuring the composite reliability, instead of Cronbach Alpha. The composite reliability was more appropriate as it weighs in the indicator differential weights (Djikstra & Henseler, 2015) as opposed to Cronbach's alpha that takes into account the equal indicator of tau-equivalence. As for convergent validity, it was determined by the value of the outer loadings (should be more than 0.708) for the average variance extracted (AVE) to achieve at least 50% of the variance (Hair, Matthews, Matthews, & Sarstedt, 2017).

Convergent validity. In assessing convergent validity, the outer loading of each item was com-puted using the PLS algorithm function. Items below 0.70 were deleted (Hair *et al.*, 2014). The de-leted items were IC3, PE7, PE8, EB2, and KS4, which amounted to five items. The value of composite reliability and average variance extracted of all constructs had at least 0.800 and 0.500, respectively,

as required (Hair, Hult, Ringle, & Sarstedt, 2014). The results of internal consistency and convergent validity are shown in Table 2 below.

Table 2. Internal consistency and convergent validity

Variable	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Entrepreneurial behaviour (EB)	0.911	0.928	0.618
Idealised influence (II)	0.861	0.899	0.642
Individualised consideration (IC)	0.812	0.876	0.64
Inspirational motivation (IM)	0.864	0.902	0.649
Intellectual stimulation (IS)	0.851	0.894	0.627
Knowledge sharing (KS)	0.838	0.891	0.672
Psychological empowerment (PE)	0.883	0.911	0.632

Source: own study.

Discriminant Validity. The discriminant validity was tested with the Fornell-Larcker and Heterotrait-Monotrait ration of correlation criterions (HTMT), as suggested by Henseler *et al.* (2015). Three values were found to exceed the threshold of HTMT0.90, as recommended by Henseler *et al.* (2015). A plausible explanation for this could reside in the inability of respondents to discriminate against the differences among the four components of transformational leadership variables, especially idealised influence and intellectual stimulation. Hence, we may say that the data suffers from the higher limit of discriminant validity due to having passed the Fornell-Larcker criterion, but not HTMT0.90 (Vorhees, Brady, Calantone, & Ramirez, 2016).

Table 3. The Heterotrait Monotrait ratio of correlation (HTMT) criterion

Variable	EB	II	IC	IM	IS	KS	PE
EB							
II	0.498						
IC	0.683	0.748					
IM	0.551	**0.928**	0.816				
IS	0.663	0.828	**0.992**	**0.905**			
KS	0.663	0.363	0.599	0.41	0.597		
PE	0.641	0.476	0.494	0.491	0.476	0.519	

Abbreviation: EB=Entrepreneurial behaviour, II= Idealised influence, IC= Individualised consideration, IM= Inspirational motivation, IS= Intellectual stimulation, KS= Knowledge sharing, PE= Psychological empowerment
Source: own study.

Structural model

A bootstrapping procedure was conducted with 500 samples (Hair *et al.*, 2014). Analysis from the structural model shows that there are six supported hypotheses (H2, H4, H6, H9, H10, and H11), with one partially supported (H8). All the supported hypotheses achieved a t-value of at least 1.645, while the partly supported hypothesis H8 showed only a marginal t-value, close to the significant threshold. For the explained variance of the endogenous variable of knowledge sharing and entrepreneurial behaviour, both have a considerable R^2 value of 36.7% and 54.7%, respectively.

As for the effect size of f^2, all the supported hypotheses achieved a minimal effect size of 0.02, which can be concluded to have a small effect on the variable existence (Peng & Lai, 2012). Effect size depends on the threshold suggested at 0.02, 0.15, and 0.35, which depicted small, medium, and large effects, respectively (Cohen, 1988). All the non-supported paths show that the effect size is less than 0.02 in H5 and H7, which indicated the non-existence of effects with zero f^2 value. Except for H8 (partially supported), the effect size recorded the value of 0.013, slightly lower than the required 0.02. This hypothesis was justified by the value of its t-value, which barely passed the significance level.

As for the explained variance of R^2, the two endogenous variables had 36.7% and 54.7% explained variance, respectively. As recommended, the value of R^2 should be within the value of 0.67, 0.33, and 0.19, which can be considered as substantial, moderate, and weak, respectively. Hence, the value of 36.7% and 54.7% were deemed to be both moderate. Figure 2 below depicts the structural path, while Table 4 shows the results of hypotheses testing based on the structural analysis.
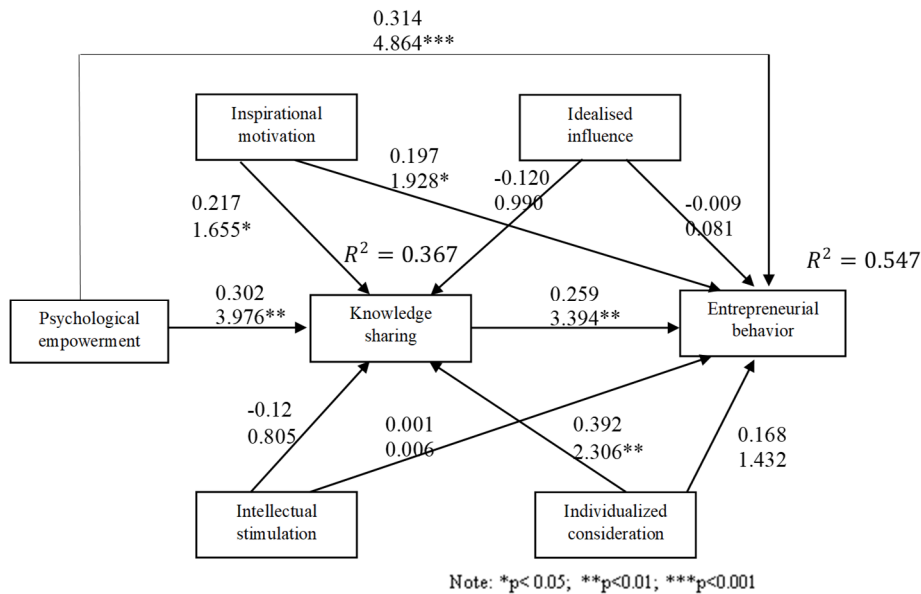
Figure 2. Results of structural analysis
Source: own elaboration.

Table 4. Results of the structural model

Hypothesis	β-value	f² value	t-value	P-value	Decision
H1: Idealised influence → knowledge sharing	-0.12	0.008	0.99	0.323	Not supported
H2: Idealised influence → Entrepreneurial behaviour	-0.009	0	0.081	0.935	Not supported
H3: Inspirational motivation → Knowledge Sharing	0.217	0.023	1.655	0.098	Supported
H4: Inspirational motivation → Entrepreneurial behaviour	0.197	0.026	1.928	0.054	Supported
H5: Intellectual stimulation → Knowledge sharing	-0.12	0.006	0.805	0.421	Not supported
H6: Intellectual stimulation → Entrepreneurial behaviour	0.001	0	0.006	0.995	Not supported
H7: Individualised consideration → Knowledge Sharing	0.392	0.055	2.306	0.022	Supported
H8: Individualised consideration → Entrepreneurial behaviour	0.168	0.013	1.432	0.153	Partially supported
H9: Psychological Empowerment → Knowledge sharing	0.302	0.112	3.976	0	Supported
H10: Knowledge sharing → Entrepreneurial behaviour	0.259	0.094	3.394	0.001	Supported
H11: Psychological Empowerment → Entrepreneurial behaviour	0.314	0.152	4.864	0	Supported

Source: own study.

Discussion

Based on the findings, we observed that six hypotheses were supported and one partially supported. The supported hypotheses are H2, H4, H6, H9, H10, and H11, while partly supported is H8. All the supported hypotheses have path coefficient, a β-value of at least 0.197, which is considered to have a substantial path strength towards its endogenous variable. The following discussion consider each of the variables tested in this study.

Idealised influence. Both idealised influence relationship to knowledge sharing and psychological empowerment were found to be insignificant with a β-value of -0.12 and -0.009, respectively. However, the relationship between idealised influence and knowledge sharing does have a degree of correlation but does not pass the threshold value of a significant level. Thus, we may deduce that the Malaysian population does not perceive the charismatic leader as crucial in sharing knowledge and

impacting entrepreneurial activities. The emotional bond created by idealised influence leaders is only perceived as external factors that make followers feeling contented with their work rather than having an impact on their knowledge sharing and entrepreneurial behaviour (Giltinane, 2013). Followers will not be affected by how leaders lay out plans on achieving goals, as these leaders are focused in their goals, oriented in executing plans, and persistent in their decision making as suggested by Gabel (2012). This sample of students seems to contradict the influence created by such leaders and hence, can be concluded that charisma and emotional attraction have no empirical evidence influencing follower's knowledge sharing and entrepreneurial behaviour.

Inspirational motivation. For the second domain of transformational leadership, the analysis discovered that inspirational motivation has a significant impact on knowledge sharing with a β-value of 0.217 and a t-value of 1.655. Similarly, entrepreneurial behaviour had a significant impact with a β-value of 0.197 and a t-value of 1.928. This is congruent with other studies that found the inspirational motivation to have a positive and significant effect on knowledge sharing (Han *et al.*, 2016). Moreover, followers are more motivated to exhibit positive behaviours as this study suggests (knowledge sharing) when their leaders serve as inspirers. Inspiration from leaders makes followers become more enthusiastic for achieving team directive goals through knowledge sharing. Entrepreneurial activities are considered to be an activity that makes people move outside their comfort zones. Having leaders that can inspiringly motivate makes individuals abandon shyness to participate in entrepreneurial activities, and we should remember that shyness is prevalent in the Malaysian context (Long *et al.*, 2014; Mittal & Dhar, 2015; Deinert *et al.*, 2015; Fauzi *et al.*, 2018a).

Intellectual stimulation. Leaders – meaning CEOs of companies that can stimulate subordinates – can induce employee's meaningfulness on their work (Peng *et al.*, 2016). For this study sample we found that intellectual stimulation does not have a significant impact on knowledge sharing and entrepreneurial behaviour with both β-value of -0.12 and 0.001, respectively. The previous study shows that intellectual stimulation does affect knowledge sharing (Al-Husseini & Elbeltagi, 2018). Thus, we may surmise that leaders who empower follower's intellect would induce creative ways in solving problems and discussing work issues openly (Deinert *et al.*, 2015; Carreiro & Oliveira, 2019). The insignificance of this study can be attributed to the fact that students do not require as much intellectual stimulation from other peers. Moreover, they might not value leaders in their team that have control or absolute power in determining the consequences of their entrepreneurial activities.

Individualised consideration. Individualised consideration was found to be significant for knowledge sharing with a β-value of 0.392 and a t-value of 2.306. Meanwhile, individualised consideration is found to partially support entrepreneurial behaviour. Leaders who mark high in individualised consideration would form a dyadic relationship with each follower individually (Herman & Chiu, 2014). The leaders understand followers based on their needs and requirements. Students in this sample would share their knowledge when leaders focus mainly on the individual. An individual would feel more appreciated and be disposed to share their knowledge as they feel they are unique to their leaders (Martin, 2017; Chen *et al.*, 2018). Meanwhile, entrepreneurial behaviour emerges as partially significant in this context due to the nature of entrepreneurial activity itself that would encourage them to participate in such activities.

Psychological empowerment. Psychological empowerment was shown to have a significant relationship to student's knowledge sharing with a β-value of 0.302 and a t-value of 3.976, which indicates a significance below the 0.01 level. The effect size of psychological empowerment also shows a strong effect with the value of 0.112. This supports the study by Houghton *et al.* (2015) who considered individual knowledge sharing based on the view "sharing is caring." Individuals who are empowered would develop a sense of confidence and build a trusting relationship; this will lead them to share their knowledge, in this case, entrepreneurial knowledge. Some entrepreneurial knowledge is considered to be tacit in its nature, as tacit knowledge is valuable to the beholder especially in entrepreneurial activities. Hence, with appropriate empowerment, one would have no qualm to share their tacit knowledge that is perceived as valuable and profitable.

On the other hand, the relationship of psychological empowerment on entrepreneurial behaviour was observed at the β-value of 0.314 and t-value of 4.864, indicating a much stronger correlation. The

effect size was recorded at the value of 0.152, thus indicating a strong effect. This study is consistent with previous studies that found a significant relationship between the two variables (Afsar *et al.*, 2016). Students will be more engaged in entrepreneurial behaviour when their leaders empower them. The meaning and impact a leader can have on an individual develops the latter's competence, resilience, and responsibility (Kang *et al.*, 2017; Houghton *et al.*, 2015; Jha, 2014).

Knowledge sharing. The explained variance of R^2 by psychological empowerment and the four components of transformational leadership on knowledge sharing value is 36.7%, which shows a substantial correlation from its antecedents. The relationship with entrepreneurial behaviour had a β-value of 0.259 and a t-value of 3.394 that supported the hypothesis. An effect size of 0.094 shows the medium effect of knowledge sharing on the model. Student's knowledge sharing behaviour indicates their willingness to participate in entrepreneurship activities. As undergraduate students have limited resources and are confined to campus communities, they must utilise every source of information and specific knowledge on what to do to generate income and ensure a smooth monetary inflow. Considering this, students who are active and viable in knowledge sharing would take the initiative to engage in entrepreneurial activities. In this regard, knowledge sharing shows to be a decisive factor for individual entrepreneurial activities as evidenced by other empirical findings (Hormiga *et al.*, 2016; De Clercq *et al.*, 2013; Castro *et al.*, 2019).

Entrepreneurial behaviour. As the dependent variable in this study, students' entrepreneurial behaviour is seen as the most sought-after skill required among future generations. The explained variance of R^2 was found to be 54.7%, indicating a high predictive power explained by the precedent variable. With seven hypotheses designed as seven exogenous variables on entrepreneurial behaviour, four were supported, one was partially supported, and two were rejected. This reveals that several variables are pivotal in ensuring that entrepreneurial behaviour among students is nurtured. For the transformational leadership domain, only inspirational motivation was significant in entrepreneurial behaviour, which suggests that students are only inspired to engage in entrepreneurial activities when leaders are seen as motivating individuals.

CONCLUSIONS

Students require effort from transformation leaders, especially in the context of Malaysia, where students embrace typical Asian characteristics, namely shyness, reticence, and modesty (Fauzi, Tan, Thurasamy, & Ojo, 2019a). Entrepreneurship activities require individuals to move outside their comfort zone and try new things. Therefore, to encourage individuals – especially in higher education institutions – internal motivation portrayed by psychological empowerment should be infused within group work. From this self-belief and significant impact of transformational leadership components, an individual would willingly share their knowledge and information on the entrepreneurial activities in which they are engaged. Next, the individual would be more inclined towards positive entrepreneurial behaviour.

Our study revealed that two out of four transformational leaderships show significant relationship (inspirational motivation and individualised consideration) to knowledge sharing and entrepreneurial behaviour. On the other hand, psychological empowerment emerged as a significant factor for knowledge sharing and entrepreneurial behaviour. Moreover, knowledge sharing is a significant factor in entrepreneurial behaviour. The result would provide an in-depth understanding that would enable the government and curriculum developers to infuse these factors in integrating entrepreneurial subjects in higher education.

As for the limitations of this study, we applied a cross-sectional approach, which only captures the behaviour of respondents within a certain period of time. While longitudinal studies are preferred, cross-sectional studies in higher education are sufficient as students' behaviour does not change drastically over the period of their undergraduate studies (Fauzi *et al.*, 2019b). On top of that, the same cohort of students registered in the same year reflects what they are expected to be at the time of their graduation. Moreover, all respondents were engineering students. Studying stu-

dents only from the field of engineering would provide information leaning towards technically in-clined respondents, for whom entrepreneurship requires more openness and good soft skills in com-municating with people. Our study might have engendered an alternative result if we considered students from other majors. Nonetheless, this study provides an understanding of how engineering students perceive entrepreneurship to be integrated into their engineering curriculum. Future stud-ies could assess students from other technical or analytical background such as medical and health field, actuarial science and architecture. Different technical background may end up differently due to the nature of the major.

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Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

The impact of industrial revolution 4.0 on international trade

Jan Rymarczyk

A B S T R A C T
Objective: The objective of the article is to examine the impact of breakthrough innovations, which make up the Fourth Industrial Revolution (4IR), on the volume and structure of international trade.
Research Design & Methods: The article is based on available literature and online sources. It is based on literature research, reports produced by a variety of research institutions, Internet sources, and desk research.
Findings: The application of core innovations of the 4IR will lead to substantial changes to the volume and structure of international trade. There will be a considerable shift towards services, while in terms of products, the goods which will gain in importance owing to digitalization will include primarily those whose costs have so far been high in transport, logistics, information, regulation, and transaction.
Implications & Recommendations: The implementation of 4IR's devices will change trade conditions substantially. First-movers will benefit the most, in line with the rule 'the winner takes it all.' Developed countries will enjoy the best competitive chances, given their advantage in terms of capital and technology. However, with falling trading costs and declining requirements in the trade's material infrastructure, small and medium-sized enterprises from developing countries will be able to increase their world trade share.
Contribution & Value Added: The article offers a comprehensive assessment of the potential impact of Industry 4.0 devices on international trade while identifying their quantitative, structural, and comparative effects on countries and enterprises. It outlines the barriers to the changes projected and to the needs that these changes necessitate.

Article type:	conceptual article
Keywords:	industrial revolution 4.0; international trade; digital technology; breakthrough innovations
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INTRODUCTION

Over the centuries, the most important generator of changes observed across economies of different countries has been technical progress (Rymarczyk, 2020; Upadhyay, 2019; Hradecka, 2019). It determines not only countries' internal processes of development but also their internationalization, which effects in the globalization of the world economy, especially in the context of catching-up economies (Paliokaite, 2019). Modern technologies and breakthrough inventions or innovations have altered the nature of production and trade enormously, both domestically and internationally (Młody, 2018; Świadek, Dzikowski, Tomaszewski, & Gorączkowska, 2019; Świadek & Gorączkowska, 2020; Gorączkowska, 2020). Thus, it shapes strategic options for managers in all sectors of national economies (Majerova, 2019; Pini, 2019), in particular promoting e-commerce and e-business (Leko Šimić, Biloš, & Mijoč, 2019). Their currently unfolding implementation – which involves the convergence of physical, digital, and biological spheres – is referred to as the Fourth Industrial Revolution (4IR). Its core instruments comprise the Internet of Things (IoT), artificial intelligence (AI), cyber-physical devices, 3D printing, blockchain, big data, cloud computing, nanomaterials, and synthetic biology (Sieja & Wach, 2019).

Some of them have already been put into practice, others remain *in statu nascendi*, while still others are being projected.

The changes that are projected to occur in international trade as a result of these technologies and innovations will entail the following: (i) a shift in the nature of trade, (ii) an increase in its volume, (iii) changes to its structure and to (iv) the impact of the comparative advantage factors of trade partners. Trade will become largely digital. We will see a considerable decline in trade costs, increased trade transparency and security together with a guarantee that contracts are performed reliably and goods and services are paid for. With falling costs and reduced information asymmetries, in particular small and medium-sized enterprises, virtual companies and entities from developing countries are likely to see their trade share grow.

In terms of the sectoral structure of international trade, it is predicted that the share of services will increase, while in terms of products, we will see a growing share of goods whose costs have so far been high in terms of transport, logistics, certifications, contracting and border crossing, along with an increase in digital goods or those with a high content of this component. Will such changes indeed take place in international trade? The logic of production and trade development influenced by technical progress suggests that these changes are very likely. However, they may unfold differently, owing to events that are now impossible to predict.

The current article offers a comprehensive assessment of the potential impact of Industry 4.0 devices on international trade while identifying their quantitative, structural and comparative effects on countries and enterprises (Androniceanu, Georgescu, Tvaronavičiene, & Androniceanu, 2020, p. 5). Moreover, the article outlines the barriers to the changes projected and needs these changes necessitate, including the implementation of measures aimed at removing these barriers. It is very likely that the international trade situation is going to develop as presented in the article, considering, among other things, that these changes have already begun, albeit in a fragmented manner. Still, we cannot rule out that unexpected events would not slow down globalization – along with international trade as its key instrument – such as the current coronavirus pandemic (Ratten, 2020) or a protective trade policy like the trade wars waged by the US President Donald Trump (Nwoke, 2020; Park, 2017).

The objective of the current article is to examine the impact of breakthrough innovations, which make up the 4th Industrial Revolution, on the volume and structure of international trade. In particular, I will attempt to determine what effect these innovations will have on international trade costs and how will they change the relevance of factors of comparative advantage for this trade.

The first section discusses the impact of new technologies on international trade costs, which are the most critical determinant of the volume and structure of trade. The next section addresses the changes likely to occur in the trade volume and its structure in terms of its sectors and products. The two following sections focus on the servitisation of international trade, and how the relative importance of the countries' comparative advantages changes for the trade, while the latter section is concerned with the barriers faced by trade digitalization.

RESEARCH METHODOLOGY

The current article is based on available literature and online sources. This is a theory development article, which relies on literature review and desk research (Rymarczyk, 2020).

This conceptual article derives research propositions from literature review and desk research of current business press papers, professional reports, company web pages, and blogs because this subject is relatively new in the theory of economics and international business. I searched through secondary literature with the combination of two screening terms: 'industrial revolution' or 'industry 4.0' and 'international trade.' Let me emphasise that many of these sources present similar perspectives, but the current article cites only the most relevant ones for further analysis.

To conclude, this article should be considered as a conceptual paper, in which literature review and desk research lead to the development of theoretical propositions. As for the scientific approach, this article uses a qualitative design of research, the method of indirect observation, cause-effect analysis, and predictive synthesis, modelling, induction, and description.

LITERATURE REVIEW AND THEORY DEVELOPMENT

The basics and theoretical considerations about the Fourth Industrial Revolution (4IR, Industry 4.0) have been widely discussed in the literature (Maciejewski & Głodowska, 2020; Rymarczyk, 2020; Ślusarczyk, 2018; Liu, 2017; Krykavskyy, Pokhylchenko, & Hayvanovych, 2019; Pisar & Bilkova, 2019). It seems that it is now high time to undertake a more in-depth analysis according to selected themes. As mentioned above, the overall literature review and theory development is divided into five analytical thematic areas. The first analytical section will discuss the impact of new technologies on international trade costs, which are the most critical determinant of the volume and structure of trade. The second analytical section will address the changes likely to occur in the trade volume and its structure in terms of its sectors and products. The third analytical section will focus on the servitisation of international trade, while the fourth will show how the relative importance of countries' comparative advantages changes for the trade. The fifth analytical section will concern the barriers faced by trade digitalization.

The Impact of Breakthrough Technologies on International Trade

Digital technologies make the costs of the cross-border trade decrease (Ismail, 2020). These costs are made up of information, transport, logistics, border-crossing, transaction costs, and costs linked to trade policies. A smooth and inexpensive flow of reliable information will facilitate the search for products, services and their most optimal manufacturers. Furthermore, it will be easier to establish contact with manufacturers, to verify their reliability and quality of their products, to conduct trade negotiations and sign contracts, to transport, store, and tranship goods, to provide cross-border clearance and make payments.

The key issue is to acquire information on markets and potential partners for exporting or importing goods, on current custom provisions, standards required in a given country, and consumer preferences. Online platforms play an enormous role in providing this information and in establishing contacts between exporters and importers, manufacturers, and consumers. The platforms help to overcome the barrier of information asymmetries as regards the quality of goods and reliability of their providers, thus increasing trust and confidence between partners. A great number of platforms act as intermediaries between buyers and sellers, ensuring that delivered products will be exactly as described, in addition managing buyers' claims and protecting them against rogue sellers (Tan, 2017, p. 8; Linz *et al.*, 2017, pp. 12-26; WTO, 2018, pp. 72-77; Manyika *et al.*, 2016, pp. 31-36). Online ratings of buyers' and sellers' recommendations – including their interactions through feedback – contribute to the greater confidence and growing number of users of these platforms. These features in consumers behaviour allow to achieve essential competitive advantages despite of distance in global environment (Hu, Ocloo, Akaba, & Worwui-Brown, 2019; Nwabueze & Mileski, 2018). With the communication cost declining, numerous small and medium-sized enterprises will play a bigger part in international trade, and so will individual entities from developing countries. Their share in trade will grow along with the number and popularity of online platforms. Price transparency and product information will toughen competition between sellers to the benefit of consumers. Global online platforms, such as Google, Amazon, Facebook, Apple (the so-called GAFA), Alibaba, eBay, Flipkart, and Route connect sellers and buyers worldwide (Weber & Gneuss, 2017, pp. 6-7). For instance, Facebook's active user base boasts as many users as China's population, i.e. about 1.4 billion (Manyika *et al.*, 2016, p. 33). With transaction costs reduced, their greater transparency and easiness with which one can obtain information, the online platforms are becoming the largest and most effective markets for the global trade. Major transnational corporations create their own e-commerce and innovation platforms, which make up the components of the international business environment (Grochal-Brejdak & Szymura-Tyc, 2018).

International flows of goods and services are mostly conducted under intra-corporate supply chains. In this respect, the operations between the parent entity of transnational corporations and their branches require perfect coordination and monitoring. For these corporations to be managed effectively, it is crucial to have information flowing between them and terminal operators, shippers,

carriers, custom brokers, insurers, and many other entities involved in these processes. Without modern information and communication technology (ICT) devices (Lechman, 2018; Lula *et al.*, 2019; Kavcakova & Kocisova, 2020) – especially the Internet of Things, big data, and cloud computing – their smooth operations and development would not be possible, while the interconnection costs would be several times higher (Gravili *et al.*, 2018; Dima & Maassen, 2018).

What continues to be a major barrier for international trade is transport and logistics costs. Despite having applied such innovations as containerization, multi-modal transport, logistics centres, GPS, and modern means of transportation, these costs still account for the largest share of overall trading costs. What should bring a substantial cost reduction in this area is the implementation of the following innovations: robotisation, artificial intelligence, the Internet of Things, and 3D printing. Combining intelligent robots with the Internet of Things will enable firms to optimize routes for cargo flows, further allowing for tracking, adjustment, and selection of sites for warehousing and transhipment. The latter two operations, along with packaging and co-packing, can be fully automated. However, a true game changer in transport will be self-driving cars. Not only will they be cheaper, but they will also be safer, faster, and more punctual. This will be of major relevance for transporting time-sensitive goods (e.g. consumer goods) or for supply chains, particularly those based on a just-in-time system.

Furthermore, the future costs of transport and logistics might prove to be overall significantly lower thanks to 3D printing technology, which allows firms to locate final production lines in close proximity of consumers. Products could be manufactured in one place, partly based on successive production stages controlled by algorithms. This should reduce the number of subcomponents and components that require transfer within supply chains, hence reducing the volume and frequency of cargo to be transported. Choosing a production location in developing countries because of their low labour costs will no longer be a factor determining the geography of value chains (Wyciślak, 2017; Pohlova, Smutka, Laputková, & Svatoš, 2018). This will be further reinforced by automation, robotisation, computerisation, and the application of artificial intelligence in manufacturing. Transnational corporations (TNC) are currently relocating a bulk of their fragmented production from developing countries back to their homelands. Furthermore, manufacturing goods in places where they are to be sold will meanwhile allow firms to avoid customs and other barriers and border crossing costs (Strange & Zucchella, 2017, p. 178; Leering, 2017, pp. 20-22; OECD, 2017, pp. 20-21). The time needed for production and delivery of products to consumers will also be reduced, with the option of having the products tailored to individual consumer needs.

Electronic systems using the Internet of Things (IoT) and Blockchain can contribute to the reduction of costs that arise from having to document transactions compliance with applicable custom provisions and custom procedures, but also sanitary, veterinary, and phytopathological standards, environmental protection regulations, quality standards, and regulations regarding product licensing, origin, and authenticity. Moreover, automated online translation systems will remove language barriers. These regulations and standards vary across nations and are subject to changes depending on the objectives of current trade policies. By providing effective and automated data management, i.e. their adequate collection, selection, and processing, firms will be able to avoid redundant procedures, conflicts of laws, and claims, while making it easier to detect fraud and abuse; as a consequence, there will emerge a faster, more transparent, and safer transfer of goods across borders. Smart contracts will allow automatic payments and the customs, verification, and certification of procedures. E-commerce platforms and mobile banking have already been facilitating cross-border payments (Ganne, 2018, pp. 30-55). The payment systems installed on online platforms such as American Amazon Pay, PayPal, and Chinese Alipay allow firms to avoid the infrastructure of correspondent banks, thus saving time and costs. However, the future belongs to Blockchain (Nowiński & Kozma, 2017). Smart contracts will ensure automated payments, eliminating bank intermediation costs and currency exchange costs. A controversial issue is whether payments will be made in cryptocurrencies; if so, this would further contribute to lowering financial transaction costs. This will depend on a number of factors, including monetary policies pursued by different countries, whether cryptocurrencies will be adopted as a means of payment, and whether their value will stabilize; cryptocurrencies have so far shown extreme volatility (Brown & Whittle, 2020).

The significant reduction of costs involved in obtaining information, searching for and contacting trade partners, concluding and recording transactions, and – crucially – the costs of goods delivery should

all have a major impact on the volume of global trading. It is not only current exporters and importers that will be able to increase their share in cross-border flows; new exporters and importers are likely to emerge for whom the costs used to represent a barrier, a threshold marking their ability to enter international trade. These will predominantly be – as already stated above – small and medium-sized enterprises, entities of different sizes, from developing countries, emerging markets, and individuals.

Changes in the Volume and Structure of International Trade

The broad application of digital technologies resulting in cost reduction engender an increase in the volume of trade while altering its structure (Ismail, 2020). Trade in some goods will increase, decline in others, while still other goods will gradually disappear, a process that is partly already happening. We will see an increase in trade in goods whose costs are higher in terms of transport, logistics, information, regulations, and transaction (WTO, 2018, pp. 88-92). Trading in time-sensitive goods – that is, intermediate goods transferred within supply chains – will therefore expand and so will perishable consumer goods. Greater transparency of trade and easier identification of products will reduce costs driven by the need of certification, which should contribute to certification-intensive goods having a bigger share in trade.

The same effect should be noticeable for goods with information- and transaction-intensive costs. Reduced information asymmetry through online platforms, elimination of transaction intermediaries, automated transactions and payments conducted with Blockchain technology can secure a larger trade share of contract-intensive goods.

Trading in information technology goods will show an upward trend. What will grow is the trade of information carrier hardware, smartphones, tablets, mobile phones, and other devices with large knowledge content, along with those involved in the installation of modern technologies like sensors, cameras, or liquid crystal displays (Lula *et al.*, 2019).

Traditional goods to which a digital component will be added (digital wrapper) can have a promising future. Classic examples here are driverless cars which are already at a testing stage, robots equipped with artificial intelligence, smart houses, clothes, shoes, and the radio-frequency identification technology (RFI), which enables transport routes to be tracked, monitored, identified, and adjusted. Digital components are also applied in equipment designed to increase warehousing efficiency (Lund & Manyika, 2016, pp. 4-5; Melzer, 2016, p. 37).

A series of modern technologies such as the IoT, cloud computing, big data, 3D printing, and online platforms will shape the volume and share of customized products in the global trade structure. The greater supply of more diversified goods should correspond to the greater demand for goods satisfying consumers' individual preferences (WTO, 2018, pp. 91-92). This process is explained by theories of demand and supply in international trade, i.e. the similarity of preferences theory, the product diversification theory, and the intra-branch trade theory (Rymarczyk, 2012, pp. 117-120). Collecting and computing big data in the 'cloud' allow for infinite amounts of elements that shape consumer taste to be classified and used in mass customization. On the other hand, flexible production systems using reprogrammable robots allow for the manufacturing of small batches or even individual items. What will prove to be of major importance for mass customization is 3D printing – i.e. the manufacturing of personalized products in the vicinity of consumers – which relies on algorithms obtained through the Internet. This production will ensure the high quality of products, close fit to consumer needs, and low transportation and production costs. This means that the majority of costs involved in international trade will be eliminated, which will certainly positively affect its volume. This will also entail a change in trade structure, because we will witness the partial elimination of the transport of intermediate goods, alongside value chains and finished products. On the other hand, the flows of raw materials and components are likely to increase, not unlike the equipment needed for the production based on the 3D system, should this equipment be unavailable on site.

Meanwhile, an opposite trend will become evident for a series of digitalizable goods. Trade in such goods as books, brochures, music stored on CDs, DVDs, and video cassettes, maps, postcards, journals, newspapers, and videogames will decline. The physical form of these goods is increasingly replaced by download services such as e-books, e-films, e-journals, and online games.

What could also impact the cross-border transfer of finished products is the sharing economy (WTO, 2018, pp. 95-97; Lopez-Gonzalez, 2017, pp. 15-16). With transportation services becoming ever more user-friendly and inexpensive, households are likely to feel dissuaded from buying new cars. On the other hand, what could create new streams for demand are models of hybrid vehicles that are environmentally friendly, equipped with software and hardware as well as driverless cars.

One could also expect the share of small shipments of minor value to grow within the structure of international trade. High trade costs rendered their cross-border transfer uneconomical. By reducing these costs significantly, digital technologies will remove the major barrier that small and medium-sized enterprises face when trading in relatively small quantities of goods, including born global companies and those from developing countries and emerging markets. The emergence of new players will drive the expansion of the international trade volume while considerably reshaping its structure.

The Servitisation of International Trade

Digital technologies will reduce the costs of cross-border transfer of not only goods but also services to the extent that they will even determine the provision of services in that they will remove the need for spatial proximity between providers and consumers (Ismail, 2020). In parallel with the steady growth of their volume and share in the creation of a global product, their importance and share in international trade will rise considerably, too. The servitisation of economic flows across borders will emerge in the wake of the development of the digital structure, thus enabling their electronic online delivery. Numerous services are already provided through Voice over Internet Protocol, e-mails, and online platforms, which allow companies from different countries to use their comparative advantage (WTO, 2018, pp. 80-86). Through communication networks, services can be provided regardless of distance, including sale, marketing, legal, financial, insurance, IT (information technology / information and communication technology), computer, technical, and other services involved in assisting transactions of international trade, as mentioned above. In this area, their share has been growing more rapidly than that of traditional services such as transport and travelling, which also employ digital services. The application of telerobotics will allow medical services (surgery, mental therapy) to be conducted from a distance; unlike today, when they require face-to-face contact. This contact could be replaced by telepresence, or a virtual presence in a space other than where the physical person is actually located. This type of digital services is already happening in a variety of activities such as business, science, and culture. Using this technology, managers from the parent entity of transnational corporations can supervise their foreign branches or monitor what happens in their offices while they are away. Digital technology supports the development of e-learning and the remote provision of knowledge in the form of courses for tens of millions of people globally (Ratten, 2020).

Moreover, major importance, and one that is on the rise, is being gained by non-standard broker services enabled by online platforms and delivered to individual clients. These services cover such areas as accounting, auditing, advisory, management, programming, designing, testing, analysing, and marketing. They can be conducted largely autonomously, by using artificial intelligence, the Internet of Things, and other revolutionary devices. Managing assets, liquidity, and fixed assets with modern technologies (wealth tech management) is becoming an alternative that grows rapidly in relation to traditional services for wealth management (Axxsys, 2018, pp. 5-7). Robo-advisers are enjoying a growing popularity in technical, legal, and financial services, including pension and insurance funds, venture capital, private equity, and hedge funds.

It is estimated that 50-70% of stock-exchange trading in the USA and 20-40% in Europe bases on algorithms, which means that orders are transacted via electronic platforms in the form of specific computer automated algorithms that contain relevant instructions and speedily respond to changing security prices and other transaction conditions. This is referred to as high-frequency trading conducted between intelligent robots (Woodward, 2017, p. 11).

Online platforms using digital technologies play a part in the development of peer-to-peer services; in other words, they provide access to services via mobile applications, thus allowing for direct contact to be established between providers and recipients of service. They reduce the costs involved in having to search for partners, their communication, and they assure that the service will be performed. This

is the above-mentioned sharing economy, which is quickly becoming more ubiquitous, primarily in transportation services (Uber) and accommodation (AirBnB).

Shifts in the Relative Importance of Comparative Advantage Factors for Trade

Classical, neoclassical, and modern theories of international trade offer a detailed analysis of what gives rise to its development, emphasizing the importance of differences between individual countries in terms of how they are equipped with material and nonmaterial factors. Traditional factors that determine whether a particular country has comparative advantage include labour, capital, and land: raw materials, climate, natural environment, and arable land. The 4IR's groundbreaking technologies will dramatically reshape the relative importance of these factors. A critical role will be played by capital resources, both physical and human, i.e. knowledge and its application. The research and development (R&D) costs involved in designing, manufacturing, testing, and implementing innovations are huge. Although the importance of start-ups is paramount to innovation, the complex process needed for an innovative idea to be realized and then commercialized remains largely in the hands of transnational corporations whose capital affords them comparative advantage. This is evident in the fact that the 4IR was actually launched by transnational corporations (TNCs) in Germany and is being further advanced by major corporations in other world economic powers. However, this suggests that the technological gap between developed and developing countries might widen.

Represented by digitalization, automation, and robotisation, the advanced technology applied in production and services will diminish the relevance of comparative advantage represented by cheap labour, whose large resources are available in developing countries. According to a UNCTAD and World Bank report, two-thirds of workers in developing countries will lose their jobs over the next two decades due to digitalization, automation, and reshoring (Kozul-Wright, 2016, p. 1). On the other hand, the importance of the comparative advantage of highly skilled workers will grow, especially with respect to workers whose skills are complementary with the new technologies (Aepli *et al.*, 2017, pp. 34-37). The appropriate demand for highly qualified workers able to serve new technological processes has been a problem in hiring and retaining skilled employees in recent years, especially in developing countries (Bilan, Mishchuk, Roshchyk, & Joshi, 2020).

The countries' comparative advantage generated by well-developed physical infrastructure of trade – like ports, railways, terminals, custom clearance facilities – will lose the importance it has today, owing to the digitalization of cross-border flows, with the exception of telecommunication and energy infrastructure. The latter will be essential in the development of digitally intensive sectors of economy and commerce. Communication networks, computers, data centres, and in particular the production of bitcoins requires massive amount of energy.

The extremely important factor of comparative advantage – which is a large market size – will only grow in significance in the era of digitalization. In digitally-intensive sectors, the economics of scale and scope are primarily associated with access to a possibly large information base, ensured largely by having a big domestic market, as compared to markets in smaller countries (Agrawal, 2019, pp. 468-471).

Trade digitalization is expected to raise the comparative importance of countries with strong institutions and good regulations. Yet other factors that contribute to winning advantage in trading are correct, clearly worded, and legally stable regulations, together with adequate regulations in such areas as taxes, environmental protection, contracts for financial flows, intellectual property protection, personal data protection, web content privacy, and strong institutions capable of effective and prompt enforcement of law. Coupled with government policies aimed at supporting the Fourth Industrial Revolution, these elements are part of a set of factors that are the driver of comparative advantage in international trade enjoyed by developed countries when viewed against developing countries (Androniceanu, Kinnunen, & Georgescu, 2020, p. 12).

Moreover, in mid-term perspective, demand for oil and gas will be to the benefit of those developing countries and emerging markets that have abundant mineral reserves, in particular oil and gas. In long-term perspective, renewable energy is likely to become widespread, along with new methods of its generation. Meanwhile, demand for other mineral resources is likely to decline as new technologies will make a closed-circuit production and recycling of potential waste largely feasibility.

Barriers to Digital International Trade

The implementation of the 4IR devices in international trade encounters multiple barriers that will certainly fail to impede the revolution's progress, as has been demonstrated by previous industrial revolutions.
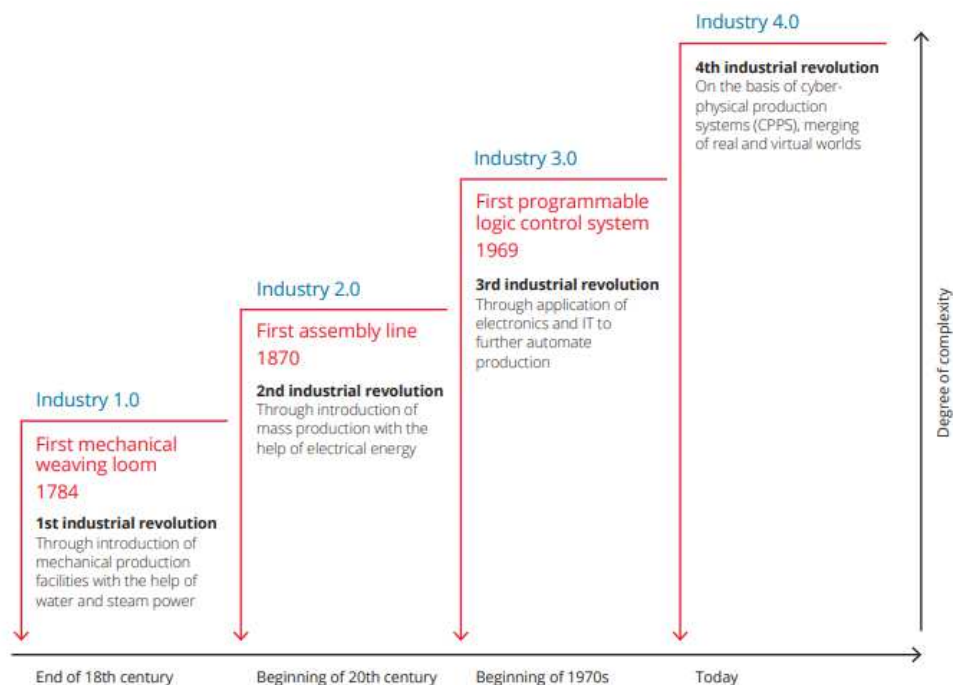
Figure 1. Industrial revolutions in the global economy between eighteenth and twenty-first century
Source: Gallagher *et al*. (2017, p. 6).

Still, the barriers may hinder and slow the revolution's advancement. These barriers include the following (Schwab, 2016, pp. 2-8; PwC, 2014, pp. 36-37; European Commission, 2019, pp. 20-21):

− technical barriers involved in developing and putting the most viable inventions into practice;
− high R&D costs and those of producing digital devices;
− insufficient resources of adequately skilled workers who could cooperate with one another and operate modern devices;
− traditionalism, conservative attitudes, and apprehension about risk on the part of top management;
− the lack of standards, norms, and possibilities to certify digital devices;
− the lack of adequate data network security and the risk of cyber-attacks and piracy in trading;
− the risk of redundancy in IT/ICT departments of commercial companies;
− uncertainty as to the projected economic effects of technologies to be installed;
− workers' and trade unions' concerns and protests over possible job losses in result of 'machines' replacing the workforce.

The obstacles encountered in trading in modern technologies will also be linked to countries' regulatory frameworks. Pressured by business lobbyists, governments could make decisions restricting foreign competition in multiple ways. Pursuing strategic trade policy – one that fosters 'national' champions – may lead to erecting import barriers to goods produced with 4IR technologies and to digitally-intensive products. Moreover, the cross-border flow of sensitive data could be blocked, as these might be taken advantage of by foreign competitors from the digital industry. Furthermore, this type of information may pose a threat to state security, or it may breach privacy and violate access to government information pertaining different areas of the state economy such as finance, healthcare, taxes, or education. These restrictive regulations find their justification in aims pursued by public policy, i.e. protecting privacy against cyber-attacks and safeguarding consumer interests and intellectual property rights. However,

these measures might sometimes be masking a pursuit of trade protectionism. One could illustrate the regulatory barriers to digital trade with the following examples (Ciurlak & Ptashkina, 2018, pp. 6-8):

- discriminatory provisions on online sale or a ban on online sale;
- restricting foreign companies in their access to electronic platforms or digital service provision;
- deploying web filtering and blocking;
- restricting online advertisements;
- restricting online payments;
- implementing national standards and requiring registration and testing of 4IR devices;
- the requirement of waiving patent rights, giving up trade secrets, source codes, and technological mandates;
- the inadequate protection of patent rights, copyright, and trade secrets;
- software piracy;
- the requirement of cooperation with local entities (e.g. by establishing a joint venture);
- tariff and non-tariff barriers to ICP products;
- restricting participation of foreign companies in government tenders in such areas as telecommunication and software provision.

What will be of utmost importance for the digital development and removal of regulatory barriers will prove to be international cooperation, the integration of regional groups, and actions taken by such world organizations as the World Trade Organization, the Organization for Economic Cooperation and Development, the International Labour Organization. They already are undertaking measures in this sphere by framing and publishing a variety of guidelines and recommendations. However not binding in nature, these documents merely promote 'good' practices among countries active in digital trade. Still, given that individual countries vary in the extent of their involvement in digital trade – not infrequently with divergent interests – we should not expect a prompt solution to the major issues concerning cross-border digital trade, especially with the future of this trade facing so many uncertainties (OECD, 2017).

CONCLUSIONS

Trade openness has a positive impact on exports and imports (Loganathan, Karakunnel, & Victor, 2020). The digital revolution, referred to as the Fourth Industrial Revolution – whose advent is generally believed to have come with the early twenty-first century – will change the nature and forms of manufacturing processes and trade in goods and services. Globalization and regionalism are making them ever more international. This means that goods and services are becoming more complex and more costly in their realization. We may safely assume that the modern technologies and devices will play a critical role in overcoming these barriers to the development of global economy. The vast number of these devices – including computers, the Internet, and mobile phones – was already in use during the Third Industrial Revolution; what we are witnessing now is their further development. Other inventions – including the Internet of Things, cloud computing, big data, artificial intelligence, 3D printing, augmented reality, Blockchain, nanomaterials, and synthetic biology – are at the stage of advanced research, with their experimental use about to be tested in practice. These innovations are expected to significantly impact the growth of world trade volume, also leading to a decline in its costs and information asymmetry, besides shortening the time needed for transaction completion and the delivery of goods and services. The digital era will see the international transfer marked by reliability, punctuality, security, the elimination of losses caused by errors and fraud, along with a high guarantee that payments will be made.

We will also witness substantial changes to the structure of world trade. First and foremost, the growth trend of services will accelerate, including services that in the past could not be delivered from a distance, as they required face-to-face contact such as medical, design, advisory, control, monitoring, and education services. The Internet of Things, online platforms, smart devices, Blockchain, and other instruments within the digital infrastructure will greatly simplify the contact between producers, exporters, importers, and consumers by establishing mostly automated transactions.

For the commodity structure of trade, the share of those goods will grow, which require high transport and logistics costs, but also time-sensitive, certification-intensive, and contract-intensive goods. Moreover, a growing trend will be evident in the trade of information technology goods, but also of those with an added digital element, which will lead to the blurring of differences between a good and a service.

A number of new technologies – most notably 3D printing – will make goods much more diverse and customizable. Manufacturing 'on site', or close to market outlets, will substantially diminish the importance of intermediate production stages and trade – i.e. offshoring and offshore outsourcing – to the benefit of reshoring, which in turn, will downplay the importance of global value chains.

We are already witnessing a decline in the trade share of goods defined as fulfilling the digitalization criteria, recorded on CDs and DVDs in favour of their digital equivalents.

The declining trade costs and diminished relevance of trade's material infrastructure may considerably increase the share of small and medium-sized companies and of developing countries, provided that they develop their digital infrastructure and introduce regulations that will facilitate this commerce.

The above presented trends in the development of international trade are speculative in their nature and draw on the observations and logical analysis concerned with the impact of technical progress on the patterns of manufacturing and international trade in the past and today.

The implementation of the 4IR devices will change trade conditions substantially. First-movers will benefit the most in line with the rule, 'the winner takes it all.' Developed countries will enjoy the best competitive chances given their advantage in terms of capital and technology. However, with falling trading costs and declining requirements for trade's material infrastructure, small and medium-sized enterprises from developing countries will be able to increase their world trade share. However, this will still depend on their capability to implement digital technology (Vlados & Chatzinikolaou, 2019). In this area, developing countries should be able to receive substantial support from their governments and local authorities, but also international organizations.

The literature has made attempts at using econometric models and computer simulations to evaluate the quantitative impact of the 4IR on the growth and composition of world trade. For example, some project that its volume will grow by two percent by 2030, with the service share seeing an increase from 11% to 25% (WTO, 2018, pp. 18-117). However, a different development scenario is also possible. Unpredictable events such as natural disasters, pandemics (e.g. coronavirus), physical and cyber warfare, climate disturbances, and government policies may result in the reversal or a major slowdown of globalization processes, hence of world trade as one of the key components of globalization.

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Conflict of Interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Cultivating entrepreneurial culture among students in Malaysia

Zubair Hassan, Muneeb Khan Lashari, Abdul Basit

A B S T R A C T
Objective: The objective of the article is to examine the factors influencing the cultivation of entrepreneurship culture among private higher education institutions in Malaysia.
Research Design & Methods: A sample of 300 students from private higher education institutions in Cyberjaya, Malaysia, was selected using a convenient sampling technique. The data were analysed using structural equation modeling via AMOS, 22.0.
Findings: The result of the study indicates that empowerment is the only factor that has a positive and significant effect on cultivating entrepreneurial culture. We found that all other factors have no significant effect on cultivating entrepreneurial culture in the studied context.
Implications & Recommendations: This study will enable education institutions to foster the entrepreneurial spirit among their students by focusing on empowering the students to carry out their tasks. This study recommends empowering students in their learning to promote entrepreneurial culture through the curriculum, assessment designs, and industrial engagement.
Contribution & Value Added: This study contributes to the existing literature on promoting entrepreneurial culture among students by establishing the key determinants of entrepreneurial culture through risk-taking behaviour, innovation, creativity, and empowerment. One of the unique aspects of this research is that these four factors are studied together and tested based on what academic institutions in Malaysia do to cultivate entrepreneurial culture among the students.

Article type:	research article
Keywords:	entrepreneurial culture; creativity; risk-taking behaviour; empowerment; innovation
JEL codes:	O15, P47, Q01, Z12

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INTRODUCTION

The growing awareness and demand for small and medium-sized enterprises – along with the importance of entrepreneurial activities – has triggered the research on entrepreneurship among scholars due to the significant effect of entrepreneurial activities on economic developments (Block, Fisch, & Van Praag, 2017). In the past, some argued and debated on various issues associated with entrepreneurship, mostly how entrepreneurs impact 'job creation, healthy competition, economic growth, promotion of an 'inclusive' society by creating chances for people who have difficulties finding jobs and, last but not least, innovation' (Block *et al.*, 2017, p. 61). Many developed and developing countries have allocated and spent vast amounts to promote and cultivate entrepreneurship culture (Acs *et al.*, 2016). Governments like Malaysia formulated policies to cultivate entrepreneurship through education, access to finance, and business transfer facilities by subsidising entrepreneurship to decrease fear of failure and encourage innovation (Ariffin, Baqutayan, & Mahdzir, 2018).

Today, we see that entrepreneurial culture is a catchy concept promoted by scholars and governments to motivate economic growth and tackle unemployment issues (Van der Westhuizen,

2017). Entrepreneurial culture is seen as an important contributor to the success of the country, so organisations – especially academic institutions – educate and train future generations to become entrepreneurs (Henry, Hill, & Leitch, 2017). Entrepreneurial culture was emphasised and promoted to generate income through attitude, values, skills and power of groups who work in an organisation (Danish, Asghar, Ahmad, & Ali, 2019). Many argued that organisations with strong entrepreneurial culture have a high propensity to achieve growth and success (Kang, Matusik, Kim, & Phillips, 2016; Danish *et al.*, 2019). However, the meaning of the concept is neither well-defined nor constituted properly enough to foster entrepreneurial culture (Malecki, 2018). In Malaysia, it is evident that entrepreneurship culture was promoted to reduce or eliminate some of the significant social issues such as drug trafficking, crime, violence, and sexual offense among the youth (Kadir & Merican, 2017). The launch of Malaysian Social Enterprise Blueprint 2015-2018, a three-year-long strategic plan for developing social enterprises through the formation of MAGIC SE to mandate social-economic growth in Malaysia with a fund of RM 20 mln was one of the initiatives to cultivate entrepreneurial culture (Malaysia Social Enterprise Blueprint, 2015). Another foundation was the Social Enterprise Alliances Malaysia (SEA) under MAGIC SE, with its own incubating program that fosters connections between social entrepreneurs and industry experts (Punadi & Rizal, 2017).

Therefore, the role of education institution plays an important role in cultivating entrepreneurial culture among students. Students who graduated from these institutions tend to become entrepreneurs that solve social and other developmental issues of the country's economy (Bergmann, Geissler, Hundt, & Grave, 2018). In the past, academic literature reported that academic institutions promote entrepreneurial culture through empowerment, by encouraging students to engage in risk-taking behaviours, and through various academic projects, networking, industry-based training, and related curriculum activities (Klofsten, Fayolle, Guerrero, Mian, Urbano, & Wright, 2019). In terms of research, there was an increasing number of entrepreneurial research to legitimate research domain of entrepreneurial culture, about which many believed that lacks a theoretical foundation (Amina & Zohri, 2019). Maroufkhani, Wagner, and Ismail (2018) argue that entrepreneurial cultural research is lacking in depth and inclusion of such research as a 'novel' area. Such novel areas of entrepreneurship research face the underdevelopment of concepts (Cavallo, Ghezzi, & Balocco, 2019). Moreover, entrepreneurial cultural concepts are often challenged because of the changing demands of society and economy (Lange & Schmidt, 2020). Since the entrepreneurial culture concept is still considered new in the field of entrepreneurship research, there are many opportunities for future research (Nikolova-Alexieva & Angelova, 2020), and so, we identified many research and knowledge gaps.

The entrepreneurship field never covered well in the past how factors such as risk-taking behaviour, creativity, innovation, and empowerment motivate institutions to cultivate entrepreneurial culture (Ahmetoglu, Akhtar, Tsivrikos, & Chamorro-Premuzic, 2018). Thus, studying how cultivating risk-taking behaviour, innovation, creativity, and empowerment among students is considered to be one of the most rewarding research areas in the study of entrepreneurship (Müller, 2016). This is the research gap that can particularly be observed within the area of entrepreneurial culture and, therefore, many researchers propose to focus more on internal factors that promote entrepreneurial culture (Nikolova-Alexieva & Angelova, 2020). The capacity to promote entrepreneurial culture should be counterbalanced with all other perspectives that consider the context of research and integrate cultural approaches (Danish *et al.*, 2019). Zollo, Laudano, Ciappei, and Zampi (2017) argue that factors which foster entrepreneurial culture are in many ways similar to commercial entrepreneurship.

From the methodological point of view, several gaps and limitations exist in previous research related to entrepreneurial culture due to the recent development of the concept (van Ewijk, 2018; Ratten, 2019). Firstly, research related to entrepreneurial culture remains largely descriptive and theoretical (Wennberg & Anderson, 2020). The literature review by Fritsch and Wyrwich (2018) shows that scholars engage in writing conceptual articles compared to empirical studies. Secondly, most past empirical studies on entrepreneurial culture lack rigorous methods (Fritsch & Wyrwich, 2018; Spigel, 2018). Thirdly, research on fostering entrepreneurial culture relies on various definitions and perspectives, which hinders comparisons among studies from the past (Letaifa & Goglio-Primard, 2016). Fur-

thermore, most research on entrepreneurial culture positions itself primarily in the public and governmental sector (Demircioglu & Chowdhury, 2020). To overcome this, our study will be conducted among students who study at private higher education institutions (PHEIs) in Cyberjaya, Malaysia, and will examine student perception of whether academic institutions really promote entrepreneurial culture rather than just including an entrepreneurial curriculum.

Another relevance of this study would be for government policymakers and entrepreneurship practitioners. From a political standpoint, they might be able to promote entrepreneurial culture indirectly, by intervening in curriculum development and academic assessment or projects that students might undertake while studying. Moreover, this study can be of value to practitioners and business incubators in their efforts to scout, finance, and promote high-potential innovative start-ups. Furthermore, that that allocate their resources to empowering students. Therefore, this study addresses the gaps in research through the presentation of empirical evidence, particularly from Malaysia. We compiled the recent academic debates and reviews done through publications on initiatives that an academic institution can take to cultivate the entrepreneurial culture among students (Wu & Zhu, 2017). Our research question is the following: Does risk-taking behaviour, encouraging innovation, creativity, and empowerment constitute entrepreneurial culture among students of PHEIs in Malaysia?

To address the current research gaps discussed above, this research aims to examine the factors affecting the fostering of entrepreneurial culture among students in higher education institutions in Malaysia. To achieve this, this study sets the following objectives that will examine the effect of (1) promoting risk-taking behaviour, (2) encouraging creativity, (3) supporting innovation, and (4) empowering students at PHEIs in fostering entrepreneurial culture.

The structure of this paper is as follows. Firstly, we briefly discuss the relevant literature on the hypothesised relationship between entrepreneurial culture and (nascent) entrepreneurship. Next, we describe our empirical research method and the data we use. We then present the regression results and discuss their outcomes. Finally, we present our conclusions, discuss the limitations of our study, and make suggestions for future research.

LITERATURE REVIEW

The concept of *entrepreneurial culture* refers to an organisational culture embodying and upholding entrepreneurial attributes and characteristics (Genoveva, 2019). In the past, entrepreneurial culture was defined as entrepreneurial attributes, values, and mindset (Brownson, 2013). To foster entrepreneurial culture, some propose the requirement of a mindset that craves for innovation, creativity, and risk-taking (Blideanu & Diaconescu, 2018). Furthermore, entrepreneurial culture is seen as an element of national culture that facilitates the success of economic growth (Valliere, 2019). Entrepreneurial culture is to encourage risk-taking, innovation and creativity (Nikolova-Alexieva & Angelova, 2020). The literature suggests that entrepreneurial culture is related to a number of positive organisational outcomes, such as generating new business and improving firm performance (Lee & Chu, 2017).

Entrepreneurial culture among students is to be influenced by personality, motivation, and family background, besides the curriculum (Odă & Florea, 2019). Students bring to universities their personalities and family backgrounds, along with personal motivations, which altogether fosters entrepreneurship culture (Genoveva, 2019). The university provides a specific context of curricula, rules, expectations, and norms of behaviour to cultivate entrepreneurial culture enabling the enhancement of student's attitude towards entrepreneurial intention (Seth, 2020). Since most of the literature seeks to define entrepreneurial culture by merging together the two key terms 'entrepreneurship' and 'culture', entrepreneurial culture is usually to consist of independence, creativity, ambition, and courage (Kirkley, 2016). This research posits that to cultivate entrepreneurial culture, PHEIs must encourage students to engage in risk-taking behaviour, encourage creativity, support innovation, and promote empowerment.

There are various theories that attempt to define and conceptualise entrepreneurial culture. The entrepreneurship competency model has become an increasingly popular means of learning entrepreneurial characteristics (Schneider & Albornoz, 2018). Regardless of a substantial number of studies in relation to entrepreneurial competencies, problems in relation to the competency improvement process

and fostering entrepreneurial culture are generally neglected, as are key variables such as the need for achievement, internal locus of control, innovativeness, risk-taking propensity, and also tolerance of ambiguity were not covered in the competency model (Schneider & Albornoz, 2018). On the other hand, psychological theories of entrepreneurship emphasise that promoting risk-taking, innovativeness, need for achievement, and tolerance for ambiguity were found to have positive and important control on entrepreneurial tendency (Embi, Jaiyeoba, & Yussof, 2019). Alternatively, economic approaches of entrepreneurship also proposed to cultivate entrepreneurial culture by promoting capitalism where entrepreneurs obtained support to become successful in their ventures (Trivedi, 2016). However, economic approaches to entrepreneurship received noteworthy criticism for failing to distinguish the self-motivated, open personality of market systems, disregarding the distinctive personality of entrepreneurial activity and downplaying the various frameworks in which entrepreneurship occurs (Gurova & Morozova, 2018).

Based on the review of the concept and related theories or approaches, this study reviewed various articles published in the field to formulate their own hypotheses. Scholars find that risk-taking behaviour among students studying at Malaysian PHEIs encourages them to become entrepreneurs (Tunkarimu & Hassan, 2017). Another study shows that risk-taking behaviour among the students promotes entrepreneurial intention to cultivate entrepreneurial culture in Malaysia (Embi *et al.*, 2019). Since risk-taking propensity is described as a person's existing predisposition to seek or evade risks (Shamsudin, Al Mamun, Nawi, Nasir, & Zakaria, 2017), PHEIs could apparently teach their students the best way to deal with an entrepreneurial way of thinking and acting through assessments and group work (Embi *et al.*, 2019; Gelaidan & Abdullateef, 2017). This approach promotes risk-seeking states of mind to cultivate entrepreneurial culture among the students at PHEIs in Malaysia (Embi *et al.*, 2019; Gelaidan & Abdullateef, 2017; Martins, Monsalve, & Martinez, 2018). Moreover, encouraging students to engage in risk-taking behaviour leads them to start new business ventures after graduation or, at least, their intention to become an entrepreneur is high (Llanos-Contreras, Alonso-Dos-Santos, & Ribeiro-Soriano, 2019).

H1:   Encouraging risk-taking behaviour among students cultivates entrepreneurial culture.

Past literature calls innovation a concept that involves the implementation of new ideas, improved products, processes, marketing methods, or business practices (Usulu & Kedikli, 2019). Scholars show that innovation culture prevails among students, but also promotes entrepreneurial spirit and intention among PHEIs in Malaysia (Lee, Kim, & Sung, 2019; Tunkarimu & Hassan, 2017). Furthermore, students with innovative personalities tend to engage in more entrepreneurial activities (Lee *et al.*, 2019; Chuah, Ting, Run, & Cheah, 2016). Institutions that facilitate knowledge transfer and spillovers cause students to engage with innovative behaviour, which results in entrepreneurial culture (Block *et al.*, 2017; Xu & Maas, 2019). Others find that entrepreneurial culture is important to foster innovation and improve performance (Leal-Rodríguez, Albort-Morant, & Martelo-Landroguez, 2017). It is important to implement a learning process from information embedded in external networks, which drives innovation to cultivate entrepreneurial culture among PHEIs (Baker, Grinstein, & Harmancioglu, 2016). Similarly, ambidextrous orientation and innovation strategy enhance innovation and cultivates entrepreneurial culture (Hanifah, Halim, Ahmad, & Vafaei-Zadeh, 2019). Moreover, students with a high level of innovation tend to incline towards entrepreneurial thinking (Mohamad, Abdullah, Ishak, & Hashim, 2019) and cultivating entrepreneurial culture. Therefore, we hypothesise that:

H2:   Encouraging innovation among students will cultivate entrepreneurial culture.

Creativity among employees and team members is important to foster entrepreneurial culture within the organisation (Cai, Lysova, Khapova, & Bossink, 2019). Leader's creativity motivates teams and employees to engage with creative behaviour and cultivate an entrepreneurial orientation (Cai *et al.*, 2019). Similarly, in the educational context, teacher's creativity inspires students to engage in entrepreneurial activities to cultivate entrepreneurial culture among PHEIs (Wibowo & Saptono, 2018). Scholars find that creativity has significant effect on student's entrepreneurial thinking to cultivate entrepreneurial culture in Malaysia (Mohamed *et al.*, 2019). However, the idea that creativity causes entrepreneurial culture is inconclusive and weak, as others find that teacher's creativity does not significantly influence entrepreneurial intention but influences entrepreneurial intention through entrepreneurial education (Wibowo & Saptono, 2018). Since its teacher's creativity that motivates students

to become entrepreneurs, some organisation implement 'Design Thinking' to cultivate entrepreneurial skills such as creativity and problem-solving abilities (Val, Gonzalez, Lauroba, & Beitia, 2019; Wibowo & Saptono, 2018). A systemic literature review shows that individual creativity causes entrepreneurial orientation among students to foster entrepreneurial culture (Rahim, Ismail, Thurasamy, & Abd, 2018). Others report that creativity comprising of business ideas and high-quality business ideas has a significant influence on entrepreneurial orientation and intention, causing people to cultivate entrepreneurial culture (Shifaâ, Abd Razak, Kosnin, & Buang, 2018). Therefore, we hypothesise that:

H3: Encouraging creativity among students will cultivate entrepreneurial culture.

Yet other scholars report that the empowerment of teachers has a positive relationship with entrepreneurial leadership and school effectiveness (Dahiru, Pihie, Basri, & Hassan, 2017). Furthermore, they find that teacher's empowerment moderates the relationship between entrepreneurial leadership and school effectiveness (Dahiru *et al.*, 2017). Country-level studies suggest that empowerment encourages people to get involved in entrepreneurial activities such as starting or owning a small or medium-sized enterprise (SME; Digan, Sahi, Mantok, & Patel, 2019). Another study found that empowerment is the key to foster an entrepreneurial ecosystem among societies, including vulnerable groups (Margaret, Anese, & Emmanuel, 2019). Similarly, others argue that empowerment is important to cultivate and foster entrepreneurial culture within organisations (Henao-Zapata & Peiró, 2018). In the Malaysian context, studies find that empowerment among the youth and students leads to entrepreneurial development that cultivates entrepreneurial culture (Taha, Ramlan, & Noor, 2017). Another study in the Malaysian context reveals that encouraging empowerment among students motivates cultivating entrepreneurial culture, which results in entrepreneurial intention (Basit, Sing, & Hassan, 2018). Therefore, we hypothesise that:

H4: Increasing empowerment among students will cultivate entrepreneurial culture.

RESEARCH METHODOLOGY

Research paradigm

Among the key research approaches – exploratory, descriptive, and explanatory research – the most appropriate conduct in hypothesis analysis is considered to be explanatory research (Saunders, 2011). To conduct the research proposed above, the most appropriate research paradigm (research patterns that this proposed research will follow) will be positivism, because of the following reasons:

− the researchers will directly involve themselves in observation, and they will base their findings on the perceived value of the respondents who are not familiar with the phenomenon;
− positivism emphasises empirical methods in verifying the subject of the investigation;
− this research emphasises investigating the entrepreneurial elements that constitute entrepreneurial culture.

Research methods

Target population and sampling

The target population consisted of students at private higher education institutions (PHEIs) in Cyberjaya, Malaysia. We distributed 300 questionnaires among the target population. The sample size was determined based on the items in the item construction. Initially, there were 21 items to measure the four dimensions of entrepreneurial culture and five items to measure entrepreneurial culture. After the first-order confirmatory factor analysis (CFA), one item (Item1) was removed from the dimension of risk-taking behaviour and one item from creativity in order to obtain the required fitness through confirmatory factor analysis and normality test. Therefore, the required sample size was 250, and this study managed to collect data from 256 respondents using the convenient sampling technique, as it is easy and convenient to collect data from student populations studying in Cyberjaya, Malaysia. The detailed profile of the respondents is illustrated in Table 1 below.

Table 1. Respondent's profile

Characteristics		Frequency	Percent	Valid Percent	Cumulative Percentage
Gender	Female	121	47.3	47.3	49.6
	Male	129	50.4	50.4	100.0
	Total	256	100.0	100.0	
Age (years)	>=50	2	.8	.8	3.1
	18-24	95	37.1	37.1	40.2
	25-35	85	33.2	33.2	73.4
	36-49	68	26.6	26.6	100.0
	Total	256	100.0	100.0	
Marital Status	Married	99	38.7	38.7	41.0
	Single	151	59.0	59.0	100.0
	Total	256	100.0	100.0	
Qualification	Bachelors	136	53.1	53.1	55.5
	Diploma	65	25.4	25.4	80.9
	Masters	30	11.7	11.7	92.6
	Others	19	7.4	7.4	100.0
	Total	256	100.0	100.0	

Source: own study.

Measures

The survey instrument had 24 items, grouped into five categories. Four independent factors that constituted entrepreneurial culture comprise risk-taking behaviour (five items), creativity encouragement (four items), support of innovation (five items), and empowerment (five items). The dependent factor was entrepreneurial culture, which is measured with five items, as shown in Table 3 below. The normality of the scale was measured using kurtosis and skewness. We considered data distribution to be normal if skewness and kurtosis fell out of the range of -1 to 1. The reliability of the scale was considered acceptable if the Cronbach's alpha values were above 0.7 (Hair *et al.*, 2010). Since most of the values fell under the range of normality, data distribution was considered to be normal. Table 2 shows the reliability of the scale. The overall means were also reliable as the standard deviation was lower than 1, which suggested that the mean value was not deviant from central tendency. The correlation was not very high or very low, suggesting that there were no multi-correlations.

Table 2. Item construction

Dimension	Items	Loading	Cronbach's Alpha	AVE
Risk-Taking Behaviour	Students may express their opinions and views in various meeting held between students and staff	0.600	0.715	0.593
	Students are encouraged to complain about their dissatisfaction towards teachers and other issues	0.670		
	Students receive a guarantee that marks and other grading will not be affected when they complain about teachers or management issues	0.517		
	Students are motivated to take risk by receiving challenging tasks such as unique projects	0.562		
	Institution provides rooms for students to develop decision-making skills and capabilities	0.616		
Creativity Encouragement	My teachers and the management of the institution take student questions seriously to foster creativity	0.723	0.769	0.706
	My teachers and the management of the institution promote self-evaluation among the student during class presentation and other related assessments to promote individual creativity	0.652		

Dimension	Items	Loading	Cronbach's Alpha	AVE
	My teachers and the management of the institution promote creativity through problem-solving	0.789		
	My teachers and the management of the institution encourage the generation of new ideas through rewards and appreciation	0.661		
Support of Innovation	My teachers and the management of the institution encourage me to engage in innovative behaviors by exploring opportunities, generating ideas, championing, and putting efforts in the development of entrepreneurial skill	0.832	0.819	0.674
	My teachers and the management of the institution acts friendly to innovative students, being patient, helpful, listening, and looking out for students' interests if problems arise	0.596		
	My teachers and the management of the institution show appreciation for innovative performance made by students	0.715		
	My teachers and the management of the institution teaches students to come up with ideas and to evaluate current practices directly	0.704		
	My teachers and the management of the institution provides financial material rewards for innovative performances by students	0.534		
Empowerment Encouragement	My teachers and the management of the institution give me freedom to make my own decisions on how to complete my tasks	0.647	0.729	0.592
	My teachers and the management of the institution delegate responsibilities during extracurricular activities such as sports	0.562		
	My teachers and the management of the institution encourage me to study and complete assessments independently with minimal supervision or guidance	0.531		
	My lecturers and the management of the institution attempt to build trust among students and teachers	0.650		
	My teachers and the management of the institution encourage students to take full responsibility and accountability for their actions and outcomes of their actions.	0.568		
Entrepreneurial culture	The study environment of the institution promotes the independence of students	0.543	0.834	0.709
	The study environment of the institution promotes aggressive competition among students to receive high marks	0.641		
	The current study environment of the institution promotes proactiveness among students	0.768		
	The current study environment of the institution promotes innovation among student through innovative idea generation	0.801		
	The current study environment of the institution promotes risk-taking behavior among students through challenging and encouraging the expression of their own opinions	0.793		

Source: adapted from Jong and Hartog (2007), Marandi *et al*. (2015), Alshut (2007), and Sharma (2015).

Validity

The validity of items on the scale was tested using average variance extracted (AVE) and factor loadings. Two validity tests were carried out such as convergent and discriminant validity by using confirmatory factor analysis via AMOS. Factor loadings on each item exceeded 0.5, which suggested that all items in the item construction were valid. Also, in terms of AVE on each dimension in the construction was above 0.5, which suggested that it was valid.

In terms of discriminate validity, it was important to show that variables are not related or strongly related to each other. Table 3 epresents the discriminant validity outcomes.

Table 3. Discriminant validity

Variables	Correlation				
	1	2	3	4	5
1: RISKTAKING	1	0.487	0.487	0.183	0.182
2: CREATIVITY	0.698	1	0.745	0.384	0.362
3: INNOVATION	0.698	0.863	1	0.403	0.392
4: EMPOWER	0.428	0.62	0.635	1	0.429
5: ENTERCULTURE	0.427	0.602	0.626	0.655	1

Note: The squared correlation is above the diagonal (1)
Source: own study.

The items in the construct were discriminantly valid, as the squared correlation values were lower and the overlapping of the correlation was minimal. Since the squared correlation above the diagonal was lower than 0.5, it was considered discriminant valid. Another way to test the existence of discriminant validity is to check whether the AVE values are higher than the squared correlation values. In this case, the AVE values were higher than all the squared correlation, which was above the diagonal, suggesting that the items used in the item construct were discriminately valid and there is no overlapping. In other words, the correlation coefficient was lower than 0.9 (Backhause *et al.*, 2006).

Analysis Techniques

In this research, validity was examined using convergent and discriminant validity and confirmatory factor analysis via AMOS22. The reliability and normality of the scale were examined using Cronbach alpha values via SPSS. Similarly, a normality test was conducted using skewness and kurtosis via descriptive statistical analysis. The hypothesis or causal effect of the four elements of entrepreneurship was tested to examine its effect on entrepreneurial culture using structural equation modelling (SEM) via AMOS.

RESULTS AND DISCUSSION

Structural equation modelling

In order to proceed with the structural equation modelling (SEM), it is important to assess the model validity and reliability using model fitness indices. To assess the SEM model fitness, CFI, RMSEA, normed Chi-square were used. This means the CFI value must exceed 0.9, the RMSEA value must be below 0.08, and the normed chi-square must be less than 3. As Figure 1 shows the CFI value was 0.902, which exceeds 0.9, RMSEA value was 0.061, which was below 0.08 and normed chi-square was 1.935, which was less than 3 suggesting that the SEM was a good fit model to proceed with path analysis (Hair *et al.,* 2014; Hu & Bentler, 1999).

Similarly, the validity of the SEM model was examined by comparing both model factor loadings. Table 4 below suggested that the SEM model is valid as the loading on each item under the CFA and SEM was exactly alike. Based on Hair *et al.* (2014), if the loading values are similar, SEM is deemed to be a valid model to analyse path estimates.
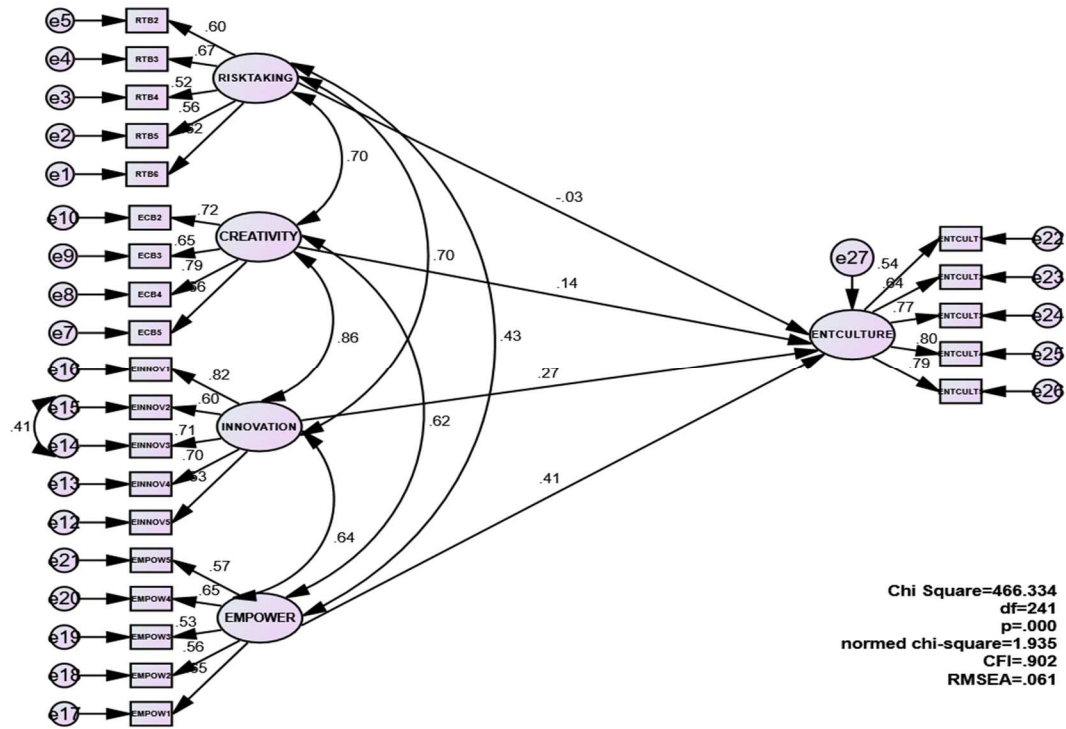
Figure 1. SEM-elements that constitute entrepreneurial culture
Source: own elaboration using Amos graphics.

Table 4. The validity of SEM

Variables	Construct	Measurement Model	Structural Model
RTB2	Risktaking	0.600	0.600
RTB3	Risktaking	0.670	0.670
RTB4	Risktaking	0.517	0.517
RTB5	Risktaking	0.562	0.562
RTB6	Risktaking	0.616	0.616
ECB2	Creativity	0.723	0.723
ECB3	Creativity	0.652	0.652
ECB4	Creativity	0.789	0.789
ECB5	Creativity	0.661	0.661
EINNOV1	Innovation	0.823	0.823
EINNOV2	Innovation	0.596	0.596
EINNOV3	Innovation	0.715	0.715
EINNOV4	Innovation	0.704	0.704
EINNOV5	Innovation	0.534	0.534
EMPOW1	Empower	0.647	0.647
EMPOW2	Empower	0.562	0.562
EMPOW3	Empower	0.531	0.531
EMPOW4	Empower	0.650	0.650
EMPOW5	Empower	0.568	0.568
ENTCULT1	EntCulture	0.543	0.543
ENTCULT2	EntCulture	0.641	0.641
ENTCULT3	EntCulture	0.768	0.768
ENTCULT4	EntCulture	0.801	0.801
ENTCULT5	EntCulture	0.793	0.793

Source: own study.

Hypothesis and path estimates

Table 5 clearly shows that the only critical and significant element of entrepreneurship in cultivating entrepreneurial culture is empowerment as the p-value was 0.0001, which was lower than the required $p < 0.05$ (Hair *et al.*, 2014). The stimulate value of 0.414 suggested that with the increase in one unit of empowerment, overall entrepreneurial culture existence in the academic institution will increase by 0.414. It is important to note that innovation, creativity, and risk-taking behaviour have been found to have a positive and significant influence on entrepreneurial intention in the past. However, we found that these factors do not contribute to the cultivation of entrepreneurial culture among PHEIs in Cyberjaya Malaysia.

Table 5. Hypotheses and path estimates

Hypotheses	Estimate	S.E.	C.R.	P	Accept/Reject
ENTCULTURE <--- RISKTAKING (H1)	-0.032	0.083	-0.290	0.772	Reject
ENTCULTURE <--- CREATIVITY (H2)	0.136	0.121	0.747	0.455	Reject
ENTCULTURE <--- INNOVATION (H3)	0.268	0.145	1.426	0.154	Reject
ENTCULTURE <--- EMPOWER (H4)	0.414	0.092	3.744	0.000**	Accept

** $p<0.01$ Significant level, * $p<0.05$ significant level
Source: own study.

Discussion

In general, studies report that the government of Malaysia through its constitutional bodies is playing a crucial role in developing and encouraging homegrown business entrepreneurs. Three of the most important institutions in this regard are the Ministry of Entrepreneur and Cooperative Development (MECD), its agency Perbadanan Nasional Berhad (PNS), and the SME Bank (Yusof, Jabar, Murad, & Ortega, 2017). Therefore, efforts have been intensified and policies were drafted by the Malaysian government to encourage entrepreneurial activities and promote the growth of self-employment nationwide through small businesses, petty trading, agriculture, and services (EPU, 2006; Yusof *et al.*, 2017). The Ministry of Higher Education and the Ministry of Entrepreneurship and Corporative Development (MECD) initiated several programs to foster entrepreneurial culture, such as the Young Entrepreneurship program, which was designed to promote the awareness of entrepreneurial activities among secondary school graduates (Norasmah & Faridah, 2010). Another program is the Undergraduate Entrepreneur Development Programme (PPUS), designed for students of higher education institutions (Norasmah & Faridah, 2010). The Undergraduate Entrepreneurship Training was also initiated by the government of Malaysia to promote entrepreneurial culture among undergraduates (Norasmah & Farid, 2010). Similarly, the government of Malaysia formulated policies to ensure entrepreneurial curriculum was built into degree programs' syllabi. Therefore, our research focused on higher education institutions and the initiatives they have taken to promote the essential elements that constitute entrepreneurial culture such as risk-taking behaviour, encouraging innovation creativity, and empowerment among students studying at PHEIs in Malaysia.

Based on the above information, our research attempted to find the effect of risk-taking behaviour, innovation, creativity, and empowerment on entrepreneurial culture. Our findings show that encouraging risk-taking behaviour among the students does not have a significant influence on the fostering of entrepreneurial culture, which contradicts Embi *et al.* (2019). Moreover, Llanos-Contreras *et al.* (2019) argue that encouraging students to engage in risk-taking behaviour leads them to initiate new business ventures and tend to cultivate entrepreneurial culture. However, our study does not establish this in the Malaysian PHEIs context. Therefore, the statistical data generated for this study shows that encouraging risk-taking behaviour is not a major element in the institutions of Malaysia for cultivating entrepreneurship culture as its significance value is found to be 0.772. Hence, H1 is rejected.

In terms of innovation, we found that encouraging innovation among the students of PHEIs in Cyberjaya, Malaysia, does not foster or encourage students to engage in an entrepreneurial ecosystem. Despite many argue that innovation should be an agenda of PHEIs to promote entrepreneurial activities among these students. Our findings differ from past studies by Koellinger (2008) and Block *et al.* (2017). Such differences may stem from specific institutions and people who govern and study in these intuitions. As highlighted earlier, in order to foster an effective entrepreneurial culture, organisations must encourage the transformation of people and the environment by encouraging people to engage in innovative behaviour (Xu & Maas, 2019). Furthermore, it is challenging and difficult for small academic institution who offer only diploma or undergraduate programs to facilitate innovation through networking as big or large companies only seeks to build networks with big universities who offer postgraduate degree programs (Baker *et al.*, 2016). The findings for this study signify that encouraging creativity is also not a prominent reason in the institutions of Malaysia for cultivating entrepreneurship culture as the significance value is found to be 0.455. Hence, H2 is rejected.

In terms of creativity initiatives and policies implemented by PHEIs, we found that they do not motivate students to engage in entrepreneurial activities, while the fostering of entrepreneurial culture at the institutions is mainly attributed to the presence of teacher's innovative behaviour, bound by regulatory rules and guidelines (Wibowo & Saptono, 2018). Even though some studies suggest that teachers play an important role, student's family background and the level of studies and assessment are what appears to cultivate entrepreneurial culture (Cai *et al.*, 2019). Similar to our finding, past research indicates that teachers' creativity does not have any significant influence on entrepreneurial intention or orientation (Wibowo & Saptono, 2018). This means that innovative behaviour is not the main driver of cultivating entrepreneurship culture as the significance value is found to be 0.154. Hence, H3 is rejected.

The only factor that showed a positive and significant effect on cultivating entrepreneurial culture in our study was empowerment. To promote empowerment, PHEIs and the government of Malaysia encourage factors related to entrepreneurial creativity such as 'taking the question seriously,' 'encourage self-evaluation', 'creative problem-solving', and 'idea generation' through a greater degree of empowerment (Danish *et al.*, 2019). In the context of our study, we may argue that PHEIs in Cyberjaya, Malaysia, emphasise empowering teachers as it has a positive relationship with entrepreneurial leadership and school effectiveness (Dahiru *et al.*, 2017). Since teacher's empowerment moderates the relationship between entrepreneurial leadership and school effectiveness (Dahiru *et al.*, 2017), this suggests that empowerment encourages people to get involved with entrepreneurial activities such as owning or starting small and medium-sized enterprise (SME; Digan *et al.*, 2019). Moreover, empowerment is the key to fostering an entrepreneurial ecosystem among societies, including vulnerable groups (Margaret *et al.*, 2019). Therefore, empowerment is considered crucial in the cultivation of entrepreneurial culture within PHEIs (Henao-Zapata & Peiró, 2018). The findings of this study indicate that empowerment is the only factor in the proposed framework that cultivates entrepreneurship culture among the Malaysian PHEIs, as the significance value is found to be 0.000. Hence, H4 is accepted.

CONCLUSIONS

Overall, we conclude that enhancing and encouraging empowerment among the students and teachers can cultivate entrepreneurial culture within PHEIs in Malaysia. Moreover, we conclude that risk-taking behaviour, creativity, and innovation do not necessarily foster entrepreneurial culture among students of PHEIs in Cyberjaya, Malaysia. Based on our findings, we conclude that risk-taking behaviour, creativity, and innovation can be enhanced through empowerment to cultivate entrepreneurial culture. The most important factor to facilitate risk-taking behaviour, creativity, and innovation is empowerment given to the teachers and students of the PHEIs. Furthermore, empowerment is the key to cultivate entrepreneurial culture, along with risk-taking behaviour and innovation.

Theoretical and practical implications

The current entrepreneurial culture or ecosystem prevail among the PHEIs in Cyberjaya, Malaysia, with an emphasis on innovation through research technology transfer and collaborative research to foster

entrepreneurial culture (Villani, Rasmussen, & Grimaldi, 2017). Some of the PHEIs 'act not only as educators but also as institutional entrepreneurs, proactively networking, shaping regional strategies and attempting to change local routines as well as national policies' (Raagmaa & Keerberg, 2017, p. 270). Taking part in entrepreneurial activities organised by the government and communities encourages students to partake in this and increase the intention to become entrepreneurs. Some PHEIs have engaged very much in incorporating an entrepreneurial curriculum in their syllabi and forming entrepreneurial clubs to organise related weekly events. This has promoted networking, idea generation, and taking-risk among students to invest in products and school projects. The success of such projects is measured by risk-taking behaviour, creativity, innovation, and return on investment.

Our study will assist or guide academic institutions to design and formulate entrepreneurial policies so as to encourage teachers and students to actively engage in entrepreneurial activities resulting in entrepreneurial culture or ecosystem. Moreover, this study will guide academic institutions to design human resources development policies through empowerment and delegation strategies so as to foster entrepreneurial culture among staff and academic leaders. This study will also play an important role for regulatory bodies to formulate policies and regulations that facilitate PHEIs to design curriculums and assessments that better foster entrepreneurial culture. Academic managers and policymakers should be careful in using innovation and creativity campaigns among students to cultivate entrepreneurial culture as they may waste resources without proper empowerment policies and commitment.

Limitations

However, our study shows the following limitations. Firstly, the study focused on very limited PHEIs in Cyberjaya, so generalising this study to all Malaysian PHEIs may not be appropriate. Secondly, the selection of samples from the target population was not conducted very systematically. The respondents should be unique in terms of social status and exposure. The use of diploma, degree, and Master's level students coming from various backgrounds would vary the opinions of respondents on how PHEIs carry their strategies in cultivating entrepreneurial culture. Finally, the academic institution's environment and curriculum were not considered in the item construction.

Future research directions

This study could be improved by employing a more systematic sampling method, which would allow a focus on matured postgraduate students. Moreover, it would be important to focus on selecting only students who come from the same income or social group, rather than taking vulnerable groups in the initial studies. Furthermore, this study can be improved by considering the study environment, institution-related factors, and curricula. Finally, it is important to consider institutional environment and policies as variables to the study and their effect on entrepreneurial culture.

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Zubair Hassan formulated the research concept, research problems, the rationale, and he contributed written research methodology and analysis (50%). Muneeb Khan designed the research instrument and data collection (30%). Abdul Basit proofed the readings and edited the text and citation, he also wrote the conclusion, recommendations, and research implications sections (20%).

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Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Do *sukuk* ratings *non-contingently* affect stock returns? Evidence from Indonesia and Malaysia

Ibnu Qizam

A B S T R A C T
Objective: The objective of the article is to investigate two issues. First, whether the Islamic bond (*sukuk*) ratings are the key determinant in affecting stock returns and, second, whether firm-characteristic variables moderate the *sukuk* ratings effect on stock returns.
Research Design & Methods: This study applied the panel estimated generalized least squares (EGLS) regression for two samples (from Indonesia and Malaysia) spanning two years, 2015-2016, for all variables, except for the intrinsic-value variable which spanned eight years, 2009-2016.
Findings: The results show that the direct and positive effect of *sukuk* ratings on stock returns are significantly present in Malaysia but not in Indonesia, while the positive and significant moderating effects of firm-characteristic variables – especially leverage and intrinsic value of the firm – are more pronounced in the positive *sukuk* rating-stock return relationship in Indonesia than in Malaysia.
Implications & Recommendations: The types of firm-characteristic variables involved in determining the effect of *sukuk* ratings on stock returns depend on the country's characteristics. As a result, adopting *sukuk* ratings to determine stock returns is not constant but, instead, it is contingent – to an extent – on other variables: firm-characteristic variables. These results suggest that still many factors should be explored so as to reach a better judgment on the quality of credit, including *sukuk*.
Contribution & Value Added: While most previous studies employed the event-study method and did not specifically consider firm-characteristic effects on analysing the relationship between *sukuk* ratings and stock returns, this study sought to reveal whether *sukuk* ratings are the key determinant in affecting prices (or stock returns), and the extent to which firm-characteristic variables moderate the relationship between *sukuk* ratings and stock returns.

INTRODUCTION

This study aims to examine whether *sukuk* ratings can be the key determinant in affecting stock returns directly, which is not contingent on firm-characteristic variables, or whether the *sukuk ratings* effect on stock returns is subject to the varying firm-characteristic factors: leverage and firm value. This issue arises from the basic assumption that the significant role of *sukuk* ratings, including credit ratings, is an intermediary providing information through which are conveyed some signals of creditworthiness and sustainability, commonly sourced from an assessment to a firm's fundamental analysis, e.g. expected future cash flows, firm value, leverage level, default-risk profile, market competitiveness, or governance (see Muhamad Sori, Mohamad, & Al Homsi, 2019). Therefore, *sukuk* ratings can reduce information asymmetry between investors and managers, so *sukuk* rating changes will be efficiently reflected in stock prices.

As defined by most scholars, *sukuk* are sharia-compliant debt instruments or non-interest-based securities with the ownership of an underlying asset (Bhatti, 2007) or Islamic bonds (Alam, Hassan, & Haque, 2013). The main characteristic of *sukuk* that distinguishes it from conventional bonds is the underlying asset, a reference of issuing debt whose value is not allowed to exceed the value of the asset. Thus, as a risky instrument, *sukuk* is also an instrument of debt-based financing that has certain restrictions which, if uncontrolled, will endanger a firm. Due to the *sukuk* characteristics, the quality and credibility of the *sukuk* owned by a firm can also be assessed. Since a 'good' or 'bad' rating rendered by a credit-rating agency is usually attributed to the assessment of a historical record on *sukuk* issuers' credibility in their credit, repayment, underlying assets, and whole business performance (Arundina, Omar, & Kartiwi, 2015), we may argue that stock returns respond to credit or *sukuk* ratings while also retaining other firm-characteristic factors to be considered.

Until recently, studies regarding the effects of conventional credit and *sukuk* ratings on returns show that, among other things, credit rating changes show a reaction among investors, mostly indicated by stock price reaction irrespective of symmetric (Muhamad Sori *et al.*, 2019) or asymmetric stock price changes for *sukuk*; *i.e.* a bond or *sukuk* that tends to emphasise more downward than upward credit-rating changes (Bissoondoyal-Bheenick & Brooks, 2015; Freitas & Minardi, 2013). Most scholars support of these findings. Among others, Ng and Ariff (2019) conventionally find the significant credit rating change effect on *sharia*-compliant stock prices. Ab Hamid, Zakaria, and Ab Aziz (2014) reveal the significant effect of *sukuk* ratings on firm performance. Paltrinieri, Hassan, Bahoo, and Khan (2019) find a significant *sukuk*–stock market behaviour relationship. Abd Rahim and Ahmad (2016) document a positive and significant asymmetrical reaction to *sukuk* issuance in which the announcement of 'high-quality,' 'excellent,' and 'good' of *sukuk* ratings receives positive responses, while 'medium,' 'questionable,' and 'weak' ratings show negative reactions. Khartabiel, Abu-Alkheil, Tunku Ahmad, and Khan (2020) find that in the post-crisis period, market reaction to *sukuk* is positive and significant, while insignificant for conventional bonds (see also Mohamed, Yahya, & Ishak, 2017).

However, other studies find different results, e.g. Alam *et al.* (2013) find that markets reacted negatively to *sukuk* announcements before and during the 2007 global financial crisis. Godlewski, Turk-Ariss, and Weill (2010) find no significant stock market reaction to conventional bond announcements, which reacted negatively to the issuance of *sukuk*. Furthermore, Godlewski, Turk-Ariss, and Weill (2013) find evidence that the stock market is neutral to conventional bond announcements but reacts negatively to *sukuk* announcements instead. Hassan, Paltrinieri, Dreassi, Miani, and Sclip (2018) find that *sukuk* and conventional bonds at the investment-grade level had lower volatility reactions to market shocks and higher persistence, while Khartabiel *et al.* (2020) suggest that there was no market reaction to the announcement of *sukuk* and conventional bonds in the pre-crisis period of the 2008 global financial crisis and during the crisis period, as the market reacted negatively significantly to both groups.

Given these studies, we may conclude that the phenomena of *sukuk* and *sukuk* ratings still show different reaction from their users and investors. Moreover, previous studies never explicitly review the issue of whether *sukuk* ratings can be used as a key determinant in pricing – mostly considered by investors – or whether the *sukuk* ratings as a determinant of prices is influenced by other variables. These two issues remain understudied in previous studies. In theory, like conventional credit ratings, *sukuk* ratings are not only built by financial and accounting data but also by other relevant information (see Hand, Holthausen, & Leftwich, 1992; Grier & Katz, 1976). This is also stated explicitly by Moody's (1995) who argues that the credit rating development process is indeed subjective because it refers to assessing the ability of future entities, which involves many unique factors related to certain industries and debt issuers so that if there is an attempt to simplify this process with a formula, it will be misleading and will result in serious mistakes. Hence, *sukuk* rating practices – including conventional credit ratings – are always dynamic under scientific scrutiny. Some results support the market reaction when the *sukuk* was announced, but other do not confirm such an investors' reaction. The reasons why the results were dynamic may also be attributed to many factors, like firm-characteristic factors.

Furthermore, to the best of my knowledge, most previous studies focus on employing the event-study method, but not to specifically consider whether *sukuk* ratings are the key determinant in affecting stock returns disregarding firm-characteristic variables or whether the relationship be-

tween *sukuk* ratings and stock returns is contingent on firm-characteristic variables. As such, this research seeks to reveal whether *sukuk* ratings are the key determinant in affecting stock prices (or stock returns), and the extent to which firm-characteristic variables moderate the relationship between *sukuk* ratings and stock returns.

To answer these research issues, the stock markets from two countries – Indonesia and Malaysia – were used as samples in this study due to their dominance of the global *sukuk* market. The global *sukuk* market share for Malaysia and Indonesia is 68.06% (60.84% + 7.225%) or approximately 749 613 million USD (670 121 million USD + 79 492 million USD) (IIFM, 2019). Because of the dominance of these two countries – which account for nearly 70% out of the global *sukuk* market – Indonesia and Malaysia as the samples in this study should be considered reasonable.

The rest of this paper will present a literature review and hypothesis development, describe materials and methods, provide results and discussion, and draw a conclusion and implications.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

As conclusively stated by many scholars, *sukuk* functions as a debt-based instrument with an underlying asset, and it enjoys a specific and complicated assessment. Due to the complexities and potential conflicts of interest when the assessment is conducted internally by the issuing firm or externally by investors, the quality of the *sukuk* is delivered for assessment by rating agencies who have the ability and expertise and who are considered to be independent and objective. This means the big three rating agencies – Moody's, Fitch, and Standard & Poor's – and smaller rating agencies on the country level. For example, at the level of the Association of Southeast Asian Nations (ASEAN), agencies that usually assign rating attributes are Perseroan Terbatas Pemeringkat Efek Indonesia (PT. PEFINDO) in Indonesia, Rating Agency Malaysia (RAM) services and Malaysian Rating Corporation Berhad (MARC) in Malaysia, Universal Ratings (RTS Ratings Pte Ltd.) in Singapore, Thai Rating and Information Services Co. Ltd. (TRIS) in Thailand, and Philippine Rating Services (Phil Ratings) in the Philippines.

Since Blume, Lim, and Mackinlay (1998) mapped credit-rating studies from the conventional literature viewpoint, the literature on *sukuk* ratings has been extensively growing. Zulkhibri (2015) identifies three groups of *sukuk* studies. The first group indicates *sukuk's* qualitative descriptions like the extent of *fiqh* (jurisprudence) explanation related to *sukuk,* the differences in nature of *sukuk* from conventional bonds, and the differences in characteristics of *sukuk*-risk indicators, the mechanism of *sukuk*, and its compliance with the norms of Islamic jurisprudence; the prime components of *sukuk* from the Iranian *Syiah fiqh* viewpoint (see *e.g.* Rohim & Shereeza, 2013; Usmani, 2008; Kordvani, 2009). In the second group – as discussed in conventional credit rating studies – *sukuk*-related studies are associated with the investigation of the determinants of *sukuk*, *i.e.* the difference between *sukuk* and Eurobonds, the macroeconomic impact on *sukuk* issuance, and how the financial crisis affects *sukuk* market development (see *e.g.* Ariff & Safari, 2015; Ahmad, Daud, & Kefelia, 2012; Said & Grassa, 2013).

Furthermore, *sukuk* issuance that has declined in recent years – attributed to the financial crisis – also results in various findings of *sukuk* rating studies; many new determinants are then considered in bond and *sukuk* rating policies. Hand *et al.* (1992) and Grier and Katz (1976) suggest that financial statements are considered inadequate in providing explanations related to rating standards (see also Arundina *et al.*, 2015; Blume *et al.*, 1998). This is also in line with Moody's statement that credit ratings have more characteristics than the description of contents of financial statements, involving so many factors unique to particular industries, issuers, and countries. As a result, no formulaic methodology can be applied (Moody's Credit Ratings & Research, Moody's Investors Service, 1995, p. 14).

The third group deals with the extent to which information on *sukuk* can be utilized by stakeholders – primarily investors – or tests the extent to which *sukuk* issuance is a determinant in prices or wealth for investors or other firm performance, *e.g.* insolvency risk. *Sukuk*-related studies in this domain are not diverse: stock price reaction to credit/*sukuk* rating changes or information content of *sukuk* issuance on abnormal return either in the crisis period or non-crisis period and *sukuk* rating impact on firm performance (see *e.g.* Ng & Ariff, 2019; Alam *et al.*, 2013; Abd Rahim & Ahmad, 2016; Hassan *et al.*,

2018; Khartabiel *et al.*, 2020; Mohamed *et al.*, 2017; Smaoui, Mimouni, & Temimi, 2019; Ab Hamid *et al.*, 2014; Godlewski *et al.*, 2010). Hence, the first hypothesis is as follows:

H1: *Sukuk* ratings positively impact stock returns.

Paltrinieri *et al.* (2019) group *sukuk* literature into three research themes: *sukuk* overview and growth, *sukuk* and finance theories, and *sukuk* and stock market behaviour. The first theme addresses the definition of *sukuk* (see *e.g.* Hassan, Aliyu, Paltrinieri, & Khan, 2019; Ahmed & Elsayed, 2019; Asutay & Hakim, 2018; Smaoui & Khawaja, 2017; and many others), the classification of *sukuk* as asset-backed and asset-based *sukuk* (see Ahmed & Elsayed, 2019; Naifar & Hammoudeh, 2016), and the recent growth of *sukuk* (Smaoui & Nechi, 2017).

From the major finance theories perspective (the second group), *sukuk* literature conclusively addresses beneficial effects from diversifying portfolio, choosing *sukuk* over conventional bonds, and investors' religiosity (Alam *et al.*, 2013; Naifar & Hammoudeh, 2016; Nagano, 2017; Mohamed *et al.*, 2017; Azmat, Skully, & Brown, 2014; Klein, Turk, & Weill, 2017; Shafron, 2018). Meanwhile, for the third group, *sukuk* is mostly linked to how much the stock market responds to *sukuk* and bonds (Godlewski *et al.*, 2013; Fauzi, Foo, & Basyith, 2017), how *sukuk* and bonds show inter-temporally their co-movements and linkages (Aloui, Hammoudeh, & Hamida 2015a; Alaoui, Dewandaru, Rosly, & Masih, 2015; Sclip, Dreassi, Miani, & Paltrinieri, 2016), what are the changes of *sukuk* structure due to the global financial crisis and other influential economic events, how different price regimes lead to the different correlation between the stock market and *sukuk* (Naifar, Hammoudeh, & Al dohaimanae, 2016; Aloui, Hammoudeh, & Hamida, 2015b, 2015c), and how interest rate impacts the *sukuk* market (Akhtar, Akhtar, Jahromi, & John, 2017).

The above literature review from either Zulkhibri (2015) or Paltrinieri *et al.* (2019) suggests that their studies highlight the same angle from one of the three themes they identified. It is empirical evidence that stock market reaction, stock abnormal returns to *sukuk* issuance, or *sukuk* rating changes occur even though its effects are different and contingent. As such, its effects are not constant and may vary with changes, *e.g.* in the quality of *sukuk* ratings (Abd Rahim & Ahmad, 2016). Furthermore, *sukuk* ratings are contingent on the specific characteristics of Islamic bonds (Azmat *et al.*, 2014), along with macroeconomic and market conditions (Hassan *et al.*, 2019). Besides, *sukuk* ratings are influenced by the different settings of crisis vs non-crisis period (Khartabiel *et al.*, 2020), by the different absorption process levels of the received information from *sukuk* announcement (Mohamed *et al.*, 2017), and by different insolvency risk levels and the size of issuing firms, including financial institutions (Islamic banks) (Smaoui *et al.*, 2019).

Extant literature conceptually shows that a moderating variable plays a role in influencing the nature – *i.e.* the magnitude, strength, or direction – of the effect on the relationship between an independent variable and a dependent variable (Wu & Zumbo, 2008; Aguinis, Edwards, & Bradley, 2017). Thus, this insight shows that a moderating variable depends on the conditions under which an antecedent affects an outcome. The effect of independent variables on a dependent variable is generally contingent on many factors. Given the contingency effect of other factors on the *sukuk* rating–capital market behaviour relationship, as mentioned above, and the existence of various determinants of credit ratings – *i.e.* firm-characteristic variables, including leverage, profitability, size, growth, and financial market performance (Murcia, Murcia, Rover, & Borba, 2014; Elhaj, Muhamed, & Ramli, 2015) – firm-characteristic variables also presumably serve as a moderating role in influencing the positive relationship between *sukuk* ratings and stock returns. Thus, the following hypothesis is worth testing:

H2a: Firm-characteristic variables (*i.e.* leverage) positively moderate the relationship between *sukuk* ratings and stock returns.

H2b: Firm-characteristic variables (*i.e.* firm value) positively moderate the relationship between *sukuk* ratings and stock returns.

RESEARCH METHODOLOGY

Population, sample, and variables

This study applied the panel estimated generalized least squares (EGLS) regression to two samples (Indonesia and Malaysia) purposively taken from two sets of the population of financial and non-financial firms listed on the Indonesia Stock Exchange (IDX) consisting of eight industries (61 *sukuk*-issuing firms): miscellaneous industry (5), trade, service, and investments (8), mining (5), property, real estate, building construction (10), consumer good industry (4), finance (25), infrastructure, utility and transportation (3), basic industry and chemical (1). Moreover, they were taken from the Kuala Lumpur Stock Exchange (KLSE) covering eleven industries (30 *sukuk*-issuing firms): among others, financial services (4), industrial products and services (5), energy (3), construction (2), real estate investment trusts (3), plantation (2), property (2), technology (1), telecommunications and media (3), transportation and logistics (3), utilities (2). To determine the dependent variable – *i.e.* stock returns (RET) – the data were taken from the annualised data returns for the 2015–2016 period from *sukuk*-issuing firms while independent variables – consisting of *sukuk* ratings (SRAT) – stemmed from *sukuk* rating agencies, *i.e.* PT. PEFINDO for the Indonesian samples and RAM Rating Services Berhad for the Malaysian samples available online on their official websites.

Referring to Ayturk, Asutay, and Aksak (2017), credit rating scales were transformed into a continuous score index evenly spanning from the highest scale (indexed as 1) to the lowest scale (indexed as 1 divided by the total number of the specific credit rating agency's scales). In PT. PEFINDO, for example, there are eighteen levels of credit-rating scales from 'idAAA' to 'idD'. Since each range from a higher scale to a lower scale is approximately 0.056 (*i.e.* 1 divided by 18), the first score index for the highest scale (idAAA) is equal to 1, while the second scale (idAA+) will be 0.944 (1 minus 0.056), and so on until the end (18th) level of the credit-rating scales (idD), indexed as 0.056. When a firm is assigned with more than one *sukuk*-rating scale due to different *sukuk* types, the score index is the average score index of combined *sukuk*-rating scales. Henceforth, firm-characteristic variables were proxied by leverage (LEV) and firm-value variables (VAL) consisting of return on investment (ROI), intrinsic value (IVAL), and the market value of the firm measured by Tobin's Q (TBNQ), interchangeably applied depending on the relative importance of the tests (Haj-Salem, Damak Ayadi, & Hussainey, 2020), while the natural logarithm of total assets (ln_SIZE) was used to control for firm-size effect, as usually adopted by many researchers (see Dang, Li, & Yang, 2018).

While these variables involve some common proxies such as RET, ROI, LEV, ln_SIZE, SRAT, and other firm value proxies, IVAL and TBNQ are measured for specific purposes. The continuous measurement of *sukuk* ratings is intended to consider more the whole information of their variance explained rather than categorical-scale measurement that was mostly applied by previous studies. Next, a firm's value proxied by IVAL reflects a firm's intrinsic value that the market does not necessarily reflect in stock prices. On the one hand, the advantage of using IVAL is that it more comprehensively represents all the tangible and intangible assets of the firm in the long run, based on fundamental analysis, rather than in the short run as reflected in stock prices (Lin & Sung, 2014). On the other hand, a firm's value proxied by TBNQ better reflects the market price of the firm in the short run. Tobin's Q that indicates more than 1 means 'overvalued' while TBNQ that lies between 0 and 1 points to 'undervalued;' its advantage is the value being more relevant in the short-run analysis (Haj-Salem *et al.*, 2020). As a result, the specific measurement of some variables (*i.e.* SRAT and TBNQ vs IVAL) included in the testing models was also a gap to be filled with the findings of this study, which was different from previous studies. Then, the data were sourced from Thompson Reuters Datastream for the 2015-2016 period, while a firm-value variable proxied by IVAL was generated from a longer data series, *i.e.* 2009-2016. The source, description, and measurement of all the variables in detail are depicted in Table 1.

Empirical Models

The empirical models are divided into two, *i.e.* Model 1 includes RET (a dependent variable), SRAT, and firm-characteristic variables proxied by LEV and VAL (a firm's value) that consist of ROI, IVAL,

TBNQ (independent variables), and Ln_SIZE (control variable). Model 2 contains the same variables as Model 1 with the addition of interaction terms between SRAT and all firm-characteristic variables, *i.e.* the SRAT-ROI, SRAT-LEV, SRAT-IVAL, and SRAT-TBNQ interactions as the independent variables to reflect the moderating effects of ROI, LEV, IVAL, and TBNQ on the SRAT-RET relationship. The empirical models 1 and 2 appear as follows:

$$RET_{i,t} = \alpha_0 + \alpha_1 SRAT_{i,t} + \alpha_2 LEV_{i,t} + \sum \alpha_3 VAL_{i,t} + \alpha_4 Ln\_SIZE_{i,t} + \omega_{i,t} \qquad (1)$$

$$RET_{i,t} = \beta_0 + \beta_1 SRAT_{i,t} + \beta_2 LEV_{i,t} + \sum \beta_3 VAL_{i,t} + \beta_4 SRAT_{i,t} * LEV_{i,t} + \sum \beta_5 SRAT_{i,t} \\ * VAL_{i,t} + \beta_6 Ln\_SIZE_{i,t} + \varepsilon_{i,t} \qquad (2)$$

Table 1. Source, description, and measurement of all the variables

Variables	Description and measurement	Source
RET_{it} -	Average annualised stock returns for the 2015-2016 period.	Thompson Reuters Datastream
$SRAT_{it}$ -	*Sukuk* ratings were rendered by a specific rating agency (PT. PEFINDO for Indonesia sample, and RAM Rating Services Berhad for Malaysia) on the *sukuk*-issuing firms from 2015 to 2016. The qualitative *sukuk* ratings are then converted into continuous metrics calculated by referring to Ayturk *et al.* (2017). For the Indonesian sample, the *sukuk* ratings range from idAAA (a score index=1) to 1dD (a score index = 0.056), plus additional mixed ratings, while for the Malaysian sample, the *sukuk* ratings span from AAA (a score index=1) to D (a score index = 0.05), plus additional mixed ratings (see the detailed distribution in Table 2).	The Indonesian Sample: PT. PEFINDO (Pemeringkat Efek Indonesia) (https://www.pe-findo.com); The Malaysian sample: RAM (Rating Agency Malaysia) Rating Services Berhad (https://www.ram.com.my)
LEV_{it} -	Firm leverage and leverage (LEV) calculated by the ratio of debt divided by total assets for the 2015–2016 period.	Thompson Reuters Datastream
VAL_{it} -	Firm value: the first one was proxied by the ratio of earnings divided by total assets (return on assets or ROI);	Thompson Reuters Datastream
	The second one was proxied by the value of Tobin's Q (TBNQ), which is the value of the equity market capitalization plus total assets minus the book value of equity, all of which are then divided by total assets;	Thompson Reuters Datastream
	The third one was represented by intrinsic value (IVAL) that was determined by adopting the Graham formula (Lin & Sung, 2014), as applied by Qizam and Fong (2019). $$IVAL = \frac{(EPS*(8.5+2g)*4.4)}{Y} \qquad (3)$$ in which IVAL represents the next seven-year expected value of growth; earning per share (EPS) is the last earnings per share for a firm; 8.5 is a price-to-earning (PE) base for a non-growth firm; *g* is the rate of a reasonably expected seven-year growth; 4.4 is the average yield of 20-year AAA corporate bonds (US) in 1962 (instead of 4.4, the central bank interest rates of each country are adopted attributable to the application of risk-free rates for the two samples); Y is the current yield on AAA corporate bonds. Meanwhile, the calculation of intrinsic value (IVAL) of firm *i* in year *t* itself necessitates an array of lagged EPS to arrive at the expected EPS growth. In this regard, two-year observations of the firm's intrinsic value (IVAL), 2015-2016, are determined, each of which was built from a long array of lagged seven-year observations, *i.e.* a 2009-2015 EPS-growth data series for IVAL of 2015 and a 2010–2015 EPS-growth data series for IVAL of 2016.	Thompson Reuters Datastream
Ln_SIZE_{it} -	Control variable, proxied by the total asset (in the natural logarithm of total assets) for the 2015–2016 period.	
$\omega i, t; \varepsilon i, t$	Error terms.	

Source: own study.

RESULTS AND DISCUSSION

Frequency Distribution and Descriptive Statistics

The specification of Ayturk *et al.* (2017) applies to model credit/*sukuk* ratings. A credit/*sukuk* rating score index as a continuous variable is constructed by using the data available from PT. PEFINDO for the Indonesia sample and the data from RAM Rating Services Berhad for the Malaysian sample. The frequency distribution of *sukuk* ratings for the two samples, Indonesia and Malaysia, is portrayed in detail in Table 2.

Table 3. Descriptive statistics for variables of interest for the Indonesian and Malaysian samples

A. The Indonesian Sample							
Items of statistics descriptive	RET	SRAT	ROI	LEV	IVAL	TBNQ	LN_SIZE
Mean	0.178	0.794	0.034	0.292	1492.94	1.318	23.404
Median	-0.0025	0.777	0.028	0.254	665.03	1.076	23.542
Maximum	4.994	1.00	0.204	0.795	16780.46	3.85	27.663
Minimum	-0.910	0.444	-0.073	0.0008	-2841.75	0.578	11.711
Standard Deviation	0.85	0.137	0.041	0.187	2529.92	0.668	2.230
Observations	122	122	122	122	122	122	122
B. The Malaysian Sample							
Mean	-0.012	0.897	0.035	0.285	5.965	1.404	16.333
Median	-0.027	0.912	0.023	0.277	5.141	1.021	16.279
Maximum	0.794	1.000	0.369	0.737	51.713	9.894	20.415
Minimum	-0.779	0.050	-0.193	0.000	-79.782	0.635	12.944
Standard Deviation	0.266	0.147	0.087	0.190	16.795	1.460	2.079
Observations	60	60	60	60	60	60	60

Source: own elaboration of outputs from Eviews 11.

Given Table 3, it appears that some variables (the average ROI, Leverage, and Tobin's Q values) are comparable between the Indonesian and Malaysian samples, but other variables are not (SRAT, IVAL, and Ln_SIZE) as their mean values are significantly different (at the significance level of 0.01). *Sukuk* ratings in Malaysia look more evenly distributed compared to Indonesia, leading to the highest level of *sukuk* rating scale. However, when viewed as a whole, the variation in the *sukuk ratings* values are comparable for either the Indonesian sample or the Malaysian sample, showing a standard-deviation value of 0.137 vs. 0.147. Unlike the *sukuk ratings* variable, it appears that stock returns for the Indonesian sample are higher than the ones for the Malaysian sample, *i.e.* 0.178 vs. -0.012 with a more even distribution for the Malaysian sample (standard deviation = 0.266) compared to Indonesia (standard deviation = 0.85).

Multicollinearity among variables

Table 4 shows the results of multicollinearity tests among the variables for the two samples, Indonesia and Malaysia. Even though all the variables for the two samples denote the VIF (variance inflation factor) values less than 10 (free from the multicollinearity problem), considering the high cross-correlation between ROI and TBNQ (0.617) (the Indonesian sample), between ROI and IVAL (0.515), and between ROI and TBNQ (0.713) (the Malaysian sample), and also the notion that ROI, IVAL, and TBNQ reflect the same firm-characteristic factor, *i.e.* firm value (e.g. Haj-Salem *et al.*, 2020), ROI will be excluded in further analysis.

Table 2. Frequency (Freq.) distribution of *sukuk* ratings for the Indonesian and Malaysian samples

A. The Indonesian sample

Column No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Sukuk Ratings	idAAA	idAA+	idAA	idAA-	idA+	idA	idA-	idBBB+	idBBB	idBBB-	idBB+	idBB	idBB-	idB+	idB; idB-	idCCC; idD	TOTAL
Sukuk Index	1	0.94	0.89	0.83	0.78	0.72	0.67	0.61	0.56	0.5	0.44	0.39	0.33;	0.28	0.22; 0.17	0.11; 0.06	
Freq. in 2015	13	1	5	8	10	12	6	3	2	1	0	0	0	0	0	0	61
Freq. in 2016	12	1	5	8	10	6	10	6	2	0	1	0	0	0	0	0	61
Total Freq.	25	2	10	16	20	18	16	9	4	1	1	0	0	0	0	0	122
Total Freq. (%)	40.98	3.3	16.39	26.2	32.8	29.5	26.2	14.75	6.56	1.64	1.64	0	0	0	0	0	100%

B. The Malaysian sample

Column No.	1	2	3	4	5	6	7	8	9	10	11	12[§]	13[§]	14[§]	15[§]	16[§]	17
Sukuk Ratings	AAA	AA1	AA2	AA3	A1	A2	A3	BBB1; BBB2; BBB3; BB1; BB2	BB3	D	B1; B2; B3; C1; C2; C3	AAA; AA1	AA2; AAA	AA3; AAA	AA1; A3; AA1	A1; AA2	TOTAL
Sukuk Index	1	0.95	0.9	0.85	0.8	0.75	0.7	0.65; 0.6; 0.55; 0.5; 0.45	0.4	0.05	0.35; 0.3; 0.25; 0.2; 0.15; 0.1	0.975	0.95	0.925	0.866	0.85	
Freq. in 2015	8	5	6	6	1	0	0	0	0	1	0	0	1	1	1	0	30
Freq. in 2016	6	6	7	5	1	1	1	0	1	0	0	1	0	0	0	1	30
Total Freq.	14	11	13	11	2	1	1	0	1	1	0	1	1	1	1	1	60
Total Freq. (%)	23.33	18.33	21.67	18.3	3.33	1.67	1.67	0.00	1.67	1.67	0.00	1.67	1.67	1.67	1.67	1.67	100

Note: Table 2 contains rating index scales calculated using the formula of Ayturk *et al.* (2017); the highest percentage of rating frequency lies in the sample of Indonesia, *i.e.* 41% (25 companies), and Malaysia, *i.e.* 23.33% (14 companies), while the rest is spread to the lowest index, idBB + (0.444) for the Indonesian sample, and D (0.05) for the Malaysian sample.

[§]This score index is the average score index of the combined *sukuk*-rating scales because of the different *sukuk* types.

Source: own elaboration of *sukuk* ratings published by PT. PEFINDO for the Indonesian sample and by RAM Rating Services Berhard for the Malaysian sample.

Table 4. Multicollinearity among the variables for the Indonesian and Malaysian samples

Variables	RET	SRAT	ROI	LEV	IVAL	TBNQ	LN_SIZE	VIF
A. The Indonesian Sample								
RET	1.000	0.0196	0.091	-0.207**	0.191**	0.357***	0.089	-
SRAT		1.000	0.169*	-0.275***	0.187**	0.182**	0.334***	1.35
ROI			1.000	-0.098	-0.0072	0.617***	-0.355***	2.16
LEV				1.000	0.123	-0.113	-0.190**	1.16
IVAL					1.000	0.078	0.146	1.09
TBNQ						1.000	-0.0046	1.75
LN_SIZE							1.000	1.56
B. The Malaysian Sample								
RET	1,000	-0,432***	0,145	0,038	0,151	-0,003	0,099	-
SRAT		1,000	-0,009	0,012	-0,009	0,117	0,153	1.06
ROI			1,000	-0,354***	0,515***	0,713***	-0,156	5.04
LEV				1,000	-0,476***	0,024	0,083	1.46
IVAL					1,000	0,040	0,149	2.23
TBNQ						1,000	-0,093	3.45
LN_SIZE							1,000	1.20

Source: own elaboration of outputs from Eviews 11.

Results of hypotheses testing

For the Indonesian sample (Table 5), the testing of Hypothesis 1 began directly with applying the two models that include all the independent variables, *i.e.* SRAT and all the firm-characteristic variables, LEV, IVAL, TBNQ, and ROI (Step 0), by running Model 1 and Model 2. Due to the high cross-correlation between ROI and TBNQ (0.61) and previous literature (Baron, Harjoto, & Jo, 2011; Siagian, Siregar, & Rahadian, 2013; Haj-Salem *et al.*, 2020), it appears that ROI and TBNQ reflect the same variable, *i.e.* firm value, so Model 1 and Model 2 were repeated by excluding ROI (Step 1) either with interactions (Model 2) or without interactions (Model 1). The results showed no significant and positive effect of SRAT on RET in Model 1. When applying the moderated regression analysis (MRA) method (Sharma, Durand, & Gur-Arie, 1981), the positive and significant coefficient in the SRAT-RET relationship is consistently absent from all the interaction terms included in the model (Model 2). These results suggested that Hypothesis 1 is supported. In Step 2, Model 1 and Model 2 were repeated by excluding TBNQ but, this time, by including leverage and firm-value effects (LEV, IVAL) as seen in Model 1 and Model 2. No positive effect of SRAT on RET appeared as significant. Thus, these results do not support Hypothesis 1. In Step 3, to shed more light on the market value of the firm effect, TBNQ – the most-recommended firm-value variable (see, *e.g.* Fooladi, Shukor, Saleh, & Jafar, 2014; Haj-Salem *et al.*, 2020) – was inserted in the model with and without interactions with SRAT, while IVAL was excluded. The results still showed the same conclusion that the SRAT effect on RET is not found to be positively significant. As such, these results are not consistent with Hypothesis 1.

Meanwhile, following the same steps as when testing Hypothesis 1, Hypothesis 2 was tested by looking into the results of Model 2 and referring to the MRA method (Sharma *et al.*, 1981). Model 2 was repeated from Step 0 to Step 3. Step 1 controlled for size effect (ln_SIZE), when all the independent variables (excluding ROI) and their interactions with SRAT were included, and only the SRAT-LEV and SRAT-IVAL interactions were found to be positively significant, while the SRAT-TBNQ interaction was negatively significant, as depicted in Model 2 of Step 1 (significant at *p*-value < 0.05 and marginally significant at *p*-value < 0.10, respectively). These results suggest that Hypotheses 2a and 2b are supported. In Step 1, Model 2 seemed to be the best because it enjoyed the highest adjusted-R^2 (adj. R^2) after including all the relevant independent variables but excluding ROI.

In search of consistency, models in Step 1 were repeated in Step 2 by excluding TBNQ, the positive SRAT-LEV and SRAT-IVAL relationship are found to be consistently significant, as depicted in Model 2 of Step 2 (all significant at *p*-value < 0.01), while in Step 3 the model was repeated when two of firm-

characteristic effects (LEV, TBNQ) were included. The results showed that the positive SRAT-LEV relationship appeared consistently significant while the SRAT-TBNQ relationship denoted its negative significance, as seen in Model 2 of Step 3. These results confirm that LEV and IVAL are the main variables that positively moderate the positive SRAT effect on RET, whereby supporting Hypotheses 2a and 2b. The results also show that TBNQ was more consistent in affecting RET as a pure independent variable, while LEV and IVAL better reflected its persistence as pure moderating variables on the relationship between SRAT and RET (see Sharma *et al.*, 1981). Moreover, Ln_SIZE positively and significantly controlled all the tests for size effect, except for Model 1 of Step 0 and Step 1, meaning that size effects significantly and positively accounted for RET.

Table 5. The results of the testing models on Hypotheses 1, 2a, and 2b for the Indonesian sample

Independent Variables:	Signs	Step 0	Step 1	Step 2	Step 3	Step 0	Step 1★	Step 2	Step 3
					Dependent Variable: RET				
		Model 1	Model 1	Model 1	Model 1	Model 2	Model 2	Model 2	Model 2
C	?	0.628	0.271	0.666***	-0.387	-0.328	-1.205	1.491***	-1.458
SRAT	+/?	-0.779*	-0.9167**	-0.687***	-0.712***	-0.026	0.237	-1.672***	0.300
ROI	+/?	-1.995				3.172			
LEV	+/?	-0.771**	-0.717**	-0.747***	-0.824***	-2.439***	-2.513***	-3.260***	-3.411***
IVAL	+/?	2.28E-05	2.23E-05	2.24E-5		-6.79E-05	-5.34E-05	-5.63E-05	
TBNQ	+/?	0.362***	0.288***		0.429***	1.498***	1.880***		1.955***
SRAT*ROI	+					-7.211			
SRAT*LEV	+					1.753*	1.928**	3.171***	3.315***
SRAT*IVAL	+					0.00014**	0.00013*	7.77E-05***	
SRAT*TBNQ	+					-1.168***	-1.749***		-1.831***
Ln_SIZE	?	-0.0022	0.018	0.010***	0.034**	0.005***	0.034***	0.010***	0.043**
R^2		0.234	0.271	0.144	0.235	0.297	0.288	0.168	0.259
Adj. R^2		0.187	0.1876	0.107	0.202	0.226	0.231	0.117	0.214
F-statistic (stat.)		4.943	5.658	3.910	7.123	4.181	5.034	3.288	5.709
p-value		0.000	0.000	0.002	0.000	0.000	0.000	0.003	0.000
Pooled-OLS		No	No	No	No	No	No	No	No
Fixed-effect		Yes♠	Yes♠	Yes♠	Yes♠	Yes♠	Yes♠	Yes♠	Yes♠
Random-effect		No	No	No	No	No	No	No	No
F-stat. (Chow test) (*p*-value)		10.587 (0.0015)	11.44 (0.001)	11.349 (0.0010)	10.051 (0.0019)	9.084 (0.0032)	10.285 (0.0017)	11.749 (0.0008)	10.739 (0.0014)
LM-statistic (*p*-value)		0.01 (0.4541)	0.02 (0.4444)	0 (1)	0.11 (0.3713)	0.02 (0.4472)	0.02 (0.4492)	0 (1)	0.05 (0.4130)
Observations		122 (61X2)	122 (61X2)	122 (61X2)	122 (61X2)	122 (61X2)	122 (61X2)	122 (61X2)	122 (61X2)

Note: ♠Considering the Chow tests (all *p*-values are lower than 0.05) and LM (Breusch and Pagan Lagrangian multiplier) tests (all *p*-values are higher than 0.05), the fixed-effect models were applied; thus, Hausman test is not relevant. '+/?' indicates the two predicted signs among the models: the predicted sign of '+' stands for a non-interaction model (without moderating effects), while the predicted sign of '?' that may appear as various signs because of the pure-or-quasi-moderator assumption (Sharma *et al.*, 1981) stands for a model with the moderating effects.
★It is the best model since it enjoys the highest adj. R^2, after including all the relevant independent variables, but excluding ROI.
*, **, *** refers to 10%, 5%, and 1% levels of significance respectively.
Source: own study.

For the Malaysian sample (Table 6), Hypothesis 1 was tested by following only two steps, preceded by Step 0. Furthermore, the MRA analysis was adopted to arrive at a consistent inference. From the results of Step 0 in Model 1, all ROI effects were significant, but due to the existence of a high cross-correlation between ROI and TBNQ (0.71) and between ROI and IVAL (0.51) – with insights from the measurement of ROI and TBNQ reflecting the same firm-value variable from Baron *et al*. (2011), Siagian *et al*. (2013), and Haj-Salem *et al*. (2020) – Model 1 and Model 2 were repeated from Step 0. The two models incorporated all the independent variables, *i.e.* SRAT, and all the firm-characteristic variables, *i.e.* LEV, IVAL, and TBNQ (excluding ROI), either with or without their interactions. The two models in Step 1 suggest that when effects of the three variables, LEV, IVAL, and TBNQ, were included to serve as pure independent variables, the positive effect of SRAT on RET was not found to be significant, as indicated in Model 1, but when they were included in the model to appear as both independent and moderating variables on the SRAT–RET relationship, the positive effect of SRAT on RET was found to be consistently significant at the significance level of *p*-value < 0.01, as seen in Model 2.

Next, when TBNQ was inserted in the model with IVAL excluded due to all of its non-significant effects on the IVAL–RET relationship in Step 1 of Model 1 and Model 2, the result did not show significant and positive coefficients; that is, the positive effect of SRAT on RET was not found to be significant. Meanwhile, the positive effect of SRAT on RET was found to be consistently significant in Model 2 of Step 2 when TBNQ and interaction terms were included but IVAL was excluded. These results confirm that Hypothesis 1 is supported when controlling for size effect and considering the effects of leverage, firm value (TBNQ), and their interaction terms.

Meanwhile, to test Hypotheses 2a and 2b, the study focused only on Model 2, following the same steps as when testing Hypothesis 1. Analysis was conducted but only on moderating effects of firm-characteristic variables (excluding ROI) on the SRAT–RET relationship (with the MRA method). In Step 1, by excluding ROI (in Step 0), the results suggested that the significant and positive effects of LEV, IVAL, and TBNQ did not exist to moderate the positive SRAT–RET relationship. Likewise, when IVAL was excluded and replaced by TBNQ to proxy for firm-value, the results were still inconsistent with the expected hypothesis. Hence, the significant and positive effects of LEV and TBNQ were not found to moderate the positive SRAT-RET relationship, as seen in Model 2 of Step 2. In this step, Model 2 shows the best model because its highest adj. R^2 was obtained after including all the relevant independent variables but excluding ROI. These results suggest that Hypotheses 2a and 2b are not supported. In this regard, the positive Ln_SIZE effect on RET was also significantly found to control for size effects in all the tests, suggesting that RET was also significantly and positively accounted for by size effects.

Table 6. The results of the testing models on hypotheses 1, 2a, and 2b for the Malaysian sample

Independent Variables:	Signs	Step 0	Step 1	Step 2	Step 0	Step 1	Step 2★
Dependent Variable: RET							
		Model 1	Model 1	Model 1	Model 2	Model 2	Model 2
C	-	-20.601***	-14.558***	-13.623***	-1.320***	-34.286***	-19.274***
SRAT	+/?	-0.303***	-0.082	0.003	0.776*	12.525***	8.488***
ROI	+/?	2.964***			7.167**		
LEV	+/?	1.859***	1.131***	1.008**	2.126**	19.650***	11.814***
IVAL	+/?	-0.009***	-0.0004		-0.049***	0.028	
TBNQ	+/?	0.265***	0.358***	0.358***	0.735***	3.764***	3.217***
SRAT*ROI	+				-6.437*		
SRAT*LEV	+				-2.081*	-19.922***	-11.940***
SRAT*IVAL	+				0.052***	-0.037	
SRAT*TBNQ	+				-0.765***	-3.681***	-3.174***
Ln_SIZE	?	1.219***	0.844***	0.785***	0.027***	1.347***	0.667***
R^2		0.976	0.957	0.947	0.625	0.989	0.9969
Adj. R^2		0.941	0.898	0.879	0.549	0.973	0.9925
F-stat.		28.124	16.436	14.029	8.179	58.657	2252.74
p-value		0.000	0.000	0.000	0.000	0.000	0.000
Pooled-OLS		No	No	No	Yes♠	No	No
Fixed-effect		Yes♠	Yes♠	Yes♠	No	Yes♠	Yes♠
Random effect		No	No	No	No	No	No
F-stat. (Chow test) (*p*-value)		11.865 (0.000)	8.438 (0.000)	8.411 (0.000)	0.651 (0.424)	17.972 (0.000)	70.775 (0.0000)
LM-statistic (*p*-value)		0.62 (0.215)	0.28 (0.299)	0.00 (0.478)	0.37 (0.272)	0.09 (0.384)	0.02 (0.445)
Observations		60 (30x2)	60 (30x2)	60 (30x2)	60 (30x2)	60 (30x2)	60 (30x2)

Note: ♠Considering the Chow tests (all *p*-values are lower than 0.05) and LM (Breusch and Pagan Lagrangian multiplier) tests (all *p*-values are higher than 0.05), the fixed-effect models were applied, except for Model 2 in Step 0 (*p*-value of the Chow test is 0.424, higher than 0.05, a pooled-OLS model is preferred). In this regard, the Hausman test is not relevant. '+/?' indicates the two predicted signs among the models: the predicted sign of '+' stands for a non-interaction model (without moderating effects), while the predicted sign of '?' that may appear as various signs because of the pure-or-quasi moderator assumption (Sharma *et al.*, 1981) stands for a model with the moderating effects.
★It is the best model since it enjoys the highest adj. R^2, after including all the relevant independent variables but excluding ROI.
*, **, *** refers to 10%, 5%, and 1% levels of significance respectively.
Source: own study.

CONCLUSIONS

When controlling for size effect and considering some firm-characteristic effects, all the results from the Malaysian sample convincingly support Hypothesis 1 rather than Hypotheses 2a and 2b. Thus, Malaysian investors place more emphasis on their *sukuk* ratings than the Indonesian investors, who base their business strategy on aggregate insights from both their *sukuk* ratings and firm-characteristic metrics, *i.e.* especially the level of leverage and firm (intrinsic) value. In other words, when controlling for size effect, the moderating effects of LEV and IVAL are found to be positively significant on the *sukuk* ratings–stock return relationship in the Indonesian sample, thereby supporting Hypotheses 2a and 2b. Thus, these results illustrate that when valuing stock (stock returns) in Indonesia, the interactions between *sukuk* ratings and leverage and also between *sukuk* ratings and firm value (IVAL) – which reflect a firm's fundamental value – is more pervasive among investors' investment activities. Meanwhile, a firm's value reflecting a market-based firm-value indicator (TBNQ) is more commonly found to serve as a pure independent variable that affects stock returns positively.

Therefore, we may conclude that – in some cases – *sukuk* ratings have a positive and direct effect on stock returns, which is consistent with the findings of Ng and Ariff (2019), Khartabiel *et al.* (2020), Mohamed *et al.* (2017), Rahim and Ahmad (2016), and Ab Hamid *et al.* (2014). However, utilizing *sukuk* ratings to determine the stock price (stock return) in other cases, is to some extent not direct and constant but, instead, contingent on and involving other variables, *i.e.* firm-characteristic variables. This certainly supports the abovementioned statement from Moody's, one of the big three rating agencies in the world, that many factors are involved in the judgement of the quality of long-term credit, including *sukuk* (Moody's Credit Ratings & Research, Moody's Investors Service, 1995). One reason why these *sukuk* rating effects on stock returns look to be different could be attributed to the fact that the types of other specific variables involved in examining the *sukuk* rating effect on stock returns may vary depending on the comparative characteristics of the sampled countries.

In some respects, Malaysia has statistically enjoyed better macroeconomic indicators than Indonesia. In the last three years (2017-2019), the average GDP per capita for Malaysia was higher than in Indonesia: 28 937.43 USD for Malaysia vs 12 113.88 USD for Indonesia (The World Bank, 2020). Besides, in 2018–2020 the default-risk profile for Malaysia was also better than for Indonesia, indicated by their comparative credit rating values: A3 for Malaysia vs Baa2 for Indonesia (Moody's Rating), A- vs BBB (S&P Rating), and A- vs BBB (Fitch Rating). Specifically, the global *sukuk* market share for Malaysia is also much greater than Indonesia, *i.e.* 60.84% vs 7.225% of the global *sukuk* market share. Thus, Malaysia is the world leader in *sukuk* (IIFM, 2019). Moreover, *sukuk* is regarded in Malaysia as an instrument that is not riskier than conventional bonds; the risk profile of *sukuk* (measured by value-at-risk or VaR) is evidently in line with credit rating predictions (Alam, Bhatti, & Wong, 2018).

Given all the above comparative performance of these country-specific characteristics (macroeconomy, risk-default, and *sukuk* market share profile), Malaysia seems to place at a relatively more advanced level of *sukuk* ratings than Indonesia. Thus, *sukuk* ratings in Malaysia attract much more interest and trust from many investors than *sukuk* ratings in Indonesia. Furthermore, the comparability of risk between *sukuk* and conventional bonds, along with consistency between *sukuk*-risk profile and credit-rating predictions in Malaysia (Alam, Bhatti, & Wong, 2018), could be another plausible explanation. The above explanations lead us to confirm one reason why the assessment of *sukuk* by *sukuk* rating agencies has a direct effect on stock returns and is more pronounced in Malaysia than in Indonesia. Therefore, *sukuk* ratings tend to better serve as the key determinant in pricing stock (stock returns) in Malaysia than in Indonesia, in which they are relatively less accounted for by its investors but, instead, their role seems to be contingent on some firm-characteristic variables (LEV and IVAL).

When testing the hypotheses, the study conducted some robustness checks. First, the models were tested by excluding the control variable (ln_SIZE) to make sure that there appears the effect of the control variable. To the best of my testing abilities, most of the control variable effects in all the models appear to be significant. Thus, all the above results are reported by controlling for size effect (ln_SIZE). Besides, a conjecture of a simultaneity bias and reverse causation regarding stock returns also impacts *sukuk* ratings, which has been checked by applying the Durbin-Wu-Hausman (DWH) test. All the samples show that reverse causation does not exist. The null hypothesis that there is no simultaneity correlation failed to be rejected (p-value = 0.18 > 0.10 and p-value of 0.4149, higher than a 10% level of significance, for the Indonesian and Malaysian sample respectively).

However, some limitations remain and require much attention from future studies, *e.g.* the data is still limited, especially from Malaysia. To receive better insights of a country's characteristic effect, coverage could be increased from a limited number of countries (Indonesia and Malaysia) to more countries, especially Muslim or non-Muslim *sukuk*-issuing countries. Moreover, moderating variables could involve not only some firm-characteristic variables or a company-level analysis but also a wider level of analysis, such as an industry-level or country-level analysis. The use of *sukuk*-rating data from credible credit-rating agencies is also highly recommended, given the significance credit-rating reputation (Baghai, Servaes, & Tamayo, 2014; Bedendo, Cathcart, & El-Jahel, 2018).

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Conflict of Interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Brand types applied by emerging markets' firms: Country of brand origin and brand use motives

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A B S T R A C T
Objective: The objective of the article is to explore the types of brands in terms of the country of brand origin (COBO) applied by emerging markets' firms and motives for applying them.
Research Design & Methods: A qualitative approach was used, i.e. multi-case study of five emerging markets' firms and data triangulation.
Findings: Studied firms apply in the international market various types of brands in terms of the COBO by 1) referring to the foreign COBO, 2) referring to the origin from the home market, and 3) neutralising the COBO effect. Moreover, the firms differ in terms of their international brand portfolio: from consisting of a single brand to covering several or dozen international – even global – regional, or local brands.
Implications & Recommendations: The dominant international branding strategy of emerging markets` firms in terms of the COBO is acquiring/ licensing well-known international or even global brand/ brands and creating 'occidental-style' brand. It is driven both by strategic and market motives. The conclusions can be applied by emerging markets' companies in their foreign expansion.
Contribution & Value Added: This study develops a deeper understanding of the brand types applied by emerging markets' companies in terms of the COBO and brand use motives.
Article type:	research article
Keywords:	international branding; the country of brand origin; COBO; emerging markets' firms' strategies
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INTRODUCTION

In recent years, an increasing internationalisation and a growing significance of international branding of emerging markets' firms have been noticed (Erdoğmus, Bodur, & Yilmaz 2010; Kazlauskaitė, Autio, Šarapovas, Abramavičius, & Gelbūda, 2015). Multinational corporations from these countries play an increasingly important role in the global market (McKinsey Global Institute, 2018). For many years, emerging countries' firms had been operating in foreign markets primarily as suppliers of low-cost products or large multinational corporations' subcontractors (Guzmàn & Paswan, 2009). Today, these companies compete both in emerging and developed countries based not only on cost advantage and lower prices but also on the uniqueness of products and application of strong brands (Pillania, 2009). International branding strategies of emerging markets' companies evolve as the degree of their internationalisation increases, starting with domestic branding through exporting products under Original Equipment Manufacturer (OEM) contracts and exporting products branded with own brands and under OEM contracts to international and global branding (Fan, 2008).

The negative impact of the country of brand origin (COBO) is one of the key barriers to foreign expansion of emerging markets' firms and brands (Chao, Samiee, & Yip, 2004; Karimov & El-Murad,

2018). Consumers perceive products and brands from developed countries as better than those from emerging markets (Josiassen & Harzing, 2008), which is reflected in customers' behaviour (Thakor & Lavack, 2003). Negative associations with the COBO reduce confidence in these brands and, as a result, consumers do not want to pay higher prices for them (Magnusson, Haas, & Zhao, 2008), although 'more sophisticated consumers are more willing to buy the developing country brand origin than technologically less sophisticated consumers' (Lee, 2019). However, as moving through the next stages of internationalisation, the equity of brands managed by emerging markets' firms increases, and the negative impact of the COBO becomes less significant (Fan, 2008). When developing a portfolio of brands applied internationally – wary of negative stereotypes (Chu, Chen, Chang, & Wang, 2010; Kim, Chun, & Ko, 2017) – firms from emerging markets face a dilemma whether to allow for the COBO to be identified (Ille & Chailan, 2011).

Although researchers underline the need to study the COBO phenomenon from a strategic perspective (e.g. Hynes, Caemmerer, Martin, & Masters, 2014), little research concerns the brand types used by emerging markets' firms in response to the COBO effect and motives for applying them. Moreover, these studies are focused on brands from developed countries and Asian companies, mainly Chinese (e.g. Xie & Boggs, 2006).

In view of the identified research gap, the aim of this article is to explore the types of brands in terms of the COBO applied by emerging markets' firms and motives for applying them, answering research questions:

1. What types of brands are applied in foreign markets by companies from emerging countries in terms of the COBO?
2. What are the motives for applying these types of brands?

To answer these questions, a multi-case study of five emerging markets' companies and triangulation of both primary and secondary sources was applied.

Answering these questions broadens the knowledge on approaches to brand portfolio creation and brand types applied in the international market by companies from various emerging countries in terms of COBO and brand use motives.

This paper is organised as follows. First, the literature pertinent to the international branding of emerging markets' firms in terms of the COBO is summarised. Next, the study method is outlined to be followed by a presentation of research findings. The paper concludes with a discussion of outcomes, limitations, and suggestions for further studies.

LITERATURE REVIEW

Our study refers to the country-of-origin paradigm, the signalling theory, and the brand origin recognition accuracy concept.

Since the 1960s, the country of origin (COO) has been one of the most important paradigms in the international marketing research. COO was initially understood as the country of manufacturing (COM; Nagashima, 1970). However, many researchers emphasis the COM's multidimensional character (e.g. Aruan, Crouch, & Quester, 2018; Coffey & Kabadayi, 2020) and indicate other dimensions, such as the country of design (COD; Insch & McBride, 1998), the country of assembly (COA; Insch & McBride, 1998), the country of parts (COP; Han & Terpstra, 1988), the country of corporate ownership (COCO; Ozsomer & Cavusgil, 1991), and – finally – the COBO (Thakor & Kohli, 1996, p. 28) defined as 'the country to which the brand is perceived to belong.' Due to the changes in the global economy – including supply chains – some scholars postulate using the COBO construct (Thakor & Lavack, 2003; Brodie & Benson-Rea, 2016).

According to the signalling theory – based on the prerequisite of a rational and risk-averse individual – both the sender (firm) and the receiver (customer) of signals have an interest in reducing information asymmetry. From this perspective, a brand applied by the company from emerging market may be treated as a signal for reducing consumer uncertainty about the quality of a product (e.g. Erdem,

Swait, & Valenzuela, 2006), while the consumer as the receiver of this signal engages in the cognitive effort of its interpreting to limit uncertainty (e.g. Kirmani & Rao, 2000).

When choosing the brands applied in the international market, firms may directly or indirectly refer to the positive image of the COBO (Aichner, 2014; Hynes, Caemmerer, Martin, & Masters, 2014) or neutralise (hide, suppress) the poor image of the country from which brand originates (e.g. Herstein, Berger, & Jaffe, 2014).

As Huang and Hsieh (2011) emphasise, emerging markets' firms face a key dilemma for the effectiveness of their international branding strategy: whether to refer to the Western culture or to the culture from which the company/brand originates. According to the studies on the brand origin recognition accuracy (BORA), consumer's recognition of a COBO is based on the associations of a brand name with the language of a given country (Samiee, Shimp, & Sharma, 2005). By using brand name suggesting an origin from the country with a desired image (e.g. a Western brand name), firms may reduce the bias caused by the negative effect of the COBO and increase the effectiveness of their international strategy (Kim, 2006; Herstein, Berger, & Jaffe, 2014). Emerging markets' firms may not only create new 'Western-style' international brands, which takes time, but also acquire an already existing well-known international brand (Huang & Hsieh, 2011).

When developing a portfolio of brands and deciding whether to refer to the brand origin from a home market, emerging markets' firms should consider both the influence of the COBO on foreign customers' perception of trust vs risk generated by a brand and a global vs local approach to the brand image creation (Ille & Chailan, 2011).

Considering the consumer's risk aversion towards a brand and the local vs global emphasis, Chailan and Ille (2015) indicate four options of brands that may be applied by the emerging markets' firms:

1. a well-known international, even global, brand acquired in order to reduce the customers' perceived risk by referring to the brand's global qualities,
2. an occidental-style brand created *ex nihilo* and introduced to foreign markets, conjuring up positive images among customers,
3. a brand already existing in the home country, emphasising its localness and referring to the positive image of the genuine COBO to reduce consumers' perception of risk, and
4. a new 'local-go-global' brand referring to the local language and cultural values.

Given the above, we propose:

H1: Companies from emerging countries apply on the foreign markets both brands referring to the brand origin from the foreign country with the positive image and brands referring to the positive image of the home country.

H2: The choice of the brand type applied by companies from emerging countries on foreign markets in terms of the COBO is motivated by market motives and strategic motives.

RESEARCH METHODOLOGY

To answer the research questions, we applied the multi-case-study method (Yin, 2003) and purposeful sampling (Harsh, 2011) intended to capture the diversity of the studied phenomenon and enable the disclosure of repetitive patterns through literal and theoretical replications (Yin, 2003, pp. 48-49). As e.g. Ebeneyamini and Moghadam (2018) emphasise, case study as a qualitative approach is appropriate to answer the 'why' and 'how' research questions. However, contrary to quantitative research, case studies disallow the identification of a phenomenon's frequency or the generalisation of conclusions for the entire population.

To provide the most precise analysis, we limited our study to one product category only: household appliances. The studied firms vary by the degree of their internationalisation (the number of foreign markets and the share of sales on foreign markets in total sales), the COCO/COBO, and the location of their production facilities (Table 1). The firms were identified based on the information obtained from the APPLIA experts, an association of employers in the household appliances industry (Applia, 2018). When selecting firms and interviewees, we followed their availability (operating in Poland, providing

required data). We analysed the cases of five household appliances companies originating from Poland, Turkey, South Korea, China (formerly Slovenia); countries classified as emerging markets by the MSCI (2018) at the time of the study (October-November 2018). Due to the research questions posted, we selected companies selling products on foreign markets under brands managed by these firms. We chose household appliances' firms as in that industry companies and brands from emerging markets have been playing an increasingly important role, competing with global brands from developed countries. It is reflected in the growing share of firms from e.g. China, South Korea, Poland, and Turkey in the household appliances market and in the growing market shares of their brands in a number of markets, including European ones (e.g. Applia, 2018; Euromonitor International, 2016).

To ensure credibility, we used a triangulation of data that were obtained from 1) primary sources using ca. two-hours semi-structured in-depth interviews in Polish with six Polish-speaking managers of the surveyed companies or their branch offices in Poland and by applying a semi-structured questionnaire with open-ended questions recommended in studies on the COO (Rashid, Barnes, & Warnaby, 2016), and 2) secondary sources such as industry reports, companies websites, and firm reports (Yin, 2003).

Table 1. General characteristics of the surveyed companies

Company	COCO/ COBO	Share of sales on foreign markets in total sales	Number of foreign markets	Share of sales under manufacturer/ licensed brands in total sales
Amica	Poland / Poland	65%	55	100%
LG Electronics	South Korea / South Korea	92%	several dozen	100%
Arçelik	Turkey / Turkey	vast majority	over 100	100%
Gorenje*$_{jt}$	China / Slovenia	95%	40	100%
Vestel$_{jt}$	Turkey / Turkey	majority	149	about 18%-20%

* The Gorenje brand originates in Slovenia (former Yugoslavia), and in 2018 the Chinese Hisense Group acquired control of it.
Source: own study.

The interviews transcripts were subjected to content analysis in search for patterns that concern central concepts of the study. As a theoretical framework for the analysis of the types of brands applied by emerging markets' firms in terms of the COBO, we adopt the typologies proposed in the literature, namely:

1. direct or indirect reference to the COBO vs the neutralisation of the COBO (Aichner, 2014; Hynes, Caemmerer, Martin, & Masters, 2014; Herstein, Berger, & Jaffe, 2014), and
2. a) a company acquires an already existing well-known brand,
   b) an occidental-style brand created *ex nihilo*,
   c) a brand that already exists in the home country, and
   d) a 'local-go-global' brand (Chailan & Ille, 2015).

In order to identify the motives of applying various brand types in terms of the COBO, we used an inductive approach (Nowell, Norris, & White, 2017).

RESULTS AND DISCUSSION

The surveyed emerging markets' firms apply various approaches to the types of brands in terms of the COBO and the structure of their brand portfolio on the international market (Table 2).

Referring to the previously indicated typology of branding strategies in terms of the COBO (direct or indirect reference to the COBO vs the COBO neutralisation) and the categories of branding strategies applied by the companies from emerging markets indicated by Chailan and Ille (2015), we identified brand types applied by the studied companies in terms of the COBO and brand use motives as presented in Table 3.

Table 2. The types of brands in terms of the COBO and the structure of brand portfolios in foreign markets

Company	Types of brands in terms of the COBO
Monobrand portfolio	
LG Electronics	Occidental-style brand with an international range created by a company: LG – a global brand first introduced in South Korea and then in foreign markets; the brand name is an abbreviation of the previous corporate name and is not associated with the COBO, since 2016 LG SIGNATURE – a sub-brand with a descriptor introduced in English.
Multibrand portfolio	
Amica	Occidental-style brands with an international range created by a company: Amica – created in an occidental-style, brand name suggests Italian origin, first introduced to the Polish market (1992) and then to Germany, the Czech Republic, Slovakia, Spain, and the UK, among other places. Hansa – created *ex nihilo* in the occidental style, brand name suggests German origin, first introduced on the Russian market (2000), and then in other countries of Eastern and Southern Europe and in Kazakhstan, Tajikistan, and Uzbekistan. A foreign brand with an international range acquired by Amica: Gram – acquired in 2001, with a regional range (Scandinavian countries) and Danish origin, existing since 1899. A foreign brand with a local range acquired by Amica: CDA – a British brand acquired in 2015, existing since 1991, sold mainly in the UK.
Arçelik	'Local' brand introduced first on the home market and then on foreign markets: Arçelik – created by Arçelik; brand name associated with Turkish origin because of its spelling, sold mainly in Turkey and a few neighbouring markets (the brand's website is available only in Turkish). Occidental-style brand with an international range created by Arçelik: Beko – created in the occidental-style, with an international range, brand name is not associated with Turkey, first introduced to the UK, and then to 130 other foreign markets. A foreign brand with an international range acquired by Arçelik: Grundig – a global brand of German origin, existing since 1945. Blomberg – a global brand of German origin and long tradition (since 1883), sold, among others, on the German market, in the UK, the USA, Kazakhstan, Azerbaijan, and Taiwan. Foreign brands with local range acquired by Arçelik: a) from developed countries: Elektrabregenz – acquired in 2002, existing in Austria since 1989, with a German name. Leisure – acquired in 2002, of British origin and English name, existing for over 230 years. Flavel – acquired in 2002, of British origin, existing since 1777, one of the most famous household appliances brands in the UK and Ireland. b) originating from emerging or developing markets: Arctic – local brand acquired in 2002, existing in Romania since 1968, Dawlance – local brand acquired in 2016, existing in Pakistan since 1980, Defy – local brand acquired in 2011, existing in South Africa since 1905.
Gorenje	A 'local' brand first introduced on the domestic market and then on foreign markets: Gorenje – a global brand of Slovenian origin created in 1954, first introduced on the market of former Yugoslavia and then on foreign markets: in 1972 in Germany and then in many European markets, in South America (e.g. Brazil, Chile), and Asia (e.g. China, Vietnam, Thailand). A foreign brand with an international range acquired by Gorenje: Asco – acquired in 2010, of Swedish origin, and with a global range. Foreign brands with an international (regional) range acquired by Gorenje: a) originating from highly developed countries: Atag – acquired in 2008, of Dutch origin, sold in the Benelux countries, Pelgrim – of Dutch origin, existing since 1920, sold mainly in the Benelux countries, Etna – of Dutch origin and more than 150 years of tradition in the kitchen appliances market, sold in the Benelux countries, UPO – of Swedish origin, sold in the Nordic countries, mainly in Finland, Körting – of German origin, sold in a few countries of Central and South-Eastern Europe, b) originating from emerging or developing markets:

	Mora – of Czech origin, sold mainly in the Czech Republic and Slovakia.
Vestel	Brand introduced first on the domestic market and then on foreign markets:
	Vestel – created by Vestel, sold mainly on the home market in Turkey and in a few neighbouring markets.
	Foreign brands with an international range gained by Vestel through a license agreement, e.g.:
	Toshiba, Sharp, JVC – global brands of Japanese origin, applied under a license agreement, sold on the international market in various categories of household appliances, consumer electronics,
	Telefunken – a global brand of German origin, gained under a licence agreement in the category of TV sets, existing since 1903, sold in about 120 countries.
	Foreign brands with an international range acquired by Vestel:
	a) originating from developed countries, e.g.:
	Vestfrost – acquired in 2008, with an international range, of Danish origin, existing since 1963, sold e.g. in Poland, Ukraine, the UK,
	Finlux – acquired in 2006, with an international range, of Finnish origin, sold in Germany, Turkey, the UK, Poland, France, Finland, Norway, Denmark, and Iceland,
	Graetz – of German origin, sold in German-speaking countries,
	Digihome – sold in the Scandinavian countries,
	Foreign brands with a local range acquired by Vestel:
	a) originating from developed countries, e.g.:
	Servis – British brand acquired in 2011, existing since 1929,
	Isis – British brand of TV sets and household appliances.

Source: own study.

Table 3. Brand types in terms of the COBO applied by the firms from emerging markets and brand use motives

Types of brands				Motives	Brand (company)
Brands acquired by a company from emerging market or obtained under a li-	Reference to an origin from a foreign country	Reference to the origin of a brand from emerging market	Acquired regional or local brand originating from emerging or developing markets	Strategic motives: - development on a particular foreign market, - strong brand position on the local market, - acquisition of a factory on the local market, - a strong regional brand without the potential to expand into other foreign markets, - developed distribution chain of the brand in countries of the region.	Arctic, Dawlance, Defy (Arçelik) Mora (Gorenje)
		Reference to a Western origin of a brand	Acquired or obtained under a licence agreement international or even global brand originating from the developed country	Strategic motives: - opportunity to acquire a strong brand of European origin, - reaching specific targets markets preferring traditional brands, - acquisition of a brand known for its advanced technology, - lower expenditure on obtaining a licence to use a strong international brand than on purchasing a brand through company acquisition, - licence to use a brand as an intermediate stage between the purchase of a global brand and production for strong brand owners, - maintaining manufacturing under a strong global brand in the acquired bankrupt factories of the brand owner, - higher margins by selling products under strong global brands acquired through licensing or acquisition. - Market motives: - high awareness and good perception of the acquired foreign brand on markets important for the company, - new vintage trend, - positive reputation of the acquired global brand on many foreign markets, - preferences of consumers towards well-known global brands with long heritage, - problems of Japanese companies, forcing them to restructure by selling factories and licences for their global brands.	JVC, Sharp, Telefunken, Toshiba (Vestel) Grunding (Arçelik) Asko (Gorenje)

Types of brands				Motives	Brand (company)
Brands autonomously created by a company from emerging market			Acquired regional or local brand originating from developed country	Strategic motives: - the expansion and strengthening of the firms' position on developed European markets, - higher margins on foreign markets when offering products under a strong brand. - Market motives: - high brand awareness and heritage on given foreign markets, - consumers' preference towards brands with a long tradition in the region.	CDA, Gram (Amica), Elektrabregenz, Flavel, Leisure (Arçelik)
	Neutralisation of the genuine country of a	Reference to a Western origin of a brand	Occidental-style brand created by an emerging market firm, suggesting origin from a developed country and created as international/global brand	Strategic motives: - building close relationships with consumers around the world, - targeting brand to foreign consumers with a name easy to pronounce and communicate on the global market, - corporate brand name containing letters that identify the COBO, - creating a global brand image. - Market motives: - positive associations with the characteristics of products originating from the country with whose language the brand name is associated, - negative associations by foreign consumers with the genuine COO, - the perception of German brands on many foreign markets as high-quality, - the positive effect of a brand associated with German origin on consumers' purchasing decisions, especially in Eastern and Southern Europe, - the perception of brands from the country of brand owner's origin as more advanced thanks to other previously created strong international brands from that country.	Amica, Hansa (Amica) Beko (Arçelik) LG (LG Electronics)
	Reference to the	Reference to the domestic origin of a brand	'Local' brand already existing in the home country created by a company from an emerging market and introduced on foreign markets	Market motives: - better perception of brands of European origin than brands from China, - poor perception of China as the COBO in comparison to the European origin of a brand, - positive image of the COBO on many foreign markets, especially in Central and Eastern Europe, - the perception of a brand on a given foreign market as a pioneer of a specific product category.	Gorenje (Gorenje) Arçelik (Arçelik)

Source: own study.

We identified various brand types applied by the studied firms in terms of the COBO, along with strategic and market motives for using these brand types:

1. Referring to the brand origin from a foreign country:

a) Well-known international, and even global, brand from a developed country acquired by an emerging-market firm (e.g. Grundig, Blomberg, Asko) or obtained under a licence agreement usually for at least five to 10 years (e.g. JVC, Sharp, Telefunken, Toshiba), whose use allows users to create positive image of their COBO.

Grundig is an example of a strong brand originating from a developed country (Germany) and acquired by an emerging-market firm (Arçelik, Turkey). This brand for years has been perceived as a global brand, especially in the electronics market. Arçelik started applying the Grunding brand in 2004 but it has recently focused on the development of this brand on the international market, extending it also to household appliances and positioning it as a premium brand of German origin.

The interviewee from Company-Arçelik emphasised that,

> Grundig has all the time been a very strong brand in Germany. It is a brand perceived as typically European … mainly dedicated to such countries as Germany or Scandinavia, because Grundig was also known there … to focus on more demanding consumers who remember this brand from the past …. [so Grundig was used] to take advantage of a trend now common on the market: the new vintage.

In turn, Toshiba, Sharp and JVC are examples of strong global brands applied by an emerging market firm (Vestel, Turkey) under a licence agreement. These brands are important for Vestel's international brand portfolio: e.g. on the Polish market about 90% of sales are products based on licensed brands such as Toshiba (TV sets), Sharp (household appliances), JVC or Hitatchi (TV sets), which are still characterised by the high level of awareness and a very good image among Polish consumers. The rationale for obtaining licences for the use of these brands in the foreign expansion of Vestel is primarily the lower cost of obtaining them under a licence than acquisition (licence fees amounting to approximately a few percent of the value of sales of products labelled with these brands) and positive associations with their COBO (Germany, Japan).

The interviewee from Company Vestel stated that:

> These brands are strong for historical reasons, so using them absolutely matters. If it did not matter, there would be no licence. … Vestel is not a global company, but buying a global brand is a greater expense. In the case of licenses, we pay percentage but do not buy the brand. … It is much easier to sell a Toshiba TV set than the same one with a Vestel label. … Japanese companies had started to have problems; they couldn't respond quickly to market changes, so they noticed: why should we have factories, blown costs, people, etc.? … these licenses are such an intermediate stage between having a brand and manufacturing by order … often it is a matter of chance, because there is an opportunity, because the customer goes bankrupt.

Moreover, the interviewee indicate such motives for acquiring licence agreement with well-known international brands from developed countries as the acquisition of a brand owner known for advanced technology, preferences of consumers towards well-known global brands with long heritage, and higher margins by selling products under known global brands.

b) Acquiring by an emerging market firm of a strong regional brand (offered in a dozen or so countries of a given region; e.g. Gram) or a local brand (e.g. CDA) originating from developed country. The use of these brands makes it possible to refer to their COBO. An example of this type of brand is a Danish brand Gram acquired by Amica SA (Poland). An interviewee from Amica explained:

> the aim certainly was to expand into Western markets, affluent and offering higher margins, plus the use of the potential of the Gram brand, which was the strongest in refrigeration equipment … [as] Scandinavian consumers are very conservative, very used to what they have had for years … [so] it would be a tough fight to make them buy Amica products …. the purchase was all about using the umbrella of familiarity towards Gram. This brand is better known, has a longer heritage, and is positioned higher than Amica.

c) Acquiring by an emerging market firm of a strong regional brand (offered in a dozen or so countries; e.g. Mora) or a local brands (e.g. Arctic) originating from emerging or developing markets. The use of these brands makes it possible to refer to their COBO and its use in a given region/country.

Arçelik acquired a number of local and regional brands with a long tradition in particular emerging or developing markets such as Arctic (Romania), Defy (South Africa), and Dawlance (Pakistan). According to the interviewee from Arçelik:

> Arçelik bought a local brand Arctic several years ago, and we sell in Romania under this brand … Arçelik has one approach: if it enters a market, it does so to develop and grow. … if a brand is strong enough, Arçelik does not kill the brand … in emerging markets such as Pakistan, among others, we have factories that we have taken over. There are very strong local brands.

Among the motives for acquiring strong local or regional brands originating from emerging or developing countries, interviewees indicated the goal to develop on a particular foreign market a distribution chain for the brand in regional countries.

2. Referring to the origin from home country:

a) A 'local' brand already existing in the home country is created by an emerging market firm and introduced on foreign markets, including neighbouring ones (e.g. Gorenje, Arçelik). These brands

are created with reference to the positive COBO image in the countries of foreign expansion, and they emphasise localness in order to reduce the risk perceived by consumers, also with reference to the success of the brand on the home market.

The example of this type of brand is Gorenje (of Slovenian origin), whose name comes from its first headquarters` hometown. The success of Gorenje in the former Eastern Bloc, including Poland, was the result of the positive perception of Slovenia as the COBO, Gorenje's long tradition, the high level of familiarity, and positive image in these countries; e.g. in Poland this brand first appeared in the 1970s and was the first brand of automatic washing machines. The brand communicates its origin in Slovenia as the member of European Union: 'European products answer to typical Chinese production, which is poorly associated …. Slovenia is the region with the best organised people. This is also reflected in their economic situation. They were the first in Eastern Europe to join the European Union and adopt the euro.'

In turn, Arçelik was the first brand used by the company Arçelik in household appliances market and successfully developed primarily on its home market (Turkey), but it is also exported to several neighbouring countries.

2. The neutralisation of a genuine brand origin by suggesting its foreign origin:

a) Occidental-style brand created by an emerging market firm and applied in foreign expansion – by suggesting origin from a developed country (e.g. Amica, Hansa, LG, Beko) – created as an international or even global brand.

These brands may be introduced first on the home market and, then, on foreign markets (e.g. Amica) or created *ex nihilo* for the purpose of expansion on foreign markets (e.g. Hansa, Beko). Amica is an 'occidental-style' brand as its brand name is associated with the Italian word *amica*, which in Latin means 'a friend, friendly.'

As the interviewee from Amica states: 'everything Italian is associated with design …. Our trademark symbolises our commitment to maintaining close relationships with customers around the world …. On the German market, the use of a non-Polish sounding brand name helps.'

Moreover, in Eastern and Southern European and Central Asian markets Amica introduced the Hansa brand created *ex nihilo*, whose name suggests German origin. This brand was created to expand into Russia and other markets of Eastern and Southern Europe.

The interviewee from Amica stresses the importance of using in the household appliances/consumer electronics industry brands suggesting German origin because of the very positive associations attributed to German products by consumers in these markets: 'Everything that is German clearly supports purchase decisions, so any associations with German origin add a few points in shopping preferences. … It stems from Russian research: everything originating from Germany is solid and of good quality.'

In turn, the leading international brand of company Arçelik is Beko, created in the occidental style. Beko consists of two initial letters of the two founders' names; it is short, easy to pronounce in many languages, easy to remember, and does not refer to Turkey. As the interviewee emphasises: 'on the European markets, the Beko brand was chosen primarily because it is easy to pronounce and easy as a brand to promote. Arçelik has a specific spelling, it is difficult to pronounce. So, it was necessary to create a brand that would be more international.'

LG is another occidental-style brand, which is the only brand of LG Electronics (South Korea) in the household appliances/consumer electronics industry. The brand was first introduced on the domestic market and then in numerous foreign markets. This brand name is an abbreviation of Lucky Goldstar, which was the former name of the company. The LG brand was created as a global brand, as emphasised on the Polish website of the brand: 'The global dimension, a look into the future, energy, sensitivity to people's needs, and technology are the foundations of LG' (lg.com/pl/o-lg/nasza-marka). Emphasis on the global character emerges from the LG brand, its logo, and the brand slogan. A strong global brand image created by the brand owner seeks to neutralise the effect of its South Korean origin, not to mention the competition from Chinese brands. As the interviewee emphasises: 'Korean companies began to be perceived as more advanced. And it was mainly based on Samsung, which was the first strong brand from Korea, while the second was probably Hyundai. Now, the perception of Korean products is as good that of Japanese products 15-20 years ago.'

The findings of our study agree with the conclusions of previous studies (e.g. Aichner, 2014; Hynes, Caemmerer, Martin, & Masters). Moreover, our research confirms the conclusions of Chailan and Ille's (2015) study that one of the brand types applied by emerging markets' firms in terms of the COBO is acquired strong international or even global brand originating from developed country (e.g. Grundig, Blomberg, Asko). However, we found that emerging markets' firms not only acquire well-known global brands with a significant reputation but also obtain them under licences (e.g. JVC, Sharp, Toshiba), which enables referencing the latter's positive COBO image (e.g. German or Japanese) and reducing costs.

Moreover, our research showed that emerging markets' companies may apply a monobrand portfolio (like LG) or a multibrand portfolio (like the other studied companies), which supports the results of Fan's (2008) study, as the vast majority of studied companies apply multiple brands. Furthermore, emerging markets' companies use a brand whose name can be associated with the language of a country perceived as a COBO (e.g. Amica, Grundig, Hansa) and avoid using brands with names associated with the language of the company's genuine country of origin (e.g. Arçelik), which is consistent with the signalling theory (Magnusson, Haas, & Zhao, 2008). As for the motives of applying various types of brands in terms of the COBO, interviewed managers indicated both strategic and market motives. Among the strategic motives, we may indicate lower expenditures on obtaining a licence than on purchasing a brand or its autonomous creation. Among other things, this may result from limited resources of emerging markets' companies or their minor marketing experience on foreign markets (Luo & Tung, 2007). The market motives we identified are confirmed by many previous studies from the consumer perspective (e.g. Josiassen & Harzing, 2008). These motives is e.g. positive reputation of acquired global brands originating from developed countries or the ones known on many foreign markets, but also the poor reputation of brands originating from emerging markets.

CONCLUSIONS

According to our study, companies from emerging markets that operate in the household appliances industry apply various brand types in terms of the COBO by 1) referring to the brand origin from a foreign country, 2) referring to the brand origin from the home market, and 3) neutralising the COBO effect. Our research shows that companies from emerging markets, which want to refer in their international branding to the image of a developed country, acquire not only global brands but also strong regional brands (sold in several countries of a given region; e.g. Gram) and even local brands (e.g. CDA) from these countries. Moreover, emerging markets' firms acquire well-known regional (e.g. Mora) or local (e.g. Arctic) brands that originate from emerging or developing economies applied locally/regionally, which refer to the positive image of their COBO.

Furthermore, we found that emerging markets' companies may refer to the origin of the brand from the home country by launching their 'local' brand, created by the company on the home market and introduced to foreign markets (e.g. Gorenje, Arçelik). This method confirms the conclusions of Chailan and Ille's study (2015). Among the brands applied by the studied firms, our study did not identify one of the brand types listed by Chailan and Ille (2015), namely the new 'local go global' brands, created as deeply rooted in the local origin. We justify this by the fact that in the case of high involvement products, including household appliances (Seitz, Razzouk, & Wells, 2010), the impact of the COBO on consumer purchases is higher compared to low involvement products (Dinnie, 2004). Moreover, household appliances are not classified as strongly culture-bound, whose purchase is significantly influenced by the COBO (Cleveland, Rojas-Méndez, Laroche, & Papadopoulos, 2016), which explains why references to cultural values are not used in these brands' positioning.

Emerging markets' firms also neutralise the COBO effect by creating occidental-style brands, whose names suggest they originate from a developed country (e.g. Amica, Hansa, LG, Beko) and are international, even global brands. The study shows that these brands may be created *ex nihilo* for the purpose of expansion into foreign markets (e.g. Hansa, Beko), as indicated by Chailan and Ille (2015), but they may also be introduced on the home market first, only later to be launched on foreign markets (e.g. Amica).

Our study shows that emerging markets' firms differ among themselves in types of brands they apply on foreign markets, in terms of the COBO, and in terms of the structure of their brands' portfolio: from a portfolio consisting of a single brand (LG Electronics) to portfolios that cover several or dozen brands, including international, regional, and local (e.g. Arçelik, Amica SA, Goreenje, Vestel). The South Korean company LG strives to create one strong global brand in Western style, also by intensifying brand promotion in various countries around the world. In turn, the Turkish company Vestel primarily focuses on acquiring many brands – recognised internationally, regionally, or only locally – often by taking advantage of market opportunities. Moreover, there appear different market and strategic motives that determine the application of various brand types in terms of the COBO.

This study contributes to the existing literature by developing a deeper understanding of the international branding of emerging markets' companies in terms of the COBO and the structure of the brands' portfolios used by these firms on the international market. This is particularly important as the research so far focused primarily on companies and brands from developed countries, while a few studies referring to emerging markets mainly focused on Asian companies (Xie & Boggs, 2006).

One of the main limitations of our article is that among companies analysed in our multiple-case study, there appear firms from only four emerging markets: Poland, Turkey, Slovenia (acquired by a Chinese company), and South Korea. Moreover, only Polish managers took part in the study, although they had experience not only on the Polish market but also on the international one. Furthermore, our study is limited to the household appliances industry, which is quite specific, among other things, due to intense international competition, geographical scope, and global value chains. Future research would benefit from including firms from other emerging markets and industries, also meaning managers from various countries who represent different approaches to the studied phenomena. Scholars should also consider conducting quantitative research on the relations between international branding strategy in terms of the COBO applied by companies from emerging markets and brand/company performance.

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Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relation-ships that could be construed as a potential conflict of interest.

The role of contextual factors on predicting entrepreneurial intention among Vietnamese students

Dương Công Doanh

A B S T R A C T
Objective: The objective of the article is to explore the specific underlying mechanisms in which contextual factors are internalised into students' cognitive process of entrepreneurship in Vietnam.
Research Design & Methods: A quantitative study with a meta-analysis was conducted by utilising structural equation modelling (SEM). The sample consisted of 2218 final-year students from fourteen universities located in two major regions in Vietnam who were surveyed using stratified random sampling.
Findings: Results revealed that social capital was not directly related to intention to become entrepreneurs, which had indirect and significant impact on start-up intention throughout attitude towards entrepreneurship, perceived behavioural control, and entrepreneurial self-efficacy. In addition, the regulatory dimension negatively affected entrepreneurial intention while the normative dimension positively promoted this intention. University education not only directly affected but also indirectly influenced entrepreneurial intention via antecedents of the theory of planned behaviour. The research also showed the mediating role of attitude towards entrepreneurship, perceived behavioural control, and entrepreneurial self-efficacy between contextual factors and entrepreneurial intention among Vietnamese students.
Implications & Recommendations: The study has several implications and practical recommendations for universities and policymakers in boosting business venturing activities among college students.
Contribution & Value Added: The empirical evidence of the research supported the theoretical arguments, which specified the detailed mechanisms that contextual factors affect the cognitive process of business venture.

Article type:	research article
Keywords:	regulatory and normative dimensions; social capital; university education; theory of planned behaviour
JEL codes:	L26, M13

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INTRODUCTION

Recently, we witness a drastic change in the labour market (Meoli, Fini, Sobrero, & Wiklund, 2020). Working environment and traditional administrative structures transformed as a result of workforce diversity, increased internationalisation, and the rapid development of technologies, which results in a revolution in how people enact their career choices (Sullivan & Baruch, 2009). For the youth – especially university students – business venture as a career gains in popularity (Edelman, Manolova, Shirokova, & Tsukanova, 2016). Indeed, many policies fostering entrepreneurial activities – especially student entrepreneurship – have been proposed in both developed and developing countries, which translates into support policies and programmes by governments of many countries. Several policies showed positive effects, whereas other revealed only partial success (Baughn, Lim, Le, Neupert, & Woods, 2006). The different outcomes of such efforts might reflect the inadequate awareness of some policymakers, involving the necessary drivers of entrepreneurship in diverse country contexts (Baughn

et al., 2006). Thus, understanding why and how individuals seek or perform entrepreneurial behaviours might promote entrepreneurship activities more effectively and efficiently. Baugh *et al.* (2006) also emphasise that normative, social, and cognitive norms of business ventures derive from different contexts of countries in terms of historical, cultural, economics, and political perspectives.

The role of contextual variations in discovering entrepreneurial intention and behaviour is emphasised by many entrepreneurship scholars (e.g. Liñán & Chen, 2009; Mueller & Thomas, 2001; Hayton, George, & Zahra, 2002; Vancea & Utzet, 2017), while some agree that contextual factors are internalised by individuals to shape their cognitive process of business venture (Bercovitz & Feldman, 2008; Turker & Selcuk, 2009; Nguyen, Nguyen, & Nguyen, 2018). However, the detailed mechanisms in which individuals' cognitive processes internalise contextual factors did not receive a clear answer. For instance, although individuals' motives to engage in entrepreneurship activities could be multifaceted (Nguyen, Bryant, Rose, Tseng, & Kapasuwan, 2009), the question that still requires evident explanation is: how do contextual factors facilitate the process of a person's entrepreneurial cognitions? Indeed, Turker and Selcuk (2009) argue that most recent studies only focus on examining the role of some internal factors such as personal characteristics (Akanbi, 2013), individual motivations (Camelo-Ordaz, Dianez-Gonzalez, & Ruiz-Navarro, 2016), and personal background (Bird & Brush, 2002; Camelo-Ordaz, Dianez-Gonzalez, & Ruiz-Navarro, 2016), rather than investigating the influence of external factors on shaping entrepreneurial intention. Moreover, Henderson and Robertson (2000) state that an individual's entrepreneurial perception is mostly driven by their innate characteristics. However, scholars reached a consensus that entrepreneurial traits and business aptitude should be nurtured by external environments (Henderson & Robertson, 2000; Turker & Selcuk, 2009). Thus, contextual factors can play a crucial role in configuring entrepreneurial intentions, even actual business venture behaviours (Kruja-Demneri, 2020). Thus, this study integrates insights from the theory of planned behaviour (Ajzen, 1991), contextual factors (e.g. country institutional profile; Busenitz, Gomez, & Spencer, 2000), and the social learning theory (Bandura, 1977) to explore the specific mechanisms in which contextual factors are internalised into students' cognitive process of entrepreneurship in Vietnam. To the best of our understanding, no entrepreneurship literature examined the path from contextual factors to predict entrepreneurial self-efficacy and the cognitive process of entrepreneurship.

Particularly, this study considers the impact of two factors in the entrepreneurial ecosystem of educational environment (social capital and education university) and two other factors outside of the educational university environment (regulatory and normative dimensions) in shaping the cognitive process of business venture, which derives from attitude towards entrepreneurship, subjective norms, and perceived behavioural control to intention to become entrepreneurs among Vietnamese students. Besides discovering the effects of contextual factors – including the regulatory dimension – the normative dimension, capital, and university education on the cognitive process of entrepreneurship, this study also aims to discover the mediating roles of attitude towards entrepreneurship, subjective norms, and perceived behavioural control between contextual factors and entrepreneurial intention.

This study seeks to make three major contributions to entrepreneurship literature. *Firstly*, the study reveals that two antecedents of the educational environment in the entrepreneurial ecosystem – including educational university and social capital – play a significant role in the shaping of entrepreneurial self-efficacy, perceived behavioural control, and attitude towards entrepreneurship, then transformed into students' intention to become entrepreneurs. *Secondly*, the research shows that both dimensions of country profiles – regulatory and normative supports – are related to students' entrepreneurial intention. However, only normative norms promote entrepreneurial activities while the regulatory dimension impedes entrepreneurial intention among students. *Finally*, this study indicates that the theory of planned behaviour is effectively employed in transitional economies such as Vietnam.

The article conveys five main parts, which include introduction, literature review, materials and methods presentation, the elaboration of results and discussion, and a conclusion.

LITERATURE REVIEW

Theory of planned behaviour

The theory of planned behaviour (TPB; Ajzen, 1991), which attempts to identify the cognitive determinants of behaviour, has been effectively implemented to estimate a variety of economic and special behaviours (Ajzen & Fishbein, 2005). In entrepreneurship literature, Krueger and Carsrud (1993) posit that the cognitive process of business venture can be explained by the TPB because behavioural intention needs an enactive process of cognition that refers to personal beliefs, perceptions, and several another exogenous variables, which transform into an intention to conduct action and then transfer into actual action. Meanwhile, Bird and Jelinek (1988) define start-up intention as the degree of cognitive awareness in regard with the process of launching a new business venture. Indeed, cognitive psychology defines intention as a state of cognition immediately preceding a behaviour. Liñán, Santos, and Fernández (2011) also argue that – based on the TPB (Ajzen, 1991) – people's entrepreneurial decisions are inspired by three motivational factors, including attitudes towards a behaviour, subjective norms, and perceived behavioural control. Firstly, the *attitude towards a behaviour* reflects the level to which a person has a favourable or unfavourable assessment of a particular behaviour, which also depends on an individual's evaluation of the expected results/outcomes of the behaviour. Secondly, *subjective norms* refer to the perception of social pressures by an individual to perform or not to perform a specific behaviour, which reflects an individual's perception about whether close people encourage or discourage to perform a particular behaviour. Finally, *perceived behavioural control* refers to beliefs about the ease or difficulty of performing a specific task. It also shows the perceptions of the availability of resources, supports, and barriers to conduct a behaviour. The TPB might be applied to any behaviours that require a specific amount of planning. Thus, the TPB has been consistently confirmed as robust in exploring intentions and behaviours in different research fields. The decision to engage in business venture is determined as an intricate one, which is also examined as the outcome of complex cognitive processes. Thus, according to this meaning, the TPB is frequently employed to investigate this mental process that results in entrepreneurial acts (Liñán, 2008).

   Numerous studies on business ventures show the relationships between three attitudinal components (attitude towards business venture, subjective norms, and perceived behavioural control) and the intention to become an entrepreneur (Gorgievski, Stephan, Laguna, & Moriano, 2017). Nevertheless, existing literature on direct influences of subjective norms on start-up intention are rather inconsistent. While some studies argue that the link between subjective norms and entrepreneurial intention is significant (Othman & Mansor, 2012; Solesvik, 2013; Maresch, Harms, Kailer, & Wurm, 2015), other find this relationship lacking in empirical support (Miranda, Chamorro-Mera, & Rubio, 2017). Lortie and Castogiovanni (2015) postulate that scholars should explore these links. Thus, I formulate the following hypotheses:

H1: Entrepreneurial intention is positively affected by (a) attitude towards entrepreneurship, (b) subjective norms, and (c) perceived behavioural control.

H2: Attitude towards entrepreneurship is positively affected by perceived behavioural control.

H3: Subjective norms are positively affected by (a) attitude towards entrepreneurship and (b) perceived behavioural control.

Social learning theory

Self-efficacy is identified as a central concept in the social learning theory proposed by Bandura (1977; 1982). The fundamental proposition of the social learning theory (or the self-efficacy theory) is that individuals' beliefs about their capacities and abilities to generate desired impacts by their own behaviours (Bandura, 1977). In entrepreneurship literature, there is a growing emphasis on the importance of entrepreneurial self-efficacy in recent studies, such as entrepreneurial career preferences, intentions, behaviour, entrepreneurial performance, and social entrepreneurship (e.g. Hand, Iskandarova, & Blackburn, 2020; Marshall, Meek, Swab, & Markin, 2020; Mozahem, & Adlouni, 2020; To, Martínez,

Orero-Blat, & Chau, 2020; Yang, Li, & Wang, 2020). Entrepreneurial self-efficacy is defined from various viewpoints (Tsai, Chang, & Peng, 2014). Some define entrepreneurial self-efficacy as entrepreneurs' self-confidence in performing particular actions (Boyd & Vozikis, 1994), while others describe it as an individual's confidence in his/her own capacities to conduct and achieve success in a business venture (Segal, Borgia, & Schoenfeld, 2005). Some previous research shows that entrepreneurial self-efficacy has a strong impact on the intention to become entrepreneurs. For example, students with high entrepreneurial self-efficacy have a high intent to engage in business ventures (Liñán, Santos, & Fernández, 2011) and even higher business venturing behaviour (Neto *et al.*, 2018). Moreover, Boyd and Vozikis (1994) emphasise that entrepreneurial self-efficacy is an important factor that can explain the increase of intention to engage in business venture, but also the probability of transformation from intention to actual entrepreneurial behaviours.

Moreover, Bandura (1982) states that an individual's behaviour is significantly affected by his/her beliefs about the ability to perform actual action effectively, while control beliefs refer to attitude towards conducting a behaviour and perceived behavioural control (Ajzen, 1991). Thus, individuals with higher entrepreneurial self-efficacy can have an increased attitude towards entrepreneurship, perceived behavioural control, and intention to become entrepreneurs. Moreover, subjective norms demonstrate close peoples' approvals and supports (e.g. close friends, family, teachers), which refer to the performance of an actual behaviour (Ajzen, 1991; Liñán & Chen, 2009), whereas self-efficacy can motivate entrepreneurial activities (Tsai, Chang, & Peng, 2014). Thus, subjective norms may be connected with entrepreneurial self-efficacy. Gorgievski *et al.* (2017) and Tsai, Chang, and Peng (2014) postulate that scholars explore the correlation between entrepreneurial self-efficacy and three antecedents of the TPB. Thus, I formulate the following hypothesis:

H4: Entrepreneurial self-efficacy positively affects (a) attitude towards entrepreneurship, (b) subjective norms, (c) perceived behavioural control, and (d) entrepreneurial intention.

Contextual factors

The regulatory dimension is defined as legal, regulative, and governmental support for new business ventures, which also includes policies fascinating nascent entrepreneurs that decrease the risks of creating a new firm and acquiring the necessary resources for business activities (Busenitz, Gomez, & Spencer, 2000). Rule-setting, controlling, monitoring, and even approving activities are included in regulatory processes (Scott, 1995). Enterprises can take advantage of resources available through sponsored and/or supportive programmes of governments. Moreover, entrepreneurs can capture opportunities steaming from policies proposed governments (Rondinelli & Kasarda, 1992). Therefore, the government can encourage entrepreneurial activities through the policies which support nascent entrepreneurs and develop entrepreneurial ecosystem. In other words, viewed as the most formal of elements in the country institutional profile (Bruton & Ahstrom, 2003), the regulatory dimension can significantly affect individuals' cognitive processes of entrepreneurship and their entrepreneurial self-efficacy. Nguyen (2020) state that these relationships should be further analysed. Therefore, I formulate the following hypothesis:

H5: The regulatory dimension positively affects (a) attitude towards entrepreneurship, (b) perceived behavioural control, (c) entrepreneurial self-efficacy and (d) entrepreneurial intention.

Normative support is defined as how much citizens admire business venturing activities, creativity, and innovation thinking. Moreover, it includes social norms, social beliefs, common values, and assumptions about human nature and behaviours that are socially assigned and performed (Busenitz, Gomez, & Spencer, 2000), which consists of 'social norms, values, beliefs, and assumptions about human nature and human behaviour that are socially shared and carried by individuals' (Alvarez & Urbano, 2012). Some prior studies confirm that the normative dimension affects business venture activities (Baughn *et al.*, 2006; Oftedal, Iakovleva, & Foss, 2017; Turulja, Veselunovic, Agic, & Pasic-Mesihovic, 2020). Spencer and Gomez (2004) suggest that the degree to which citizens respect business activities or admire entrepreneurs might predict entrepreneurship better than general dimensions of

culture. Therefore, normative support may play a significant role in shaping students' cognitive processes of entrepreneurship and their entrepreneurial self-efficacy. Furthermore, Nguyen *et al*. (2020) postulate that we should consider the effects of normative supports on the cognitive process of entrepreneurship. As a result, I formulate the following hypothesis:

H6: The normative dimension positively affects (a) attitude towards entrepreneurship, (b) perceived behavioural control, (c) entrepreneurial self-efficacy, and (d) entrepreneurial intention.

Social capital is not only likely to strengthen the tangible and intangible assets of nascent entrepreneurs but also helps them to share information, establish collaborative networks, build trust in business transactions, and obtain essential resources (Adler & Kwon, 2002). Nevertheless, the exact meaning of social capital was not clearly explained (Lang & Fink, 2019; Poon, Thai, & Naybor, 2012). Social capital reflects the supports from closest people – such as family and close friends – in order to help nascent entrepreneurs find the necessary resources to start own business (Davidsson & Honig, 2003). Moreover, social capital shows the value of social networks (Adler & Kwon, 2002). Therefore, social capital may be determined as the totality of supportive resources, consisting of both definite and potential supports that derive from long-term social relationships (Lang & Fink, 2019; Yoon, Sun, & Yulianti, 2015). Moreover, the links between social capital and intention to become entrepreneurs are explored by several previous studies (Ali & Yousuf, 2019; Chia & Liang, 2018; Mahfud, Triyono, Sudira, & Mulyani, 2002; Liñán & Santos, 2007). Social capital depicts such results as financial benefits and other entrepreneurial resources, meaning that people can be supported by social networks such as their family, friends, and relatives. Indeed, social capital is seen as a crucial factor in business opportunity recognition (Ali & Yousuf, 2019) and encouraging entrepreneurial careers (Mahfud *et al*., 2020). To establish a new business, entrepreneurs are likely to access and acquire supportive resources from close relatives and social networks. The influence and support from close friends and family can be much more crucial than other cultural norms in shaping the cognitive process of entrepreneurship among nascent entrepreneurs and their entrepreneurial self-efficacy (Baughn *et al*., 2006; Bhagavatula, Elfring, van Tilburg, & van de Bunt, 2010). Vuković, Kedmenec, Postolov, Jovanovski, and Korent (2017) postulate the investigation of correlations between social capital and the cognitive process of a business venture. Hence, I propose the following hypothesis:

H7: Social capital positively affects (a) attitude towards entrepreneurship, (b) perceived behavioural control, (c) entrepreneurial self-efficacy and (d) entrepreneurial intention.

Professional education in universities and institutions is seen as a great way to acquire essential knowledge about and necessary skills for entrepreneurship (Turker & Selcuk, 2008). However, in a study focusing on students' personality traits, Wang and Wong (2004) emphasise that many students' start-up dreams may be impeded by inadequate preparation and insufficient business knowledge. Much more importantly, students may be are unwilling and inadequately prepared to take risks. Thus, academic education can play an important role in encouraging young people to consider business ventures as a career choice (Saeed, Yousafzai, Yani-de-soriano, & Muffatto, 2013). However, some argue that university education is too academic and insufficient to encourage entrepreneurship (Morris & Tsukanova, 2017). In order to promote entrepreneurial activities, many universities provide students with courses related to business and entrepreneurship to equip them with necessary knowledge and skills for business ventures (Turker & Selcuk, 2008). Moreover, university education can build a dynamic ecosystem that significantly influences students' cognitive processes of business venturing (Fini, Grimaldi, Marzocchi, & Sobrero, 2012). Uddin and Bose (2012) state that there is a strong link between university education and students' start-up intention. Meanwhile, Cox, Mueller, and Moss (2002) argue that university education can augment students' entrepreneurial self-efficacy via business courses and practical programmes. In Vietnam, a number of national programmes and actions were implemented by the government to promote business venture activities, for example 'Supporting students Entrepreneurship 2017-2020 with a vision towards 2025.' Hence, entrepreneurial education raised the interest of policymakers who seek to foster the country's enterprise development. Three elements are included in entrepreneurship education (Hoang, Le, Tran, & Du, 2020), including curricular entrepre-

neurship programmes, extracurricular entrepreneurship programmes, and social education in boosting entrepreneurial activities. Thus, entrepreneurship-related courses, such as new business venture creation, creativity, innovation, entrepreneurship, and new venture planning, were especially provided in programs at economic universities (Tung, Hung, Phuong, Loan, & Chong, 2020). These courses equip students with essential knowledge and skills to run their own businesses. Lavelle (2019) argues that the relationship between university education and the three antecedents of TPB should be investigated. Thus, I formulate the following hypothesis:

H8: University education positively affects (a) attitude towards entrepreneurship, (b) perceived behavioural control, (c) entrepreneurial self-efficacy, and (d) entrepreneurial intention

Therefore, in the light of prior studies, I propose the following conceptual framework (Figure 1) so as to investigate the particular underlying mechanisms internalised in students' cognitive processes of business ventures in Vietnam, i.e. the contextual variables of social capital, university education, regulatory dimension, and normative dimension.
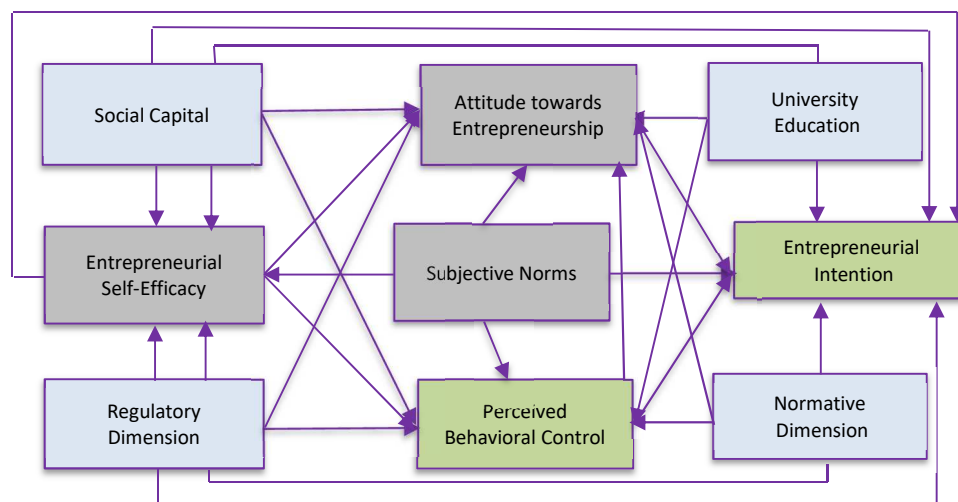
Figure 1. The conceptual model
Source: own elaboration.

RESEARCH METHODOLOGY

Data collection and sample

The sample consisted of 2218 undergraduate students recruited from 14 universities in Vietnam using stratified random sampling in a four-stage procedure. At the first stage, two main regions of Vietnam were selected, including the Northern and Southern areas with the demarcation line in Quang Tri province. Following the report of the Ministry of Education and Training (2018), 1 707 025 students were studying in 224 universities in Vietnam. Moreover, there were 123 universities located in the Northern and 101 in the Southern area. The second sampling stage randomly selected eight universities in the Northern region (National Economics University, Dai Nam University, Foreign Trade University, the University of Transport and Communications, Hanoi Open University, the National University of Civil Engineering, Thuongmai University, and the Hanoi University of Science and Technology) and six universities in the Southern region (Quy Nhon University, Hue University, the Da Nang University of Technology, Saigon University, the University of Economics Ho Chi Minh City, Dong Thap University), which followed university entrance scores per each region, that based on national university entrance exam. At the third stage, two to four classes each university were sampled in terms of fields of study. At the final sampling stage, research participants were recruited in the questionnaire directly distributed to college students aged 18 to 24 years. The participants were clearly informed about voluntary participation in the survey, that their responses would be confidential and secure, and the data would only be used for academic purposes.

The majority of participants were studying and working part-time (45.9%) or just studying (31.5%). Only 5.7% participants were studying and running own businesses. There were 52.2% women and 54.6% students of economics. A large percentage of participants were in their final year (36.2%), followed by second year (26.6%), and third year (22.8%). Most parents of participants had no relationship with business (56.1%).

Table 1. Characteristics of participants

Variables	Characteristics	Frequency	%
Gender	Male	1061	47.8
	Female	1157	52.2
Fields of study	Economics	1212	54.6
	Non-economics	1006	45.4
Years of study	First year of college	320	14.4
	Second year of college	589	26.6
	Third year of college	505	22.8
	Final year of college	804	36.2
Types of current professional activity	Only studying	699	31.5
	studying and participating in a part-time work	1018	45.9
	Studying and launching a business	126	5.7
	Studying and searching for a secure job	375	16.9
Mother's occupation	Self-employed	608	27.4
	Staff in an organization	294	13.3
	Manager in an organization	71	3.2
	Others	1245	56.1
Father's occupation	Self-employed	575	25.9
	Staff in an organization	261	11.8
	Manager in an organization	137	6.2
	Others	1245	56.1

Source: own elaboration.

Measures and Questionnaire Development

All scales used in the study were adopted from prior studies, including social capital (Davidsson & Honig, 2003; Baughn *et al*., 2006), university education (Turker & Selcuk, 2008), regulatory and normative dimension (Busenitz, Gomez, & Spencer, 2000), attitude towards entrepreneurship, perceived behaviour control and entrepreneurial intention (Liñán & Chen, 2009), subjective norms (Liñán & Chen, 2009), and entrepreneurial self-efficacy (Liñán, 2008; Tsai, Chang, & Peng, 2014). I employed a five-point Likert-type format rated from *1 (strongly disagree)* to *2 (strongly agree)* in each construct. The final scales that extracted unsatisfactory items are represented in Table 2. Because the respondents are Vietnamese students, the observed variables (items) were first translated into Vietnamese from the original English version. Furthermore, some words have been modified to be better suit Vietnamese culture and context. Then, the questionnaire instrument was back translated into English to guarantee consistency between the original version and the translated one.

Analyses

A regression analysis was employed to evaluate the impact of contextual factors on students' cognitive processes in business ventures and the roles of mediators such as attitude towards business venture, subjective norms, and perceived behavioural control between environmental factors and students' intention to engage in a business venture. *Firstly*, the study examined the Cronbach's alpha and conducted explorative factor analysis (EFA) so as to scrutinise the internal consistency reliability of constructs in the conceptual framework. All constructs were likely to be satisfactory when the values of Cronbach's alpha exceeded 0.63 (Nunnally & Bernstein, 1994). Simultaneously, the corrected item-total correlation of each observed variable (item) had to exceed 0.3 (Hair, Black, Babin, & Anderson, 2010). *Secondly*, confirmatory factor analysis (CFA) was utilised to estimate the reliability and validity

of the variables (scales), which was adopted since this approach could have been employed to examine whether measures of constructs with the nature of that scales are appropriate or not (Nunnally & Bernstein, 1994), which has been broadly utilised in studies of the social field (Hair *et al*. 2010; Tsai, Chang, & Peng 2014). *Finally*, structural equation modelling (SEM) was used to estimate path coefficients for each hypothesised link in the research model. Goodness of fit of the measurement model was considered using χ^2 (Chi-square Statistics), χ^2/DF (Chi-Square/Degree of Freedom), CFI (Comparative Fit Index), TLI (Tucker-Lewis Index), GFI (Goodness-of-Fit). However, χ^2 and χ^2/DF were impressionable to sample size (Jöreskog & Sörbom 1993), thus, the CFI, TLI, and RMSEA were utilised. A CFI of over 0.90 is ideal (Bentler & Bonett, 1980), while one exceeding 0.95 is an excellent fit (Hu & Bentler, 1999). RMSEA value lower than 0.05 demonstrates a good fit, while between 0.05 and 0.08 indicates a reasonable fit (Browne & Cudeck, 1993). Moreover, the indirect effects or the mediating roles were examined utilising a bootstrapping approach with 6000 replications and the confidence degree of 90% (Shrout & Bolger, 2002; Preacher & Hayes, 2008).

RESULTS AND DISCUSSION

Measure assessment

The Cronbach's alpha of all constructs was tested. Initial results indicated that ATE1 was extracted due to the corrected item-total correlation being lower than 0.3, while EI1 and EI2 were removed because their values of Cronbach's alpha were higher than that of the 'entrepreneurial intention' construct. After extracting unmoderated items, the Cronbach's alpha of all scales varied from 0.761 (Normative dimension-ND) to 0.918 (Entrepreneurial intention-EI). Moreover, all corrected item-total correlation of each item in scales were higher than 0.3.

Initially, the total of 36 items of all variables were used in the exploratory factor analysis (EFA) with principal axis factoring (Promax), while the initial results of testing the reliability of scales by EFA revealed that KMO = 0.907; Sig. of Bartlett's Test of Sphericity = 0.000 < 0.05; Cumulative (%)= 65.740 > 50%; and Eigenvalues = 1.053 > 1. However, factor loadings of PBC5, PBC6, SC1, and ESE1 were lower than 0.5. Thus, these items were extracted from constructs before conducting confirmatory factor analysis (CFA). The final results of EFA represented that KMO =0.888, Sig. of Bartlett's Test of Sphericity = 0.000 < 0.05; Cumulative (%) = 68.228 > 50%; and Eigenvalues = 1.019 > 1. Thus, the validity of all scales were confirmed after extracting unsatisfactory items. The final results of Cronbach's alpha and pattern matrix is presented in *Table 2*.

Table 2. Cronbach's Alpha and Pattern Matrix after extracting unmoderated items

Items	Factor									Cronbach's alpha
	F1	F2	F3	F4	F5	F6	F7	F8	F9	
Regulatory Dimension (RD)										**0.874**
RD4. The government sponsors organizations that help new business develop	0.810									0.836
RD2. The government set aside government contracts for new and small businesses	0.794									0.840
RD3. Local and national governments have special support available for individual who want to start a new business	0.769									0.848
RD1. Government organization in this country assist individuals with starting their own business	0.733									0.853
RD5. Even after failing in an earlier business, the government assists entrepreneurs in starting again	0.711									0.858
Social Capital (SC)										**0.811**
SC5. If I started a business, my friends would help me to succeed		0.777								0.761

Items	Factor									Cronbach's alpha
	F1	F2	F3	F4	F5	F6	F7	F8	F9	
SC4. My friend would want me to start my own business		0.676								0.774
SC2. If I started a new business, my family members with help me to succeed		0.637								0.774
SC3. If I started a new business, some members my family would work with me		0.685								0.779
SC6. If I started a business, some of my friends would work with me		0.586								0.785
Perceived Behavioural Control (PBC)										**0.820**
PBC3. I can control the creation process of a new firm			0.790							0.734
PBC2. I am prepared to start a viable firm			0.846							0.745
PBC4. I know the necessary practical details to start a firm			0.600							0.799
PBC1. To start a firm and keep it working would be easy for me			0.631							0.809
Attitude Towards Entrepreneurship (ATE)										**0.826**
ATE4. Being an entrepreneur would entail great satisfactions for me				0.835						0.759
ATE5. Among various options, I would rather be an entrepreneur				0.761						0.765
ATE2. A career as an entrepreneur is attractive for me				0.733						0.780
ATE3. If I had an opportunity and resources, I'd like to start a firm				0.661						0.816
Entrepreneurial Self-efficacy (ESE)										**0.840**
ESE4. I can see new market opportunities for new products and services					0.843					0.780
ESE3. I can develop and maintain favourable relationships with potential investors					0.838					0.786
ESE5. I can develop a working environment that encourages people to try out something new					0.669					0.801
ESE2. I show great aptitude for leadership and problem-solving					0.549					0.819
University Education (UE)										**0.846**
UE1. The education in university encourages me to develop creative ideas for being an entrepreneur						0.862				0.753
UE2. My university provides the necessary knowledge about entrepreneurship						0.798				0.794
UE3. My university develops my entrepreneurial skills and abilities						0.754				0.807
Normative Dimension (ND)										**0.761**
ND2. In this country, innovative and creative thinking is viewed as the routes to success							0.846			0.647
ND3. Entrepreneurs are admired in this country							0.709			0.702
ND4. People in this country tend to greatly admire those who start their own business							0.575			0.728
ND1. Turning new ideas into businesses is an admired career path in this country							0.541			0.736
Subjective Norms (SN)										**0.851**
SN2. If I decided to create a firm, my closest friends would approve of that decision								0.837		0.758

| Items	Factor									Cronbach's alpha
	F1	F2	F3	F4	F5	F6	F7	F8	F9	
SN3. If I decided to create a firm, people who are important to me would approve of that decision								0.772		0.792
SN1. If I decided to create a firm, my closest family would approve of that decision								0.795		0.827
Entrepreneurial Intention (EI)										**0.918**
EI5. I have very seriously thoughts of starting a firm									0.952	0.874
EI6. I have a firm intention to start a firm someday									0.822	0.892
EI4. I am determined to create a firm in the future									0.898	0.895
EI3. I will make every effort to start and run my own firm.									0.765	0.911
Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequancy							0.907			
Sig. (Bartlett's Test of Spericity)							0.000			
Cumulative (%)							68.228%			
The Value of Initial Eigenvalue							1.019			

Source: own study.
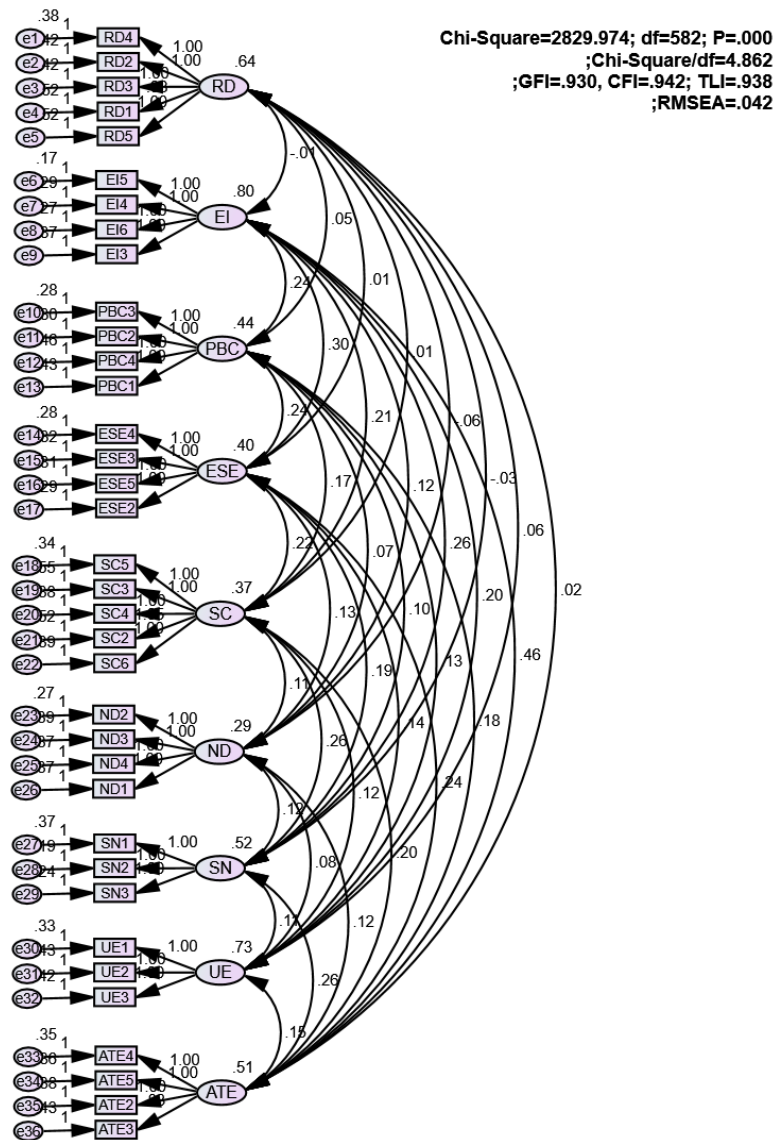
Figure 2. The results of confirmatory factor analysis
Source: own elaboration.

Then, the reliability, convergent validity, and discriminant validity of each construct was examined by utilising confirmatory factor analysis (CFA). A number of highly recommended indices were considered to examine the model's fitness. The fit indices represented the model fit data reasonably well (CMIN/DF =4.862 < 5; GFI= 0.930; CFI = 0.942; TLI =0.938 > 0.9; and RMSEA = 0.042 < 0.5; Browne & Cudeck, 1993; Hu & Bentler, 1999).

I tested the average variance extracted (AVE), composite reliability (CR), and maximum shared variance (MSV) to show the reliability, convergent validity, and discriminant validity of the constructs (Anderson & Gerbing, 1988; Hair *et al*., 2010). As indicated in Table 3, CR values for all variables were demonstrated to be higher than 0.70, the lowest CR value was witnessed in the normative dimension (0.769). Furthermore, all the AVE values were within their recommended level with a value higher than 0.45. Moreover, the MSV values of all constructs were lower than their AVE (Hair *et al*., 2010). The results of confirmatory factor analysis (CFA) also indicated that all items had a standardised regression weight higher than 0.5, with only SC3 having the lowest value at 0.634.

Table 3. The reliability, convergent and discriminant validity of variables

Varia-bles	CR	AVE	MSV	MaxR(H)	ATE	RD	EI	SC	ND	SN	UE	PBC	ESE
ATE	0.829	0.549	0.523	0.833	**0.741**								
RD	0.876	0.585	0.020	0.877	0.027	**0.765**							
EI	0.922	0.746	0.523	0.926	0.723	-0.009	**0.864**						
SC	0.813	0.466	0.346	0.816	0.460	0.014	0.396	**0.683**					
ND	0.769	0.454	0.150	0.770	0.320	-0.140	0.255	0.351	**0.674**				
SN	0.855	0.663	0.346	0.861	0.511	-0.046	0.398	0.588	0.314	**0.814**			
UE	0.848	0.650	0.070	0.849	0.245	0.092	0.257	0.234	0.183	0.179	**0.806**		
PBC	0.830	0.551	0.329	0.834	0.382	0.099	0.410	0.421	0.201	0.218	0.233	**0.742**	
ESE	0.839	0.566	0.332	0.840	0.540	0.018	0.534	0.576	0.387	0.427	0.264	0.574	**0.753**

Note: ATE: Attitude towards entrepreneurship; SN: Subjective norms; PBC: Perceived behavioural control; EI: Entrepreneurial intention; RD: Regulatory dimension; ND: Normative dimension; ESE: Entrepreneurial self-efficacy; SC: Social capital; UE: University education.
Source: own study.

Structural model

The structural model was conducted to validate the conceptual framework and estimate the relationships in the research model. Similar to the confirmatory factor analysis (CFA) − determined as the measurement model − the structural model fully corresponded with the observed dataset as its fitted indication appeared within the accepted degrees: CMIN/DF = 5.474; GFI= 0.926; CFI = 0.935; TLI =0.928; and RMSEA = 0.046 (Browne & Cudeck, 1993; Hu & Bentler, 1999). A satisfactory predictive validity was achieved by the conceptual framework as well.

Research results revealed that the total of 26 correlations were tested. Twenty out of 26 hypotheses were statistically significant, six of them were not significantly supported by the research dataset.

In terms of direct relationship, the results showed that attitude towards entrepreneurship had the strongest effect on students' intention to engage in business venturing ($\gamma = 0.791$; $p < 0.001$), followed by start-up self-efficacy ($\gamma = 0.268$; $p < 0.001$), and perceived behavioural control ($\gamma = 0.145$; $p < 0.001$). University education was positively linked to the intention to become an entrepreneur, but the effect level was rather weak ($\gamma = 0.062$; $p = 0.002 < 0,01$). However, the regulatory dimension negatively affected entrepreneurial intention ($\gamma = -0.058$; $p=0.008 < 0,01$). Besides, there appeared no statistical significance to indicate that subjective norms, social capital, and normative dimension correlates with entrepreneurial intention ($p > 0.05$). These results are similar to previous studies that tested the relationship between attitude towards entrepreneurship (Liñán, Nabi, & Krueger, 2013; Dinc & Budic, 2016), subjective norms (Liñán, 2008; Maes Leroy, & Sels, 2014), perceived behavioural control (Liñán & Chen, 2009; Traikova, Manolova, Mollers, & Buchenrieder, 2017), entrepreneurial self-efficacy (Tsai, Chang, & Peng, 2014), and entrepreneurial intention.

Entrepreneurial self-efficacy significantly correlated with both attitude towards entrepreneurship (γ = 0.345; *p* < 0.001) and perceived behavioural control (γ = 0.540; *p* < 0.001). Thus, high entrepreneurial self-efficacy can augment individuals' attitude towards entrepreneurship and perceived behavioural control and then enhance their entrepreneurial intention ($\gamma_{\text{indirect ESE-EI}}$= 0.404). This study confirmed that start-up self-efficacy and perceived behavioural control were two different variables because the influencing degrees of these constructs on other factors were totally different (Tsai, Chang, & Peng, 2014).

Chi-Square=3076.451; df=562; P=.000
;Chi-Square/df=5.474
;GFI=.926, CFI=.935; TLI=.928
;RMSEA=.045
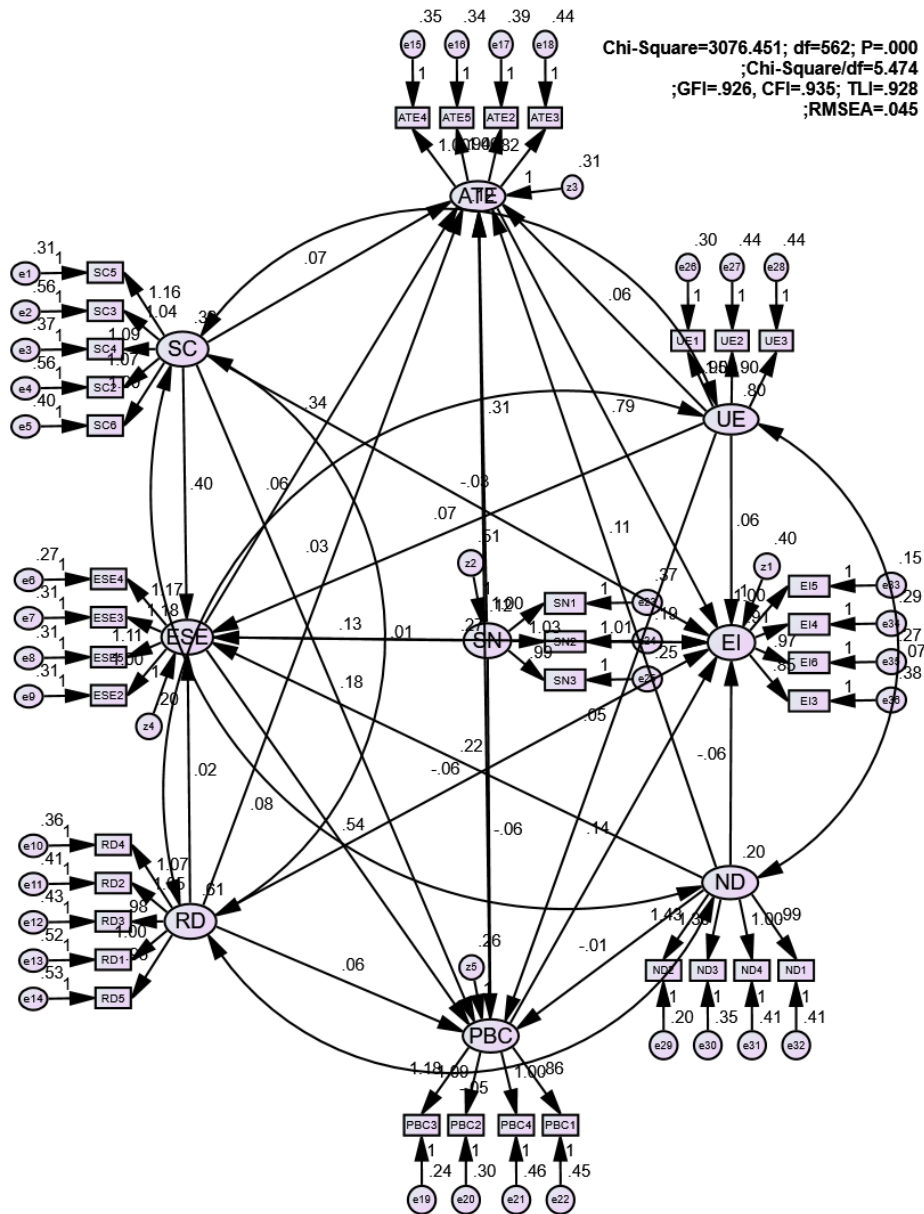
Figure 3. Structural model (standardised estimates)
Source: own elaboration.

From close entrepreneurial supports aspects, even though social capital was not directly related to entrepreneurial intention, it had indirect effects on attitude towards entrepreneurship and entrepreneurial intention throughout entrepreneurial self-efficacy and perceived behavioural control ($\gamma_{\text{indirect SC-ATE}}$ = 0.188; $\gamma_{\text{indirect SC-EI}}$ = 0.373). Thus, support from close friends and family can boost start-up self-efficacy, attitude towards entrepreneurship, perceived behavioural control, and then increase intentions to become entrepreneurs among students. These results reflect the important role

of social capital in shaping entrepreneurial self-efficacy and the cognitive process of business venture (Baughn *et al.,* 2006; Vuković *et al.,* 2017).

Table 4. The results of structural path analysis

Hypotheses				Estimates	S.E	C.R	P-value	Description
H1a	ATE	→	EI	0.791	0.037	21.300	***	Supported
H1b	SN	→	EI	0.007	0.027	0.257	0.798	Not supported
H1c	PBC	→	EI	0.145	0.036	4.037	***	Supported
H2	PBC	→	ATE	0.123	0.032	3.864	***	Supported
H3a	SN	→	ATE	0.313	0.023	13.525	***	Supported
H3b	SN	→	PBC	-0.062	0.020	-3.157	0.002	Supported
H4a	ESE	→	ATE	0.345	0.043	8.051	***	Supported
H4b	SN	→	ESE	0.128	0.017	7.490	***	Supported
H4c	ESE	→	PBC	0.540	0.038	14.278	***	Supported
H4d	ESE	→	EI	0.268	0.049	5.470	***	Supported
H5a	RD	→	ATE	0.025	0.019	1.300	0.194	Not supported
H5b	RD	→	PBC	0.062	0.018	3.487	***	Supported
H5c	RD	→	ESE	0.024	0.016	1.540	0.124	Not supported
H5d	RD	→	EI	-0.058	0.022	-2.653	0.008	Supported
H6a	ND	→	ATE	0.108	0.039	2.769	0.006	Supported
H6b	ND	→	PBC	-0.009	0.036	-0.241	0.810	Not supported
H6c	ND	→	ESE	0.225	0.032	7.083	***	Supported
H6d	ND	→	EI	-0.061	0.044	-1.397	0.162	Not supported
H7a	SC	→	ATE	0.073	0.035	2.107	0.035	Supported
H7b	SC	→	PBC	0.184	0.032	5.777	***	Supported
H7c	SC	→	ESE	0.403	0.027	14.676	***	Supported
H7d	SC	→	EI	-0.032	0.039	-0.834	0.405	Not supported
H8a	UE	→	ATE	0.058	0.018	3.229	0.001	Supported
H8b	UE	→	PBC	0.047	0.016	2.865	0.004	Supported
H8c	UE	→	ESE	0.068	0.014	4.799	***	Supported
H8d	UE	→	EI	0.062	0.020	3.077	0.002	Supported

Note: *** < 0.001; ATE: Attitude towards entrepreneurship; SN: Subjective norms; PBC: Perceived behavioural control; EI: Entrepreneurial intention; RD: Regulatory dimension; ND: Normative dimension; ESE: Entrepreneurial self-efficacy; SC: Social capital; UE: University education.
Source: own study.

Table 5. Total effects of variables using bootstrapping (6000 replications)

Dependent variables	Effects	Independent variables							
		ND	UE	RD	SC	ESE	SN	PBC	ATE
ESE	Direct	0.225	0.068	0.000	0.403	0.000	0.128	0.000	0.000
	Indirect	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Total	**0.225**	**0.068**	**0.000**	**0.403**	**0.000**	**0.128**	**0.000**	**0.000**
PBC	Direct	0.000	0.016	0.062	0.184	0.540	-0.062	0.000	0.000
	Indirect	0.121	0.037	0.000	0.217	0.000	0.069	0.000	0.000
	Total	**0.121**	**0.053**	**0.062**	**0.401**	**0.540**	**0.007**	**0.000**	**0.000**
ATE	Direct	0.108	0.058	0.025	0.073	0.345	0.313	0.123	0.000
	Indirect	0.091	0.034	0.017	0.188	0.066	0.045	0.000	0.000
	Total	**0.199**	**0.092**	**0.042**	**0.261**	**0.411**	**0.358**	**0.123**	**0.000**
EI	Direct	0.000	0.062	-0.058	0.000	0.268	0.000	0.145	0.791
	Indirect	0.235	0.103	0.051	0.373	0.404	0.318	0.097	0.000
	Total	**0.235**	**0.165**	**-0.007**	**0.373**	**0.672**	**0.318**	**0.145**	**0.791**

Note: ATE: Attitude towards entrepreneurship; SN: Subjective norms; PBC: Perceived behavioural control; EI: Entrepreneurial intention; RD: Regulatory dimension; ND: Normative dimension; ESE: Entrepreneurial self-efficacy; SC: Social capital; UE: University education.
Source: own study.

In terms of the relationship between country institutional profile and the cognitive process of entrepreneurship, the normative dimension is not directly related to entrepreneurial intention but strongly affects the intention to become an entrepreneur through entrepreneurial self-efficacy and perceived behavioural control ($\gamma_{\text{indirect ND-EI}}$ = $\gamma_{\text{total ND-EI}}$ = 0.235). The normative dimension appeared as also directly and indirectly related to attitude towards entrepreneurship ($\gamma_{\text{direct ND-ATE}}$ = 0.108; $\gamma_{\text{indirect ND-ATE}}$ = 0.091; $\gamma_{\text{total ND-ATE}}$ = 0.199). Moreover, the regulatory dimension – although lacking a direct influence on entrepreneurial self-efficacy – slightly affected the attitude towards entrepreneurship ($\gamma_{\text{direct RD-PBC}}$ =0.062) and perceived behaviour ($\gamma_{\text{direct RD-ATE}}$ = 0.025). Moreover, university education had a strong and positive impact on entrepreneurial self-efficacy ($\gamma_{\text{direct UE-ESE}}$ = 0.068). It also had a direct and indirect effect on perceived behavioural control ($\gamma_{\text{total UE-PBC}}$= 0.053), attitude towards entrepreneurship ($\gamma_{\text{total UE-ATE}}$= 0.092), and entrepreneurial intention ($\gamma_{\text{total UE-EI}}$= 0.165).

CONCLUSIONS

Although prior studies interested in exploring the impacts of individual and environmental factors on the intention to become an entrepreneur, few studies integrated these variables into a single framework (Clercq, Lim, & Oh, 2011; Nguyen, 2020). Moreover, some researchers argue that environmental factors are internalised by individual characteristics to shape a nascent entrepreneurs' process of entrepreneurship (Nguyen *et al.*, 2018). However, the mechanisms underlying peoples' cognitive process of entrepreneurship that internalise environmental factors have not been adequately explained. Thus, this study combined the theory of planned behaviour (Ajzen, 1991) and the social learning theory (Bandura, 1977) with contextual factors so as to discover these mechanisms.

Thus, this study contributes to entrepreneurship literature by, *firstly*, revealing that attitude towards entrepreneurship has the strongest effect on entrepreneurial intention, followed by start-up self-efficacy and perceived behavioural control. The study finds that subjective norm is not directly related to entrepreneurial intention, but it has an indirect impact on the intention to become an entrepreneur through attitude towards entrepreneurship and perceived behavioural control. In other words, start-up self-efficacy, attitude towards business venturing, and perceived behavioural control play mediating roles in the correlation between subjective norms and entrepreneurial intention. *Secondly*, this research reveals the links between social capital and the intention to engage in business venture, which however is not statistically significant and is mediated by attitude towards business venture, subjective norms, and perceived behavioural control. *Thirdly*, university education appears to not only directly shape entrepreneurial intention but also affect the three antecedents of TPB. *Fourthly*, while the normative dimension is not related to entrepreneurial intention, the relationship between the regulatory dimension and entrepreneurial intention is rather weak. Moreover, attitude towards entrepreneurship mediates the link between normative dimension and entrepreneurial intention but does not mediate the regulatory dimension and intention to become an entrepreneur. *Finally*, the findings of this study helps policymakers in ameliorating the entrepreneurship ecosystem – including regulatory and normative support – in order to promote business venturing activities among the youth, especially college students. Furthermore, universities and institutions should design entrepreneurial courses and practical programmes that will support students in acquiring the necessary knowledge and skills to run own businesses after graduation. With an effective supporting scheme, university education can enhance students' attitude towards entrepreneurship, self-efficacy, perceived behavioural control, and then foster entrepreneurial intention, even their future start-up behaviour.

This research has several limitations. *Firstly*, the number of universities selected to distribute questionnaires was not sufficiently large (only 14 universities and institutions), so future research should survey wider. *Secondly*, the study only examined factors that affect entrepreneurial intention, without scrutinising the correlation between entrepreneurial intention and actual entrepreneurial behaviour. Future studies should consider this relationship. *Moreover*, due to resource limitations, this study examined the influence of contextual factors – such as social capital, university education,

regulatory and normative support – on entrepreneurial intention, while there are many other environmental factors. Thus, future studies should extend the research model or apply another theory so as to contribute to the entrepreneurship literature.

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Conflict of Interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Drivers of structural convergence: Accounting for model uncertainty and reverse causality

Krzysztof Beck

A B S T R A C T
Objective: The objective of the article is the examination of factors that affect structural convergence and assessing their robustness.
Research Design & Methods: Determinants of structural similarity are examined using the Bayesian model averaging with dilution prior to establishing robust drivers in the long run. The short-run analysis is conducted using Bayesian model averaging within a dynamic panel framework with weakly exogenous regressors.
Findings: The application of Bayesian model averaging allowed for the identification of 12 variables associated with more similar production structures, among others, the bilateral total and intra-industry trade, the level of development, geographical distance, foreign direct investment flows, technology, corruption, and membership in the EU. Accounting for reverse causality showed that trade induces divergence in the short run – in line with predictions of neoclassical theories – but is associated with more similar production structures in the long run. Interestingly, even though old EU countries are characterised by more homogenous production structures, EU membership is associated with structural divergence once differences in income are included in the model. Even more unexpectedly, countries with more similar production structures are characterised by more similar and generally lower levels of corruption.
Implications & Recommendations: The analysis shows that policies aiming at the promotion of FDI and technological transfers can speed up the process of structural convergence.
Contribution & Value Added: The paper presents the first systematic analysis into the sources of structural similarity.
Article type: research article
Keywords: structural similarity; structural convergence; economic structure; economic integration; European Union
JEL codes: E23, F15, F43, F60

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INTRODUCTION

Structural similarity is one of the main issues of European integration. Countries with similar production structures are prone to more symmetrical shocks and, consequently, a higher degree of business cycle synchronisation (Beck, 2013, 2014, 2019). In turn, business cycle synchronisation is a precondition for the formation of an effectively functioning monetary union. This topic has recently become more important as more and more authors are reporting business cycle divergence in the European Union (Beck & Janus, 2013; Degiannakis *et al.*, 2014; Bekiros *et al.*, 2015; Ferroni & Klaus, 2015; Campos & Macchiarelli, 2016; Grigoraş & Stanciu, 2016; Coppola, Ianuario, Chinnici, Di Vita, Pappalardo, & D'Amico, 2018; Janus, 2019; Beck & Stanek, 2019; Beck, 2020). In light of the above, it is somewhat puzzling that research into structural similarity is remarkably scarce. Authors deal with specialisation patterns (e.g. Chiappini, 2014) and to a lesser extent, its determinants (e.g. Vechiu & Makhlouf, 2014). Moreover, there has been tremendous interest in the similarities of trade structure (e.g. Van

Biesebroeck, 2011), i.e. intra-industry trade and its impacting factors (e.g. Zhang & Clark, 2009; Kinnunen, Androniceanu, & Georgescu, 2019).

The research into structural similarity sensu stricto is relatively narrow. Höhenberger and Schmiedeberg (2008) describe structural convergence for Western European countries on a three-sector level and in less technology-intensive sectors with divergence in technology-intensive manufacturing. Olczyk and Lechman (2011) report the progressing structural convergence between Germany and Visegrad countries. Grodzicki (2014) investigates the structural similarities between 25 EU member states at a three-sector level and for subsectors of manufacturing and services. He notices that European economies are becoming more homogenous at the three-sector level but are clustering at the lower level of aggregation.

To the best of my knowledge, there were only two attempts so far to examine structural similarity's determinants. Wacziarg (2004) found that structural convergence is affected by the difference in the level of real GDP *per capita* and differences in factor endowments (capital per worker, human capital, and population) in a sample of 120 countries. Using data on Portuguese counties, Crespo and Fontoura (2009) report that a common border, geographical distance, differences in factor endowments (capital, human capital), differences in real GDP *per capita*, and the centrality of location are associated with structural convergence.

The aforementioned void in the literature prompted my inquiry into the determinants of structural similarity presented here that could fill the gap in the existing literature. The relevancy of structural convergence for the issues of currency union has motivated the choice of the sample of European Union member states, as the results might be directly applicable to policy consideration. At the same time, we should remember that structural convergence is not a policy goal on its own; it is one of the measures to assure a more symmetrical distribution of shocks and – through that – enable a more effective monetary and fiscal policy implementation (Androniceanu, Gherghina, & Ciobanasu 2019). Differences in production structure might reflect patterns of comparative advantage and facilitate the effective allocation of resources.

As the research into the subject of structural convergence is scarce, this paper undertakes the goal of providing a pervasive look at the sources of structural convergence. In order to accomplish this, the paper assumes an empirical approach to the verification of the relevance of 54 potential determinants of structural similarity taken from previous research and from the literature on structural change and international trade. In order to assess which of these variables are, in fact, associated with more similar production structures, I utilised Bayesian model averaging (BMA). After all, BMA is perfectly tailored for dealing with model uncertainty, especially in cases when there is insufficient prior knowledge available. In this setting, the obtained result could serve as a benchmark for future research both in terms of theory and practice. This part of the analysis is static in nature and elucidates long-run relationships between structural convergence and its determinants, while ignoring the potential endogeneity and dynamic nature of the relationship between the examined variables. Accordingly, the short-run relationships are examined further using the Moral-Benito (2016) econometric framework based on the likelihood function for dynamic panel models with weakly exogenous regressors and fixed effects.

The rest of the article is organised as follows. Section 2 provides a literature review. Section 3 describes data and estimation strategy, while section 4 describes empirical results. The last section concludes.

LITERATURE REVIEW

The problem of structural convergence was analysed indirectly in the literature on international trade. On the one hand, the neoclassical model of trade predicts that countries with different relative factor abundance are characterised by less similar production structures (Fenstra, 2015). On the other hand, models with monopolistic competition and increasing returns, reconcile growing trade with structural similarity (Krugman, 1979, 1980). The former shows that bilateral trade is directly associated with structural divergence and differences in factor abundance – indirectly; while the latter links intra-industry trade with convergence. Wacziarg (2004) and Crespo and Fontoura (2009) report that differences in factor abundance influence structural similarity, while Wacziarg (2004) shows that the impact

of trade is fragile. Baxter and Kouparritsas (2003) demonstrate that there is no apparent connection between trade structure and industrial structure of the economy.

The second strand of the literature that deals with structural convergence is the structural change research (Krüger, 2010; Herrendorf *et al.*, 2014; Święcki, 2017; van Neuss, 2019). Caselli and Coleman (2001) and Buera *et al.* (2015) demonstrate in both theoretical models and practice that change in the skill structure between low-skilled and high-skilled workers drives structural change, consequently confirming the role of factor endowments in structural convergence. The role of income holds a very prominent role in structural change literature. Scholars link changes in income with the evolution of economic structure using Engel's Law (Foellmi & Zweimüller, 2008; Boppart, 2014; Caron *et al.*, 2014) or changes in sectoral productivities associated with workers skill levels (Bonatti & Felice, 2008; Duarte & Restuccia, 2010; Buera *et al.*, 2015; Caron *et al.*, 2017), which has evidences both at the level of enterprises (Bilan *et al.,* 2020; Stachova *et al.,* 2020) and for the national economy (Popoola, 2019). Imbs and Wacziarg (2003) record an empirical observation that with the increasing level of GDP *per capita*, countries go through a U-shaped pattern of specialisation. With increasing GDP *per capita*, economies first diversify in terms of structure and after reaching some critical point, start to re-specialise. This result is confirmed by Koren and Tenreyro (2007) for a highly diversified set of countries and by Partekra (2009) for the European Union. This outcome suggests that at high levels of *per capita* income, countries will get increasingly less similar in terms of production structure unless they are going to specialise within the same sectors as a result of cross-border vertical integration (Fixler & Siegel, 1999; OECD, 2013).

The impact of international trade flows on structural change is advocated by Matsuyama (2009), Imbs *et al.* (2012) and Bielekova and Pokrivcak (2020) in their theoretical models and empirical investigations. Jones (2013) stresses the role of input-output linkages in the evolution of economic structure, while Peneder and Streicher (2018) extend this notion to the introduction of vertical integration in global value chains. Meanwhile, Ngai and Pissarides (2007) advocate the importance of differences in sectoral total factor productivity growth rates for structural change. Stijepic and Wagner (2015) and Felice (2016) demonstrate the role of government spending and public investment on sectoral composition, respectively.

RESEARCH METHODOLOGY

Data and measurement

My analysis covers 26 European Union countries (without Croatia and Malta). All variables are in bilateral form for 26 countries, which amounts to 325 country pairs. The research covers the 1995-2015 period. In the cross-sectional data setting, all examined variables represent the mean values for the entire examined period. The mean values are utilised to capture the long-run relationship between structural similarity and its potential determinants.

In the cross-sectional setting, the regressand measures the similarity of production structures of two countries, calculated as bilateral Krugman specialisation index (1991) for sectoral value added with the economy divided in 35 sectors:

$$KSI_{ij} = \frac{1}{T} \sum_{t=1}^{T} \sum_{l=1}^{L} \left| v_{lit} - v_{ljt} \right| \tag{1}$$

in which v_{lit} denotes the share of sector *l* in value added for country *i* at time *t*, while *L*=35 is an overall number of different industries in the economy. The KSI value ranges from 0 to 2, in which production shares in the two countries are identical with the value of the measure equal to 0. Data for KSI_{ij} was extracted from the World Output-Input Database (WOID) and is annual.

A list of regressors with sources of data used to calculate them and descriptions of their constriction is provided in Table 1. In total, the set is made of 54 regressors described in the first section, complemented with gravity variables and macroeconomic, institutional, and cultural indicators.

The analysis of cross-sectional data allowed for the identification of twelve variables that influence structural similarity over the long run: MB, RGDPpc, BCIPROD, RGDPpcPROD, IIT, BCIDIFF, PATENT,

LNDGEO, CAPARABLE, LNTRADE, FDID, and OLDEU. Consequently, in the second stage of the analysis, those variables were examined further in the panel data setting; except for MB, LNDGEO, and OLDEU, which are time-invariant. The second stage involves dynamic panel Bayesian model averaging with weakly exogenous regressors, which dictated the elimination of MB, LNDGEO, and OLDEU, as they are time-invariant and are accounted for by fixed effects. The data in the panel setting is at annual frequency and covers the same sample of countries and time period as covered under the cross-sectional data setting, yet this time all the variables are calculated for a given year instead of being averaged over the entire period. Consequently, the sample comprises 325 country pairs, 20 years, and a total of 6500 observations.

Table 1. Data description

VARIABLE	DESCRIPTION	SOURCE
AGROWTH	AV of the difference between mean GDP growth rates over the 1999-2011 period	PWT
ARABLE	AAV of the difference in arable land	WB
ARABLEpw	AAV of the difference in arable land per worker	PWT & WB
B	common border dummy	-
BCIDIFF	MV of the AV of the difference in Bayesian Corruption Index	Standaert (2015)
BCIPROD	MV of the product of the values of Bayesian Corruption Index	Standaert (2015)
CAP	AAV of the difference in capital	PWT
CAPAREABLE	AAV of the difference in capital to arable land ratio	PWT & WB
CAPLAND	AAV of the difference in capital to land ratio	PWT & WB
CPW	AAV of the difference in capital per worker	PWT
CPWARABLE	AAV of the difference in capital per worker to arable land ratio	PWT & WB
CPWLAND	AAV of the difference in capital per worker to land ratio	PWT & WB
EMPL	AAV of the difference in employment	PWT
EMPLARABLE	AAV of the difference in employment to arable land ratio	PWT & WB
EMPLLAND	AAV of the difference in employment to land ratio	PWT & WB
EPCpc	AAV of the difference in electricity consumption *per capita*	WB
EU	average number of years both countries spend in the EU together between 1999 and 2011	-
EXCHANGE	coefficient of variation of bilateral nominal exchange rate	AMECO
FDID	AAV of the difference in FDI flows	UNCTAD
GOV	AAV of the difference of government shares in GDP	PWT
HUMAN	AAV of the difference in human capital	PWT
HUMANARABLE	AAV of the difference in human capital to arable land ratio	PWT & WB
HUMANCAP	AAV of the difference in human capital to capital ratio	PWT
HUMANEMPL	AAV of the difference in human capital to employment ratio	PWT
HUMANLAND	AAV of the difference in human capital to land ratio	PWT & WB
IIT	MV of the ratio of bilateral intra-industry trade to total trade in intermediate goods	WOID
IITT	MV of the product of (bilateral intra-industry trade to total trade in intermediate goods and the ratio of imports and export to the sum of two countries GDPs	WOID & DOT
INFVAR	AV of the difference between standard deviations of inflation rate over the 1999-2011 period	WEO
IUp100	AAV of the difference in number of internet users per 100 inhabitants	WB
L	common language dummy (at least on official common language)	-
LAND	AAV of the difference in land	WB
LANDpc	AAV of the difference in land *per capita*	WB
LNDGEO	natural logarithm of geographical distance between capitals	Google Maps
LNPOPPROD	MV of the natural logarithm of population product	PWT
LNRGDPPROD	MV of the natural logarithm of real GDP product	PWT
LNTRADE	natural logarithm of the average value of real imports plus exports	DOT & PWT
MA	dummy variable for a pair of countries sharing a marine border	-

VARIABLE	DESCRIPTION	SOURCE
MB	dummy variable for a pair of countries with access to the ocean or the sea	-
MU	average number of years both countries spend in the Eurozone together between 1999 and 2011	-
OILpc	AAV of the difference in the number of internet users per 100 inhabitants	WB
OLDEU	dummy variable for a pair of countries that were members of the EU before 2004	-
OPEN	AAV of the difference in imports+exports shares of GDP between two countries	PWT
PATENT	AAV of the difference in number of patents per 1 mln inhabitants	WB
POPDIFF	AAV of the difference in population	PWT
RGDPDIFF	AAV of the difference in real GDP	PWT
RGDPpc	AAV of the natural logarithm of the difference in real GDP *per capita*	PWT
RGDPpcPROD	MV of the real GDP *per capita* product	PWT
TFP	correlation coefficient of growth rates of total factor productivity in two countries	PWT
TRADE1	MV of the ratio of imports and export to the sum of two countries GDPs	DOT & WB
TRADE2	MV of the ratio of imports and export to the sum of two countries total trades	DOT
TRANS	dummy variable for a pair of transition countries	IMF
UNEMP	AAV of the difference between unemployment rates in two countries	IMF WEO
URBAN	AV of the difference in the urban population	WB
URBANshare	AAV of the difference in share of the urban population	PWT & WB

Abbreviations: MV – average value; AV – absolute value; AAV – average absolute value; PWT – Penn World Tables (Feenstra *et al.*, 2015); WB – World Bank; DOT – IMF Directions of Trade; UNCTAD – United Nations Conference on Trade and Development; WEO – IMF World Economic Outlook.
Source: own elaboration.

Estimation strategy

Cross-sectional setting

In order to find robust drives of structural convergence, this research applied Bayesian model averaging (BMA) and utilised vast prior structure to deal with multicollinearity. Accurate and detailed review of BMA can be found in Hoeting *et al.* (1999) and Beck (2017). Moreover, a detailed discussion on the choice of prior structure within the BMA framework was prepared by Fernández *et al.* (2001), Ley and Steel (2009, 2012), Feldkircher and Zeugner (2009), and Eicher *et al.* (2011). The list of regressors used in the research suffered considerably from multicollinearity. Therefore, the methods applied in this paper were truncated to deal with this issue. Consequently, I employed two different estimation strategies employing prior structure designed to deal with multicollinearity.

The first strategy (Strategy I) utilised a uniform model prior (Sala-I-Martin *et al.*, 2004; Ley & Steel, 2009) complemented with a function accounting for multicollinearity (George, 2010) to calculate prior model probabilities:

$$P(M_j) \propto |R_j|^{0.5} \left(\frac{1}{2}\right)^K \tag{2}$$

in which $K = (54)$ denoted total number of regressors used in the analysis. The figure $|R_j|$ denoted the determinant of correlation matrix for all the covariates included in model *j*. Within the uniform model, prior model probabilities on all considered models equalled ($= \frac{1}{2^K} = 1/2^{54}$). Consequently, the determinant of the correlation matrix $|R_j|$ in (2) played the key role in determining the distribution of prior probability. The high degree of multicollinearity in the considered model *j* was associated with the value of the determinant of the correlation matrix $|R_j|$ close to 0 and, accordingly, the lower prior probability assigned to model j. Posterior probabilities were calculated with the use of MC[3] sampler (the Markov Chain Monte Carlo Model Composition; Madigan *et al.*, 1995). The correlation coefficient between the analytical and MC[3] posterior model probabilities for the best 10 000 models was used as a measure to assess the convergence of the chain.

In the second strategy (Strategy II), a binomial-beta model prior (Ley & Steel, 2009) was utilised:

$$P(M_j) \propto \Gamma(1 + k_j) \cdot \Gamma\left(\frac{K - EMS}{EMS} + K - k_j\right) \tag{3}$$

in which the $EMS = \frac{K}{2}$ probability of each model size equalled ($= \frac{1}{K+1}$). Multicollinearity was dealt with by using tessellation prior with the Metropolis-Hestings algorithm. In other words, dilution was implemented through the MCMC search, while tessellation was achieved by the 'Spinner Process' (George, 2010). For tessellation prior, the correlation coefficient of analytical and MC[3] was inadequate to assess the convergence of the chain. Consequently, empirical exercise was repeated ten times, with different numbers of burn-ins and iterations. In all cases, the obtained results were virtually the same as the ones reported here.[1]

The tone of BMA advantages offered the possibility to apply g prior (Zellner, 1986). The rule known as a 'benchmark prior' – proposed by Fernández *et al.* (2001) – indicated that risk inflation criterion (RIC) designed by Foster and George (1994) was the optimal choice for a dataset with 325 observations and 54 covariates. Nevertheless, I submitted the results to vast robustness checks by changes in both model prior and g prior.

The assessment of the models based on posterior model probabilities (PMP) calculated by combining model specific value of the likelihood function through the Bayes theorem (Beck, 2020b):

$$PMP = p(M_j|y) = \frac{l(y|M_j) \cdot p(M_j)}{p(y)} = \frac{l(y|M_j) \cdot P(M_j)}{\sum_{j=1}^{2^K} l(y|M_j) \cdot P(M_j)} \tag{4}$$

in which $l(y|M_j)$ denoted model-specific marginal likelihood while y – a given data set. Within this setting, posterior model probabilities could have been treated as weights because $p(y) = \sum_{j=1}^{2^K} l(y|M_j) * P(M_j)$. Consequently, the posterior mean (PM) for the coefficient β_i, independent of the space of the models was defined as (Beck, 2020c):

$$PM = E(\beta_i|y) = \sum_{j=1}^{2^K} P(M_j|y) \cdot \hat{\beta}_{ij} \tag{5}$$

in which $\hat{\beta}_{ij} = E(\beta_i|y, M_j)$ was β_i estimated with ordinary least squares for the model M_j. The posterior standard deviation (PSD) was given by:

$$PSD = \sqrt{\sum_{j=1}^{2^K} P(M_j|y) \cdot V(\beta_j|y, M_j) + \sum_{j=1}^{2^K} P(M_j|y) \cdot \left[\hat{\beta}_{ij} - E(\beta_i|y, M_j)\right]^2} \tag{6}$$

in which $V(\beta_j|y, M_j)$ was the conditional variance of β_j in the model M_j. To enable the relative strength comparison of analysed drivers of structural convergence, I report standardised posterior mean (SPM) and standardised posterior standard deviation (Doppelhofer & Weeks, 2009), alongside PM and PSD.

The posterior inclusion probability (PIP) – i.e. the probability of including the regressor in the model after seeing the data – was given by:

$$PIP = P(x_i|y) = \sum_{j=1}^{2^K} 1(\varphi_i = 1|y, M_j) \cdot P(M_j|y) \tag{7}$$

in which $\varphi_i = 1$ signified the inclusion of variable x_i in a given model. A variable was classified as robust if the PIP was above 0.5, which was the equivalent of no prior information. More details on the interpretation of the results will be given in subsections 3.1 and 3.2.

The posterior probability of a positive sign of $\beta_j - P(+)$ was given by:

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[1] The results are available upon request.

$$P(+) = P[sign(x_i)|y] = \begin{cases} \sum_{j=1}^{2^K} P(M_j|y) \cdot CDF(t_{ij}|M_j), & \text{if } sign[E(\beta_i|y)] = 1 \\ 1 - \sum_{j=1}^{2^K} P(M_j|y) \cdot CDF(t_{ij}|M_j), & \text{if } sign[E(\beta_i|y)] = -1 \end{cases} \qquad (8)$$

In which CDF denotes cumulative distribution function and $t_{ij} \equiv (\hat{\beta}_i/\widehat{SD}_i|M_j)$.

The Bayesian model averaging framework enabled the assessment of the nature of relationships between regressors by using jointness measures. Ley and Steel (2007) measure was given by:

$$LS_{(ih)} = ln\left[\frac{P(i \cap h|y)}{P(i \cap \bar{h}|y) + P(\bar{i} \cap h|y)}\right] = ln\left[\frac{P(i \cap h|y)}{P(i|y) + P(h|y) - 2P(i \cap h|y)}\right] \qquad (9)$$

in which i and h represent two different covariates. For $LS >$, the two regressors were classified as strong complements, for $2 > LS > 1$ covariates were complements, for $1 > LS > -1$ the variables were unrelated, for $-1 > LS > -2$ the regressors were significant substitutes, and $-2 > LS$ characterised strong substitutes. All the estimations with cross-sectional data were performed with the BMS package (Feldkircher & Zeugner, 2009) for R.

Panel data setting

In the panel data setting, Moral-Benito (2016) framework was used to account for endogeneity between structural similarity and its potential drivers. The method utilised dynamic panel setting and allowed for dealing with both model uncertainty and reverse causality. In order to account for both those issues, the Moral-Benito framework utilises the likelihood function for dynamic panel models with weakly exogenous regressors and fixed effects. Accordingly, for the panel data setting, the main equation was given by:

$$y_{it} = \alpha y_{it-1} + x_{it}\beta + \eta_i + \zeta_t + \upsilon_{it} \qquad (i = 1, \dots., N; t = 1, \dots, T) \qquad (10)$$

in which y_{it} was a structural convergence measure for country pair i at time t, x_{it} was a vector of examined KSI drivers, β was a parameter vector, η_i is a country-pair-specific fixed effect, ζ_t was a period-specific shock, and υ_{it} was a shock to structural similarity. Formally, the assumption of weak exogeneity was expressed as:

$$E(\upsilon_{it}|y_t^{t-1}, x_i^t, \eta_i) = 0 \quad (i = 1, \dots., N; t = 1, \dots, T) \qquad (11)$$

in which $y_t^{t-1} = (y_{i0}, \dots, y_{it-1})'$ and $x_t^t = (x_{i0}, \dots, x_{it})'$. Consequently, weak exogeneity implied that the lagged depended variable, fixed effects, and the current values of the covariates were uncorrelated with current shocks. At the same time, I allowed all of them to correlate with each other.

Moral-Benito (2013) derived the likelihood function in the described setting. I accomplished that by augmenting equation (10) with reduced-form equations that captured the unrestricted feedback process given by:

$$x_{it} = \gamma_{t0}y_{i0} + \cdots + \gamma_{t,t-1}y_{i,t-1} + \Lambda_{t1}x_{i0} + \cdots + \Lambda_{t,t-1}x_{it-1} + c_t\eta_i + \vartheta_{it} \qquad (12)$$

in which $t = 2, \dots, T$ and c_t was the $k \times 1$ vector of parameters. For $h < t$, γ_{th} was a $k \times 1$ vector $(y_{th}^1, \dots, y_{th}^k)'$ $h = 0, \dots, T - 1$; Λ_{th} was a $k \times k$ matrix of parameters, and ϑ_{it} was a $k \times 1$ vector of prediction errors. Finally, the mean vector and the covariance matrix of the joint distribution of the initial observations and the individual effects η_i were unrestricted:

$$y_{i0} = c_0\eta_i + \upsilon_{it} \qquad (13)$$

$$x_{i1} = \gamma_{10}y_{i0} + c_1\eta_i + \vartheta_{it} \qquad (14)$$

in which c_0 was a scalar, while c_1 and γ_{10} were $k \times 1$ vectors. The model described in the equations (10) and (12-14) was characterised by the natural logarithm of the likelihood function given by:

$$\log f(data|\theta) \propto \frac{N}{2}\log\det\left(B^{-1}D\Sigma D'^{B'^{-1}}\right) - \frac{1}{2}\sum_{i=1}^{N}\{R'_i\left(B^{-1}D\Sigma D'^{B'^{-1}}\right)^{-1}R_i\} \tag{15}$$

in which $R_i = (y_{i0}, x'_{i1}, y_{i1}, \ldots, x'_{iT}, y_{iT})'$ was a vector of observable variables, while $\Sigma = \text{diag}\{\sigma_\eta^2, \sigma_{v_0}^2, \Sigma_{\vartheta_1}, \sigma_{v_1}^2, \ldots, \Sigma_{\vartheta_T}, \sigma_{v_T}^2\}$ was the block-diagonal variance-covariance matrix of $U_i = (\eta_i, v_{i0}, \vartheta'_{i0}, v_{i1}, \ldots, \vartheta'_{iT}, v_{iT})$. B was a matrix of coefficients given by:

$$B = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 & \cdots & 0 & 0 & 0 \\ -\gamma_{10} & I_0 & 0 & 0 & 0 & \cdots & 0 & 0 & 0 \\ -\alpha & -\beta' & 1 & 0 & 0 & \cdots & 0 & 0 & 0 \\ -\gamma_{20} & -\Lambda_{21} & -\gamma_{21} & I_k & 0 & \cdots & 0 & 0 & 0 \\ 0 & 0 & -\alpha & -\beta' & 1 & \cdots & \vdots & \vdots & \vdots \\ \vdots & \vdots & \vdots & \vdots & \vdots & \ddots & 0 & 0 & 0 \\ -\gamma_{T0} & -\Lambda_{T1} & -\gamma_{T1} & -\Lambda_{T2} & -\gamma_{T2} & \cdots & -\gamma_{T,t-1} & I_k & 0 \\ 0 & 0 & 0 & 0 & 0 & \cdots & -\alpha & -\beta' & 1 \end{bmatrix} \tag{16}$$

and D was a matrix of coefficients given by:

$$D = \begin{bmatrix} [c_0 & c'_1 & 1 & c'_2 & 1 & \cdots & c'_T & 1] \\ & & I_{T(k+1)} & & & & \end{bmatrix} \tag{17}$$

The Moral-Benito approach (2013, 2016) allows for dealing with endogeneity and model uncertainty in a dynamic panel setting. On the other hand, the complex nature of the likelihood function given in equation (15)'s numerical optimisation was very time-consuming, and consequently, estimation with all 43 regressors became infeasible. As a result, the method was able to deal with a far lower number of potential regressors compared to with a conventional BMA approach. Therefore, the above-mentioned Moral-Benito method was applied to a subset of variables classified as robust determinants of structural similarity in cross-sectional analysis. To make the calculation of the maximum likelihood easier, all the regressors utilised at this stage of the analysis were standardised.

Even though the likelihood function used in the Moral-Benito approach is vastly more complicated than simple likelihood used in the case of an OLS model, all Bayesian model averaging statistics were calculated in the same way.

Therefore, the robustness of structural similarity drivers could have been assessed with PIP, PM, and PSD. As recommended by Eicher *et al.* (2011) and Moral-Benito (2012) unit information prior (Kass & Wasserman, 1995) was chosen for g prior, and Binomial-beta distribution was chosen for prior model probability. All the estimations in the panel data setting were obtained using the GAUSS code originally prepared by Moral-Benito (2016) and rewritten by the author of that paper.

RESULTS AND DISCUSSION

Cross-sectional setting

Table 2 reports the result of the BMA application. In this context, Kass and Raftery (1995) propose a detailed classification scheme with robustness as weak, positive, strong, or decisive when posterior inclusion probability is between 0.5 and 0.75, 0.75 and 0.95, 0.95 and 0.99, or 0.99 and 1, respectively. Accordingly, MB, RGDPpc, and BCIPROD were decisively robust, while RGDPpcPROD is strongly robust. IIT, PATENT, and BCIPROD were strongly or positively robust, depending on the employed strategy. LNTRADE was weakly robust in both strategies. Finally, LNDGEO, CAPARABLE, FDID, and OLDEU were weakly robust only in one strategy.

Marine border dummy (MB) was classified as robust with posterior inclusion probability amounting to one in both BMA specifications. The natural logarithm of the geographical distance (LNDGEO) was robust with PIP equal to 0.7 in Strategy I, while being fragile with 0.48 PIP in Strategy II; yet its posterior inclusion probability was very close to the critical value of 0.5. Still, this variable could have been considered only weakly robust. The posterior mean for both variables was positive, which

Table 1. BMA statistics in Strategy I and II

Strategy	I						II					
VARIABLE	PIP	PM	PSD	SPM	SPSD	P(+)	PIP	PM	PSD	SPM	SPSD	P(+)
MB	1.000	0.066	0.012	0.227	0.041	1.000	1.000	0.071	0.013	0.244	0.044	1.000
RGDPpc	1.000	0.168	0.026	0.524	0.082	1.000	1.000	0.174	0.030	0.542	0.092	1.000
BCIPROD	1.000	0.000	0.000	0.583	0.115	1.000	1.000	0.000	0.000	0.573	0.109	1.000
RGDPpcPROD	0.960	0.000	0.000	0.481	0.173	1.000	0.978	0.000	0.000	0.461	0.152	1.000
IIT	0.850	-0.167	0.087	-0.117	0.061	0.000	0.619	-0.120	0.104	-0.084	0.073	0.000
BCIDIFF	0.762	0.002	0.001	0.167	0.111	1.000	0.682	0.002	0.001	0.142	0.112	1.000
PATENT	0.734	0.000	0.000	0.172	0.118	1.000	0.860	0.000	0.000	0.212	0.107	1.000
LNDGEO	0.699	0.022	0.016	0.118	0.089	1.000	0.447	0.014	0.017	0.078	0.094	1.000
CAPARABLE	0.593	-0.000	0.000	-0.192	0.185	0.001	0.364	-0.000	0.000	-0.115	0.171	0.002
LNTRADE	0.535	-0.009	0.010	-0.165	0.174	0.000	0.693	-0.014	0.010	-0.246	0.183	0.000
FDID	0.508	0.003	0.003	0.148	0.161	1.000	0.435	0.002	0.003	0.126	0.158	1.000
RGDPDIFF	0.456	0.000	0.000	0.212	0.296	1.000	0.263	0.000	0.000	0.149	0.291	0.998
CAPLAND	0.409	-0.001	0.002	-0.126	0.199	0.000	0.275	-0.001	0.002	-0.111	0.203	0.000
LAND	0.398	0.000	0.000	0.056	0.077	0.999	0.345	0.000	0.000	0.052	0.077	1.000
POPDIFF	0.338	-0.000	0.000	-0.321	0.534	0.032	0.361	-0.000	0.000	-0.333	0.518	0.016
OLDEU	0.303	0.024	0.042	0.093	0.164	0.999	0.562	0.055	0.057	0.215	0.222	1.000
EMPL	0.262	0.000	0.000	0.310	0.598	0.997	0.278	0.000	0.000	0.311	0.563	0.992
EMPLLAND	0.241	0.000	0.000	0.081	0.162	0.919	0.228	0.000	0.000	0.081	0.160	0.971
HUMAN	0.239	0.013	0.026	0.019	0.037	1.000	0.172	0.010	0.024	0.015	0.035	1.000
CPW	0.235	-0.000	0.000	-0.029	0.057	0.000	0.316	-0.000	0.000	-0.040	0.065	0.000
IUp100	0.162	0.000	0.001	0.022	0.056	1.000	0.100	0.000	0.000	0.013	0.043	0.998
IITT	0.155	-0.764	1.945	-0.018	0.045	0.000	0.088	-0.435	1.546	-0.010	0.036	0.000
EPCpc	0.151	0.000	0.000	0.018	0.046	0.999	0.076	0.000	0.000	0.009	0.032	0.999
EU	0.116	-0.021	0.062	-0.038	0.113	0.007	0.359	-0.066	0.095	-0.119	0.172	0.005
TRADE1	0.112	-0.161	0.502	-0.012	0.038	0.001	0.067	-0.094	0.402	-0.007	0.030	0.013
TFP	0.110	-0.005	0.015	-0.008	0.026	0.000	0.035	-0.001	0.008	-0.002	0.013	0.001
OILpc	0.100	0.000	0.000	0.012	0.039	0.999	0.062	0.000	0.000	0.007	0.030	0.997
TRADE2	0.092	-0.052	0.178	-0.010	0.036	0.002	0.065	-0.035	0.149	-0.007	0.030	0.007
INFVAR	0.088	0.000	0.001	0.007	0.025	0.988	0.038	0.000	0.001	0.003	0.017	0.960
CPWARABLE	0.086	0.000	0.000	0.006	0.024	0.998	0.058	0.000	0.000	0.005	0.023	0.998
EXCHANGE	0.073	0.007	0.029	0.005	0.022	0.990	0.033	0.003	0.020	0.002	0.015	0.976
LNRGDPPROD	0.070	-0.001	0.004	-0.012	0.069	0.066	0.054	-0.002	0.014	-0.039	0.233	0.172
LNPOPPROD	0.055	0.001	0.005	0.008	0.074	0.636	0.091	0.003	0.015	0.052	0.228	0.952
URBAN	0.050	0.000	0.000	0.002	0.058	0.872	0.052	0.000	0.000	0.002	0.093	0.706
LANDpc	0.050	0.000	0.000	0.004	0.019	0.977	0.021	0.000	0.000	0.001	0.011	0.973
GOV	0.049	0.014	0.070	0.005	0.024	0.993	0.038	0.010	0.059	0.003	0.020	0.987
HUMANCAP	0.041	-20.27	121.4	-0.003	0.018	0.027	0.023	-10.924	88.347	-0.002	0.013	0.020
EMPLARABLE	0.038	0.000	0.000	0.004	0.041	0.752	0.038	0.000	0.000	0.000	0.037	0.530
MA	0.036	-0.000	0.003	-0.002	0.012	0.013	0.020	-0.000	0.002	-0.001	0.009	0.010
TRANS	0.033	-0.001	0.006	-0.003	0.018	0.016	0.058	-0.002	0.010	-0.006	0.028	0.006
OPEN	0.031	0.000	0.003	0.001	0.010	0.767	0.014	0.000	0.002	0.000	0.006	0.818
ARABLE	0.028	0.000	0.000	0.001	0.008	0.983	0.024	0.000	0.000	0.001	0.009	0.998
ARABLEpw	0.026	0.000	0.000	0.003	0.022	0.970	0.019	0.000	0.000	0.003	0.025	0.958
URBANshare	0.022	-0.001	0.009	-0.001	0.007	0.097	0.011	-0.000	0.005	-0.000	0.004	0.111
HUMANARABLE	0.022	0.001	0.008	0.001	0.008	0.894	0.010	0.000	0.006	0.000	0.006	0.857
B	0.021	-0.000	0.003	-0.001	0.008	0.062	0.016	-0.000	0.003	-0.001	0.007	0.044
AGROWTH	0.020	0.004	0.064	0.000	0.005	0.902	0.009	0.002	0.042	0.000	0.003	0.896
UNEMP	0.019	0.000	0.000	0.000	0.005	0.516	0.011	0.000	0.000	0.000	0.004	0.600
CAP	0.018	-0.000	0.000	-0.000	0.036	0.685	0.024	-0.000	0.000	-0.002	0.045	0.426
L	0.017	-0.000	0.003	-0.000	0.005	0.267	0.009	-0.000	0.002	-0.000	0.003	0.268
MU	0.014	0.000	0.002	0.000	0.007	0.674	0.011	0.000	0.002	0.000	0.005	0.498
HUMANEMPL	0.012	-4.986	263.469	-0.000	0.006	0.406	0.007	-6.006	246.996	-0.000	0.006	0.376
CPWLAND	0.009	0.000	0.000	0.000	0.013	0.707	0.008	0.000	0.000	0.001	0.043	0.650
HUMANLAND	0.009	-0.011	6.117	-0.000	0.014	0.606	0.009	-0.940	21.195	-0.002	0.049	0.313
Burn-ins	0.6m						0.4m					
Iterations	6m						4m					
Cor PMP	0.99						not applicable					

Note: Robust variables are shaded

Source: own study.

implied that countries separated by a sea or/and high geographical distance were characterised by less similar production structures. These results should come as no surprise, as geographical distance is associated with higher transportation costs and hampering the possibility of vertical integration through global value chains or multinationals.

The difference in real GDP *per capita* (RGDPpc) was characterised by PIP equal to one regardless of the employed prior structure. Positive PM suggested a negative relationship between RGDPpc and structural similarity. This result can be traced back to Linder hypothesis (1961), as countries with a comparable level of development are characterised by more similar consumption structures.[2] In turn, consumption structures affect production structures. This conclusion should be confronted with the notion of the U-shaped relationship between real GDP *per capita* and specialisation proposed by Imbs and Wacziarg (2003). Accordingly, as GDP *per capita* of a country increases, the country diversifies its production structure until it encounters a critical level of GDP *per capita*, henceforth re-specializing. Consequently, if countries above the critical level of GDP *per capita* are specializing, the result obtained here suggests that they must specialise within the same sectors, as their GDP *per capita* levels converge.
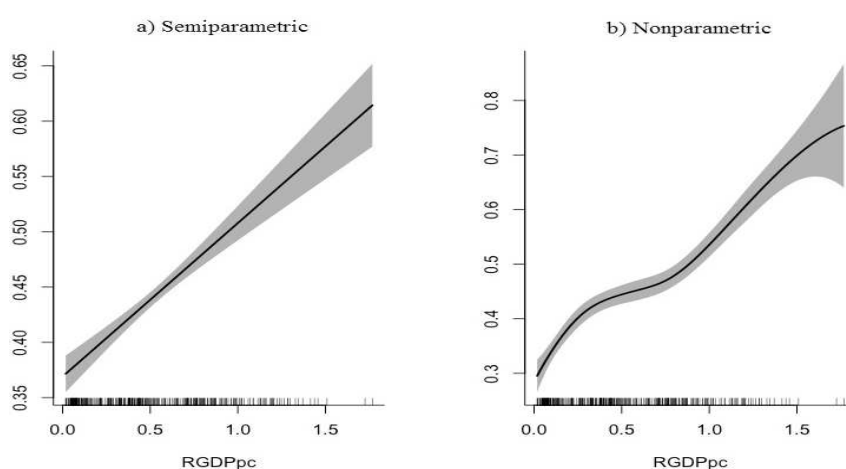

Figure 1. Semiparametric and nonparametric estimation results (dependent variable KSI)
Source: own elaboration.

The product of real GDP *per capita* (RGDPpcPROD) was characterised by the PIP higher than prior inclusion probability, and it entered with a positive posterior mean in all BMA specifications. This puzzling result implied that the higher level of RGDPpcPROD is associated with a lower similarity of productions structures. When structural similarity was regressed on RGDPpcPROD alone, the point estimate was not statistically significant, and only the inclusion of RGDPpc made it statistically significant (at 0.001 level). The jointness measure of Lay and Steel (2007) classifies this pair of variables as strong complements: their joint inclusion in the model vastly improves it compared to the inclusion of each of these variables alone (the value of Lay and Steel (LS) measure was 6.84). This result suggests that there was a nonlinear relationship between RGDPpc and structural similarity. A line fitted with a penalised spline smoother (Ruppert & Carroll, 2000) with 95% confidence interval is shown in panel b) of Figure 1. The decreasing GDP *per capita* distance raised structural similarity at an increasing rate near the beginning of the horizontal axis. When a semi-parametric regression (Ruppert *et al.*, 2000) was run with all robust variables, the relationship between KSI and RGDPpc became linear in panel a) of Figure 1. A more interesting feature of the graph is the cut off around 0.3 for panel b) and 0.37 for panel a). Following the Linder hypothesis, this might suggest that a structural similarity can be driven up by the similarity in the stage of development only until some point for two reasons. Firstly, differences in preferences inherent for specific countries – associated with tradition, history, and culture of given

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[2] The impact of income on economic structure has been widely confirmed in the literature (Bonatti & Felice, 2008; Foellmi & Zweimüller, 2008; Duarte & Restuccia, 2010; Boppart, 2014; Caron *et al.*, 2014, 2017; Buera *et al.*, 2015), in which authors model the transition of economic structures on demand-side by using non-homothetic preference and changes in relative prices among sectors induced by disproportionate growth rate of technological progress.

countries – might maintain some fixed levels of consumption structure difference unaffected by changes in GDP *per capita*. Secondly, even if the two countries shared identical preferences and consumptions structures, their production structures could differ due to differences in natural resources and factor abundance. One problem that could not be dealt with within the BMA framework was simultaneity, which I consider in the next subsection.

The absolute value of the difference of ratios of capital to arable land (CAPARABLE) was associated with posterior inclusion probability equal to 0.59 and 0.36 for Strategy I and II, respectively. A negative posterior mean was somewhat puzzling, as large differences in relative factor abundance are associated with less dissimilar production structures. The jointness measure suggested that the variable was a complement of RGDPpc and RGDPpcPROD (LS measure 2.73 and 2.74 for RGDPpc and RGDPpcPROD, respectively). As those variables were proxies for similarities in countries' prosperity, CAPARABLE could have also been used as a proxy for the stage of development, capturing differences not inherent to GDP *per capita*. With this interpretation, higher differences at the stage of development would be associated with lower structural similarities. A dummy variable indicating that both countries were members of the European Union before 2004 (OLDEU) was robust under Strategy II, with posterior inclusion probability equalling 0.56. Although, the dummy variable was fragile under Strategy I, with PIP equalling 0.303. Surprisingly, a positive posterior mean indicated that old EU member states were on average characterised by less similar production structures. When the variable OLDEU was included in the model alone, it was characterised by a negative coefficient, and it was statistically significant at any conventional level. The inclusion of RGDPpc in the model changed the sign of the coefficient, indicating that after controlling for differences in the state of development, the effect of long-lasting integration was associated with a lower degree of structural similarity. As the EU15 were able to enjoy the benefits of the common market for a longer period of time, the countries could have specialised according to their comparative advantage. This conclusion is strongly supported in the empirical literature (Amiti, 1999; Brülhart, 1998a, 1998b; Brülhart & Traeger, 2005; Combes & Overman, 2004; Midelfart-Knarvik & Overman, 2002; Midelfart-Knarvik *et al.*, 2003; Storper *et al.*, 2002). Midelfart-Knarvik *et al.* (2002) go even further, showing that European economies are becoming less similar in terms of the structure.

Unsurprisingly, intra-industry trade in intermediate goods (IIT) was listed as one of the robust determinants of similarity of production structures. The variable was characterised by PIP equal to 0.85 and 0.62 for Strategy I and II, respectively, while the posterior mean was negative and ranged from -0.17 to -0.12. This result should not be unexpected, as the similarity of production structures was most likely accompanied by high intensity of intra-industry trade. Still, a critical question was whether the direction of influence goes from IIT to KSI or the other way around. I consider this issue in the next section. Bilateral trade (LNTRADE) was also classified as robust with 0.54 and 0.68 PIP in Strategy I and Strategy II, respectively. The posterior mean ranged from -0.014 to -0.009, indicating that higher trade is associated with more similar production structures. An economic interpretation here was somewhat troublesome, as comparative advantage theories of trade predict that higher trade promotes less similar production structures through specialisation. On the other hand, theories incorporating trade as a mean of technological spillovers (e.g. Grossman & Helpman, 1991a) provide an alternative explanation. By facilitating technological transfers, trade can serve as a mechanism of promoting technology-based specialisation with patterns resembling those of the trading partners. Nevertheless, there remains the issue of possible reverse causality between international trade and structural similarity.

Differences in the number of patents per one million inhabitants (PATENT) were characterised by PIP higher than the prior value and positive posterior mean under both BMA specifications. PATENT was a proxy for differences in technological development and technological potential of two countries. The positive posterior mean suggested that differences in technological development were associated with lower structural similarity. The role of technology in the structural change is extensively studied in economic models (e.g. Grossman & Helpman, 1980, 1991b) and empirical research (e.g. Chiappini, 2014), especially in the context of innovation and entrepreneurship (Crudu, 2019) as well as catching-up economies (Paliokaite, 2019). The results for PATENT affirm the role of technology for structural similarities. Differences in foreign direct investment flows (FDID) – with PIP equalling 0.51 for Strategy I – was another robust determinant of structural similarity. A posterior mean equal to 0.003 suggested

that differences in FDI flows were associated with dissimilar production structures. As FDI contributes to vertical integration, they might promote the development of similar production structures between origin and host countries. The results obtained in this research suggest that host countries' flows might assimilate production structures of investing countries. Nevertheless, we may expect host countries to be at the lower parts of the value chain, with sectoral classification remaining unchanged. The existence of a link between FDI, vertical integration, and specialisation is supported by Vogiatzoglou (2007) for Asia, while by Dupuch and Maizer (2005) and Vechiu and Makhlouf (2014) for the EU.

Finally, the last two variables classified as robust under both strategies were the absolute value of the difference between Bayesian Corruption Index measures (BCIDIFF) and the product of the Bayesian Corruption Index (BICPROD) for two countries. The posterior inclusion probability for BCIPROD was equal to 1, while the posterior mean was positive under both specifications. BCIDIFF was also characterised by a positive posterior mean and PIP equal to 0.76 and 0.68 for I and II Strategy, respectively. In effect, the analysis suggests that, on the one hand, countries characterised by a vast difference in the level of corruption have dissimilar production structures, and in general, countries with high levels of corruption are structurally heterogeneous on the other. Moreover, jointness measures showed that the two variables are strong complements (LS measure: 3.75), which meant that each of them was carrying different information about the variation in KSI. BCIPROD included alone in the model was insignificant, but upon the inclusion of BCIDIFF it was statistically different from zero at any conventional level. Additionally, BCDIFF was a strong complement of RGDPpc and RGDPpcPROD, while BCIPROD of RGDPpcPROD with LS measures equalled 3.75, 3.79, and 6.84, respectively. It would seem that all four variables amplified their influence on structural similarity, and each of them was associated with a different part of the variability in KSI. Bilateral relationships of all the aforementioned variables and KSI were depicted in the scatterplot matrix in Figure 2. So far, neither theoretical nor empirical links between corruption and structural similarity or specialisation have been established, although Chang *et al.* (2015) provide a model in which corruption and growth can coexist in the presence of specialisation.
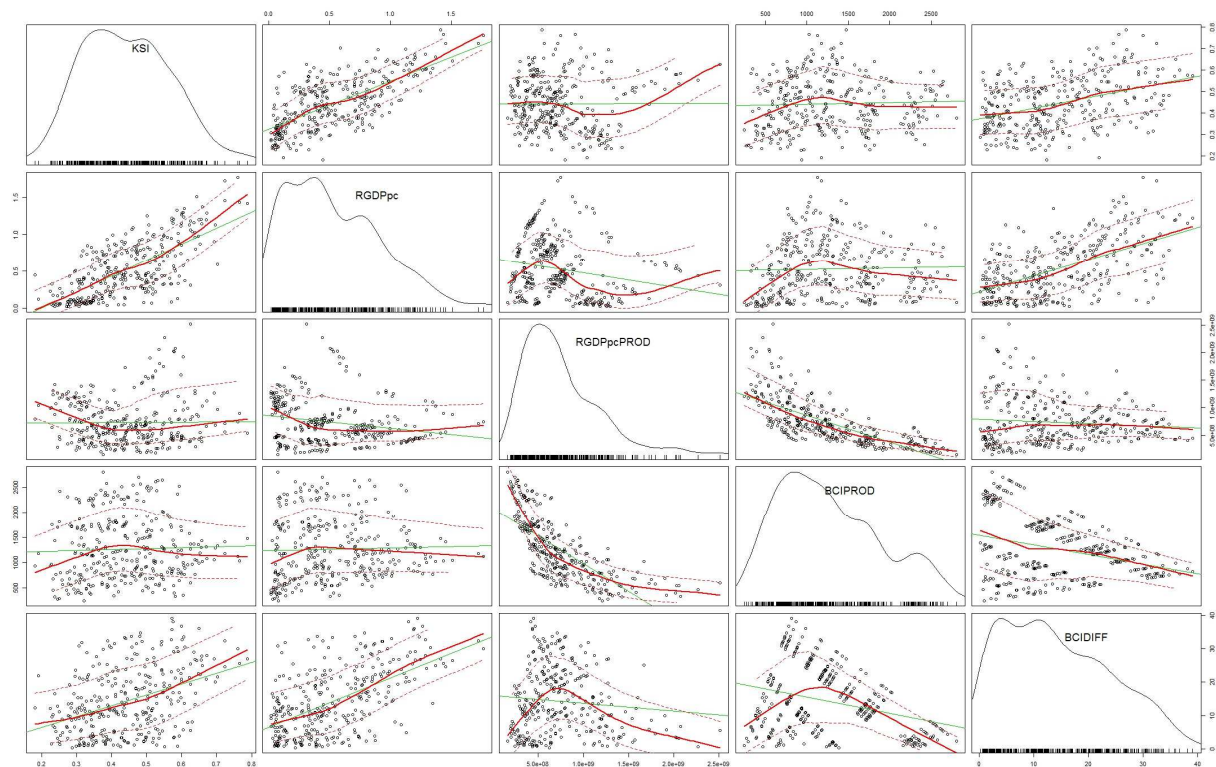

Figure 2. Bivariate relationships between KSI, RGDPpc, RGDPpcPROD, BCIPROD, BCIDIFF
Note: OLS fitted line is green, while the results of nonparametric regression along with 0.95 confidence band is red.
Source: own elaboration.

Turning to standardised posterior means, GDP *per capita* difference, Bayesian Corruption Index product exerted the most substantial impact on structural similarity, followed by GDP *per capita* product and marine border dummy. The strength of the influence of intra-industry trade, differences in the Bayesian Corruption Index, bilateral trade, and differences in the number of patents was considerably smaller. For all other variables, the values of posterior means are sensitive to the choice of estimation strategy.

The above results went through vast robustness checks in terms of dilution prior, g prior, and model prior structure.[3] The presented results are not sensitive to changes in prior specifications, yet some comments are due. The specifications of BMA with RIC g prior – including binomial model prior – reproduce results comparable with the ones encountered in Strategy I. In specifications with beta-binomial, prior results are comparable with Strategy II. This brings overwhelming evidence that MB, RGDPpc, BCIPROD, RGDPpcPROD, IIT, BCIDIFF, PATENT, and LNTRADE are, in fact, robust determinants of structural similarity. Moreover, LNDGEO, CAPARABLE, FIDD, and OLDEU are robust within the sets of priors associated with Strategy I and II, respectively, which engenders more arguments for their robustness. When one of the g priors not recommended for the data at hand is used (Fernández *et al.*, 2001), all the above variables are classified as robust. Furthermore, with ill-advised g priors – namely Hannan-Quinn (HQ) and unit information prior (UIP; Kass & Wasserman, 1995) – the number of robust variables was vastly extended. Except for the variables presented in the main results, under UIP and HQ, PIP higher than 0.5 characterised LAND, HUMAN, POPDIFF, CPW, CPWARABLE, TRANS, LNRGDP-PROD, and LNPOPPROD. The values of PIP for those variables vary from specification to specification. In the last set of robustness checks, flexible priors were applied, namely Empirical Bayes g (George & Foster, 2000; Hansen & Yu, 2001) and hyper-g (Liang *et al.*, 2008; Feldkircher & Zeugner, 2009). Under flexible priors, except for the variables in the main results, LAND, HUMAN, POPDIFF, and CAPLAND had PIP higher than prior inclusion probability. The inclusion of these additional variables in the robust set might be explained by higher susceptibility of these priors to the noise in the data. This explanation is rather convincing, as even when all the variables from the main results are included in the model, they can only account for 75.6% of the variability in structural similarity.

Panel data setting

The results obtained with the Moral-Benito (2016) approach to Bayesian model averaging for dynamic panel models with weakly exogenous regressors and fixed effects are depicted in Table 3. Raftery (1995) considers variables robust if $\left|\frac{PM}{PSD}\right|$ is higher than 1, which implies that variables improve the model, while Masanjala and Papageorgiou (2008) advocate $\left|\frac{PM}{PSD}\right|$ higher than 1.3, which corresponds to a 90% confidence interval. The most stringent condition for robustness is proposed by Sala-I-Martin *et al.* (2004), who require the absolute value of the ratio to be higher than 2, associated with a 95% confidence interval. According to this scheme, differences in the level of corruption, real GDP product, intra-industry trade, and total trade are robust, while all other variables are fragile. The fragility of differences in capital to arable land ratio, the number of patents, GDP *per capita*, and foreign direct investments is understandable. Those variables influence economic structure in the long run, while their impact in the shorter period is somewhat limited.

Posterior mean on the lagged structural convergence (KSIlag) is slightly above one, and it is characterised by almost 29 times smaller posterior standard deviation. The result indicates persistence in terms of structural similarity and shows the pattern of divergence in EU member states over the analysed period. Intra-industry trade positively influences structural similarity even in the short run, while the outcome supports a long run prediction. Consequently, the results obtained in the cross-sectional setting remain valid after accounting for reverse causality. Conversely, accounting for reverse causality changes the sign of the posterior mean in the case of international trade and supports the relationship between trade and economic structure described in neoclassical theories. Combined results from cross-sectional and panel data setting show that – in the short-run – intensified trade ties contribute

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[3] Results are not reported here for brevity but are available upon request.

to structural divergence, yet the countries characterised by higher bilateral trade are also more similar in terms of sectoral composition.

Table 3. BMA statistics for panel setting

Variable	PIP	PM	PSD	PM/PSD
KSIlag	-	1.105	0.039	28.701
BICPROD	0.998	0.002	0.009	0.241
BICDIFF	0.998	0.029	0.014	2.109
CAPARABLE	0.997	-0.003	0.007	-0.457
PATENT	0.989	0.004	0.005	0.741
RGDPpcPROD	0.985	-0.048	0.014	-3.369
IIT	0.982	-0.020	0.006	-3.564
LNTRADE	0.981	0.065	0.010	6.269
RGDPpc	0.970	0.002	0.010	0.175
FDI	0.914	0.001	0.002	0.500

Source: own study.

BICPROD turned out to be fragile while BICDIFF – robust, and the sign of posterior mean for differences in the level of corruption was the same as in the cross-sectional analysis. Changes in the level of corruption affected structural convergence in the short and long run. Accounting for reverse causality demonstrated that the causality goes from corruption to economic structure and not the other way around. Differences in the level of development were fragile, suggesting that they impact economic structures in the long run. Conversely, the product of real GDP *per capita* was robust, and the posterior mean for RGDPpcPROD had the same sign as in the cross-sectional exercise. Accordingly, as countries are getting richer and converging in terms of the level of development, they are converging in terms of economic structures both in the short and long run. The results also show that the causality goes from the level of development to economic structures, which provides further evidence for theories that link changes in the level of income with structural change.

CONCLUSIONS

The application of Bayesian model averaging allowed to identify eight variables that prove to be robust determinants of structural similarity in the long run, regardless of the employed prior specification, namely marine border dummy, difference and product of real GDP *per capita*, difference and product in Bayesian Corruption Index, intra-industry trade, difference in number of patents per one million inhabitants, and the volume of bilateral trade. Furthermore, under multicollinearity dilution prior, geographical distance, difference in capital to arable land ratio, and difference in FDI flows are classified as robust. Finally, the dummy variable representing membership in the European Union before 2004 is robust only under tessellation prior. Interestingly, the differences in absolute and relative factor abundance do not seem to influence the degree of structural convergence.

The results suggest that there is a strong negative relationship between GDP *per capita* distance and structural similarity, although income convergence can bring structural similarity only until some point. If the link between the variables is driven by demand, there might be some natural constraints imposed by differences in culture and in available resources and factor endowments. Changes in the level of development impact economic structures in both the short and the long run. Moreover, once the effect of GDP *per capita* distance has been accounted for, the impact of the European common market on structural similarities becomes negative. This notion is consistent with 'the Krugman View' (1993) and predictions of economic geography in general, along with the Imb's and Wacziarg's (2003) U-shaped specialisation curve. Accordingly, further European integration may lead to structural divergence. On the one hand, less similar production structures might be associated with international specialisation according to comparative advantage and the effective allocation of resources. On the other hand, they pose a risk of asymmetric shocks and an increased need for independent monetary policy.

Bilateral trade plays a prominent role in the promotion of structural convergence. It is associated with more similar production structures in the long run, and a theoretical explanation for this phenomenon must be found outside the reality of comparative advantage theories. Accounting for reverse causality in the above study showed that international trade leads to structural convergence in the short run, along with the predictions of neoclassical trade models. Intra-industry trade affects structural similarity positively in both the short and long run. This result indicates the prominent role of the integration of production processes in European value chains for structural convergence. Accounting for reverse causality in the above study assured that the direction of causality goes from higher trade in intermediate inputs within the same sectors to changes in economic structure. In turn, this notion is reinforced even further by the relevance of FDI flows in explaining the structural similarity. We should emphasise that this type of integration is beneficial from the viewpoint of the stability of the currency union in Europe. Furthermore, technological advancements are yet another driving force of structural similarity. National governments could speed up the process of structural convergence by establishing or improving the coordination of supranational research and development at the European level. At the same time, the authorities should remember these changes take effect in the long run.

Finally, what influences structural similarity is corruption as both differences in the level of corruption and its overall level are associated with less similar production structures in the long run. Changes in the level of corruption impact structural similarity in the short run as well, and the panel exercise above showed that the direction of influence goes from corruption to economic structures. Still, this relationship requires further investigation as it has not yet received attention in practical and theoretical models. Moreover, we should highlight the main differences between the results obtained in the study presented above and in the existing empirical literature. Wacziarg (2004) and Crespo and Fontoura (2009) report a significant role of differences in factor abundance. On the contrary, this article classified differences in both absolute and relative factor abundance as fragile. The analysis of the impact of differences in factor abundance gives significant results for many models with the data at hand. However, the results are not robust as they heavily rely upon the inclusion and exclusion of specific variables. Previous research reports a significant impact of these variables because it neglects to account for model uncertainty. Future research should give this matter more attention.

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