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How Does Managerial Experience Predict the Internationalization Type of a Young Firm?

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ABSTRACT This study aims to find out how useful managers' past general and export experience is in predicting whether young manufacturing firms become fast internationalizers. Extant literature about the role of managerial experience in determining young firms' internationalization type is scant. This paper fills this gap by providing systematic evidence on which kinds of general and export experience can be used for accurate predictions of two firm types: born globals and general fast internationalizers. Our dataset encompasses information about managerial experience of the whole population of young Estonian manufacturing firms. Based on using four different prediction methods (logistic regression, rough sets, decision tree, neural networks) and a large variety of variables reflecting managers' past experience, the results indicate that in prediction models, export experience variables are more valuable than general experience variables. Born globals can be predicted with an accuracy of at least 90% in case of all applied machine learning methods, while the precision is lower in case of general fast internationalizers. The study leads to important implications for international business theory and practice.

INDEX TERMS Exporter type, managerial experience, young firm, internationalization, SMEs.

I. INTRODUCTION

Exporting has received considerable research attention since the 1960s. Studies on early internationalization started emerging in the late 1980s and, especially, in the beginning of the 1990s. Export and internationalization literature has focused on several topics: for instance, on differences between various exporters' internationalization processes and patterns, export barriers and obstacles to exporting, success factors, export(ers)' survival, and governmental export assistance (for an overview, see, e.g., [1]–[6]).

Despite the abundance of general export and early internationalization literature, only a few authors have focused on predicting exporter types. Most of them have selected a limited number of types: e.g., non-exporters vs. exporters, firms exporting directly or indirectly vs. not exporting, exporters with a higher vs. lower export share, and those with or without domestic sales (see, for example, [7]–[17]).

Only a few studies have focused on predicting whether a firm internationalizes early and rapidly or not [18]–[21]. This is a serious research gap as fast internationalization (for definitions, see Appendix A), especially expanding early to several (distant) markets and achieving a relatively large export share soon after establishment, has been associated with higher overall and export survival probability, and also, sales and employment growth [22]–[24]. Thus, for instance, for export support agencies, it would be especially important to detect which firms would internationalize fast, and to support such firms. Still, extant research indicates that funding decisions can be associated with high failure rates [25], [26].

For predicting which firms would internationalize early and rapidly, different variables have been used: firm size, managers' attitudes, language skills, education, network contacts and prior international experience, but also information diversity, innovativeness, perceived risk, and export barriers [18]–[21]. From these, "experience, knowledge, expertise are valuable, rare, inimitable and non-substitutable resources" [27, p. 351] that can affect firms' internationalization favorably [28]. Managers' and founders' prior

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experience from international operations is especially important for young firms as they have not had time to learn from their own activities [29]. Lack of experience can cause considerable uncertainty during firms' initial foreign market entries [30]. Thus, without managers' prior experience, firms would try less actively to enter distant markets as those tend to be culturally more different from their home market [31]. In addition to bringing their prior knowledge into the young firm [32], [33], these key decision-makers ''decide when, where and how to enter foreign markets'' [34, p. 60]. Thus, it is important to find out to what extent their previous experience helps young firms to internationalize early and rapidly.

Despite the importance of managers' and owners' prior internationalization-related experience, such variables have not yet received enough attention in export prediction literature [35]. Thus, this study aims to find out how useful managers' past general and export experience is in predicting whether young firms become fast internationalizers. To achieve this, 11 theoretically motivated variables portraying past experience are used to predict two early internationalizer types, namely a general fast internationalizer and a born global, for the whole population of young Estonian manufacturing firms. Four different prediction methods – logistic regression, rough sets, decision tree, neural networks – are used. In addition, the individual usefulness of the predictors is outlined.

The main contributions of the paper to the extant literature are as follows. First, to the authors' knowledge, it is the first study predicting empirically which types of general and export specific experience matter for fast internationalization. Previous papers on the same topic have used experience variables scantly. Second, it provides a theoretical concept based on empirical evidence, which can be tested and elaborated in further research. Third, the paper includes a detailed overview of available literature, and thus, is also valuable as a topical literature review. Fourth, a whole population of firms and experience information from the Estonian Business Registry are used, which makes the paper free from sampling errors and reporting biases characteristic to survey data. Last, the paper validates the usefulness of a variety of machine learning tools to solve the task of predicting firm's fast internationalization.

The paper starts with an extensive literature review that outlines the theoretical foundations, variables, methods and results of past studies focused on predicting fast internationalization or other export-related characteristics. Research gaps are emphasized in the literature review section as well. In the following section, information about the dataset, variables and methods applied in this study is provided. Thereafter, the main results of the study are presented, while the main contribution to the theoretical literature is developed in the form of a conceptual framework. A separate part is devoted to the practical implications and the paper ends with a conclusions part.

II. LITERATURE REVIEW

Appendix B gives an overview of the theoretical and theme variety of the literature on exporter type prediction. It can be concluded from this appendix that exporter type prediction studies have been based on several streams of literature: mostly internationalization and export (performance) literature, but also entrepreneurship literature, literature on business models, the resource-based view, transaction cost perspective, institutional theory, and literature on cultural differences and cognitive perspectives. The four studies [18]–[21] that specifically focused on explaining which firms would internationalize early used internationalization (including born global) literature, the resource-based view and literature on firms' failure, export barriers and diffusion of innovations.

From the four above-mentioned studies, Kahiya [20] predicted which firms would become international new ventures, Lautanen [21] studied which firms would start exporting within four years, while Hull *et al.* [19] found out which firms would wish to become born globals. Finally, Baum *et al.* [18] tried forecasting whether a firm would become a born global, a born-again global, a traditional (slow) internationalizer, or a born regional (for an overview of the meanings of these terms, see Appendix A). Other studies predicted various exporter type-related characteristics, like exporting with or without having domestic sales, exporting directly or indirectly, and achieving vs. not achieving export success (see Table 1).

Several variables have been used for predicting future exporter types. The studies that focused on predicting early internationalization used international growth orientation, learning orientation, product differentiation, prior international experience and strength of network contacts [18], information diversity and being innovative [19], export barriers [20] and firm size, language skills, education, perceived risk, and previous export experience [21] as predictors. The studies that predicted other exporter type related characteristics used an even wider range of variables: for example, economic environment, export market size, firms' organizational policies, business abilities and skills, export strategy, product characteristics, productivity, and time spent on doing international business (see Table 1).

Several authors have also used experience-related variables (e.g., top managers' and/or key decision-makers' experience from working abroad or in doing international business, the firm's experience from exporting, number of international markets or frequency of foreign market visits; see Table 2) in predicting exporter types or other export-related outcomes, but most of them have chosen only one or a few of such variables. In addition, several authors have mentioned the importance of experience in their studies on born globals and other fast internationalizers. Again, the number of experience-related variables has been limited in each study: mostly they have related to the founders' or managers' experience from studying, working or otherwise living abroad or working in exporting firms located in the home country (see Appendix C).

TABLE 1. Methodological variety of the literature on export prediction.

Study	Data	Method(s)	Predicted exporter type-related variable(s)	Variable(s) used for prediction
Studies that predicted whether firms (may) become early internationalizers				
Baum et al. (2015) [18]	survey data (Germany, 248 firms, 2007)	latent class analysis, correlation analysis	exporter type: born global, born-again global, traditional internationalizer, born regional	international growth orientation, learning orientation, product differentiation, prior international experience, strength of network contacts
Hull et al. (2020) [19]	interview data (321 Chinese nascent entrepreneurs)	MANOVA, correlation analysis, probit regression, the PROCESS method	exporter status: wishing to become a born global vs. not; likelihood of early failure	information diversity, being innovative
Kahiya (2013) [20]	survey data (129 firms from New Zealand)	logistic regression analysis, exploratory factor analysis	exporter status: becoming an international new venture vs. not	export barriers: 8 factors (e.g., managerial factors, foreign market restrictions, government policy, resource constraints etc.)
Lautanen (2000) [21]	interview data of 76 Finnish SMEs (1992 and 1996)	truncated regression model, probit regressions	speed of adopting the exporting strategy: in less than 4 years or in 4 years or more	firm size, language skills, education, perceived risk, previous export experience
Studies that predicted other export-related characteristics				
Burton & Schlegelmilch (1987) [7]	survey data (310 firms from UK and West Germany, 1982)	multiple discriminant analysis	exporter status: non-exporter vs. exporter (30 groups determined by export share compared to industry's average using a 5% step up to more than 200% from industry's average)	organizational variables (policy measures, marketing policies), attitudinal variables (general attitudes, self-perception)
Child et al.(2017) [49]	interview data (180 SMEs from 6 economies: 30 from each)	latent class analysis, multinomial logistic regression analysis, correlation analysis	exporter type (depending on its business model): traditional market-adaptive, technology-exploiter, ambidextrous explorer	firm size, firm experience, decision-maker's experience, economy type (developed vs. developing), industry
Ciravegna et al.(2019) [50]	survey and interview data (29 Costa Rican IT firms, 2007/8 and 2017)	correlation analysis, principal component analysis, cluster analysis	internationalizer status after the initial internationalization (e.g., becoming a multinational, further expansion in a region, exiting from foreign markets)	exporter type: entrepreneurial (early, but not fully planned), serendipitous (reactive, unplanned, responded to unsolicited orders), strategic (early, planned)
Draz et al. (2016) [8]	survey data (104 Pakistani SMEs)	MLP NN (Multi-Layer Perceptron Neural Network)	exporter status: exporter without domestic sales, exporter with domestic sales, non-exporter	13 variables (size, various production-related measures, cluster membership and education of production personnel and the entrepreneur)
Fletcher (2001) [51]	survey data (541 Australian firms, 1994; 17 interviews in 1999)	Chi square analysis, ANOVA	firm status: inward, outward, linked internationalizer and de-internatio-nalizer	various factors: e.g., trips overseas, time spent on international business, knowledge of foreign cultures, experience, economic environment etc.
Hessels & Terjesen (2010) [9]	survey (402-871 Dutch SMEs depending on the studied topic)	binomial logistic regression analysis	exporter status: exporting directly or indirectly or not exporting	owners' and managers' perceptions about the local business environment, their organization and its business partners
Landa-Torres et al. (2012) [10]	SEPI's survey data (2008, 595 Spanish firms)	machine-learning: hybrid HS (harmony search)-ELM (extreme learning machine) algorithm	exporting success: successful firms (with export share over 15% and positive export growth in 2003-8) and others	30 variables concerning firms' general features, business abilities and skills, human capital, export strategy, and competitive environment
Lu et al. (2014) [11]	Chinese national survey data (1998-2005, more than 1 million observations)	regression analysis (OLS), correlation analysis, ordered probit, multinomial logistic estimation	exporter status: being a pure exporter (no local sales), exporting but also having local sales or being a non-exporter	total factor productivity (4 different indicators), export market size
Lu et al. (2017) [12]	World Bank's survey data from 29 developing countries (2002-6, 12,679 firms)	regression analysis, correlation analysis	exporter status: exporting directly, using intermediaries (only them or also exporting directly) or not exporting	productivity: logarithm of output per worker, total factor productivity
Razzolini & Vannoni (2011) [13]	Unicredit-Capitalia's survey data (Italy, 1998-2003, 1,537 firms)	logistic regression	exporter status: exporting directly vs. being a passive (indirect) exporter vs. not exporting	total factor productivity, value-added per worker, size (all measured in logs)
Smith (2005) [14]	survey data of 350 service exporters (Japan)	artificial neural network	exporting success: successful (export share over 20%) exporters vs. others	environmental, organizational, managerial, strategic and functional variables (in total, 25)
Smith (2007) [15]	survey data of 1,246 service exporters (Japan, Germany, USA, 2002-3)	artificial neural network	exporting success: exceptional exporters (export share over 20%) vs. others	environmental, organizational, managerial, strategic and functional variables (in total, 25: same as in Smith (2005))
Wagner & Zahler (2015) [16]	detailed firm-level customs data (312 firms from Chile, 1990-2007)	linear probability regressions; panel regressions; linear regressions	export status: having a follower or not after a pioneer exported a certain product somewhere; export value	success vs. failure of the pioneer
Wolff & Pett (2000) [17]	survey data (157 U.S. exporters with up to 500 employees)	principal components factor analysis with varimax rotation, analysis of variance	3 competitive patterns: service pattern (focused export activity), marketing pattern and operations pattern (broad-based export activity); export intensity	firm size: very small vs. mid-range vs. larger (up to 25 employees, 26-100 and more, respectively)

TABLE 2. The use of international experience related variables in export prediction literature: Some examples.

Experience variable	Studies focused on exporter type prediction	Other export / internationalization prediction literature
Decision-maker characteristics		
being born abroad		Philp & Wickramasekera (1996) [52]
adult years spent abroad		Gruenhagen et al. (2018) [53]
the key decision-maker's experience from doing international business before establishing or joining the firm	Child et al.(2017) [49]	Philp & Wickramasekera (1996) [52]
top managers' experience from working abroad	Baum et al. (2015) [18]	
experience from working abroad for at least 3 months (yes/no or number of foreign countries)		Gruenhagen et al. (2018) [53]; Philp & Wickramasekera (1996) [52]
decision-makers' international business experience	Fletcher (2001) [51]	
top managers' experience from working in a local firm operating internationally	Baum et al. (2015) [18]	
knowledge of the target markets' social and cultural background		Ramaseshan & Soutar (1995) [100]
frequency of foreign market visits	Smith (2005, 2007) [14], [15]	Philp & Wickramasekera (1996)
lack of foreign market experience	Kahiya (2013) [20]	Shih & Wickramasekera (2011) [54]; Yang et al. (1992) [55]
Firm characteristics		
the firm's age		Javalgi et al. (2000) [56]; Oberhofer & Pfaffermayr (2012) [57]; Westhead et al. (2002) [58]; Yarbrough et al. (2017) [59]
the firm's experience from exporting / doing international business (yes/no or number of years)	Fletcher (2001) [51]; Lautanen (2000) [21]	Manolopoulos et al. (2018) [60]; Westhead et al. (2001, 2002) [36], [58]
number of international markets	Landa-Torres et al. (2012) [10]	
initial exporter type: entrepreneurial, serendipitous, strategic	Ciravegna et al.(2019) [50]	

Note: The studies by Baum et al. [18], Kahiya [20] and Lautanen [21] focused on predicting if a firm becomes a fast internationalizer while others focused on predicting other exporter types or exports in general.

Experience can be considered an important predictor as ''previous experience of selling goods or services abroad is a key influence encouraging firms to export'' [36, p. 334]. Furthermore, ''due to increased confidence in their ability to accurately estimate risks and uncertainties associated with subsequent internationalization, experienced decision-makers are more likely to further increase their foreign market commitment'' [37, p. 3]. Only a few studies listed in Appendix C disagreed with these statements but most of them were based on a few cases or a limited number of survey responses. Thus, it is important to find out how suitable experience is for predicting which firms would become fast internationalizers.

In terms of prediction methods, the four studies that focused on explaining which firms would internationalize fast (see Table 1) have relied mainly on classical statistical tools – i.e., logit and probit regressions – for prediction. The accuracies have remained below 90% on all occasions. Out of the studies that predicted other exporter type related characteristics (see Table 1), only three, namely Landa-Torres *et al.* [10] and Smith [14], [15] used machine learning methods for predicting exporting success. However, these authors focused on ''success'' in terms of achieving a certain export share: they did not study if firms would become fast internationalizers. Still, these studies (i.e., [10],[14],[15]) clearly validate the usefulness of neural networks and decision trees for solving the classification problem and thus, these methods will be implemented in this study as well.

Based on the literature review, we can conclude the following. First, only a few studies focus on the prediction of fast internationalizers (e.g., [18]–[21]). Thus, this research domain witnesses serious underdevelopment. Second, the available prediction studies in a broader sense (see Table 2) usually neglect detailed information about past experience. Rather, they use one or a few general variables (e.g., whether the firm's manager had been involved in exporting). Third, these studies' theoretical foundations have been very dispersed (see Appendix B), with limited attention on theorizing about the role of experience as a predictor of fast internationalization. Fourth, machine learning applications have so far been rarely used for predicting export related outcomes. Fifth, empirical literature about fast internationalizers is mostly based on small samples collected through surveys (see Table 1). The latter aspect does not enable to generalize the results on the whole population. Moreover, information needed for prediction is not factually known at the moment of studied firms' foundation. In addition, besides the time needed for additional data collection, respondent biases can alter the effective usage of such information. Thus, this study resolves all these issues by using a large variety of theoretically motivated factual experiential variables to predict fast internationalization in the whole population of firms with various classification methods. Finally, it develops a conceptual

framework of what kind of experiential knowledge matters in case of fast internationalization. Thus, the paper contributes to both theoretical and empirical literature about the role of experience in fast internationalization.

III. DATA AND METHODS

A. POPULATION OF FIRMS

This study focuses on the whole population of Estonian firms founded in 2012-2013. This period was chosen as it enables studying both their pre- and post-foundation activities in this dataset: detailed (digital) information about exporting in firms' annual reports starts from 2009. In turn, from 2016, the reporting standard for very small firms was simplified and thus, their reports might not encompass export data for their first post-foundation years. Thus, for the firms founded in 2012, the pre- and post-foundation periods were 2009-2011 and 2013-2015, while for the ones founded in 2013, 2010-2012 and 2014-2016 were used.

We restricted our analysis to the manufacturing sector, as these firms are more active in exporting, their export data by markets are available, and as service firms' internationalization paths are not fully comparable to goods producers' paths (for an overview, see, e.g., [38]). Another interesting sector would be information and communication technology, but many of these firms obtain sales through online channels, which do not disclose their customers' exact geographical origin. While the whole population for the period 2012-2013 consisted of 37,772 firm foundations (including a large proportion of firms which never generated any sales), the following restrictions were applied: a) setting the focus on manufacturing sector, b) using a certain minimum turnover limit (i.e., 16 thousand euros to be VAT liable), c) including only firms with managers who had past export experience, d) focusing on Estonian residents as managers. These restrictions reduced the whole population to 80 firms.

B. VARIABLES

The list of variables reflecting past entrepreneurial experience (see Table 3) was composed based on past literature focusing on the prediction of internationalization (see Table 2), but also on the literature on the importance of managers' and/or owners' experience for fast internationalization (see Appendix C). It was possible to include multiple variables not used before in such literature (including detailed export data of the firms where the manager worked before, e.g., number of markets, activities outside Europe). Such variables should portray the managers' knowledge of foreign markets even more thoroughly than, for instance, studying or living abroad as the latter activities do not always guarantee that the manager knows all important characteristics of the country to start exporting there.

Table 3 documents two dependent variables (born global, i.e., BORNGLO, and fast internationalizer in a more general sense, i.e., FASTINT), which are the most common categories of early and rapid internationalizers applied in the literature. The main distinction between born globals and general fast internationalizers relies in the distance of markets entered in a fast manner (see Appendix A and Table 3). The definitions of BORNGLO and FASTINT enable focusing on ''true'' internationalization, excluding those young firms that achieve very marginal and random export sales. The latter group was excluded as such random sales often occur due to unsolicited export orders instead of a firm's strategic choice, and thus, managers' previous export experience does not have such an important role in case of marginal exports [39].

The eleven independent variables (see Table 3) divide in between two domains: four of them (BOARDEXP, NOOFFIRMS, TURNOVER, NACES) focus on general entrepreneurial experience, while the rest are focused on export-related experience. The first column in Table 3 explains the context each respective variable represents, while the calculation of variables mostly relies on known applications in past studies. For instance, many variables portraying internationalization from Lukason and Vissak [28] were applied in this study.

The population of 80 firms divides as follows: 8 firms for BORNGLO = 1 and 72 firms for BORNGLO = 0. The same figures for FASTINT were respectively 18 and 62. The latter figures also indicate that among the general population of young firms, fast internationalizers from the manufacturing sector that have managers with past export-related entrepreneurial experience represent a rare phenomenon in Estonia.

C. METHODS AND THEIR APPLICATION

To predict fast internationalization, we apply four different techniques: logistic regression, decision trees, rough sets and neural networks. The application of a wide range of techniques (including statistical and soft computing) results in a more holistic analysis: i.e., such a combination of methods allows to generalize the usefulness of individual predictor variables more profoundly. The selection of these methods is based on their good performance for solving classification problems (e.g., [10], [40]). In fact, all these approaches have also been applied before in analyzing problems about exporting, for instance, [9] and [41] for logistic regression, [42] and [43] for rough set theory, [10] and [101] for decision trees (C4.5), [8] and [15] for artificial neural networks.

The comparison of models composed based on different techniques is achieved by using the correctly classified rate or accuracy. Model accuracy (rate of all correct classifications) is obtained from the classical confusion matrix by accounting for the share of true negatives and positives among all classified observations.

Unlike statistical techniques, machine learning methods suffer from the overfitting problem. Therefore, they are usually applied by dividing the dataset into training and test sets, which provides a more realistic understanding of the model's performance [44]. When the dataset is not large, which is the case of this study with the whole population of only 80 observations, using only one training and test

TABLE 3. List of independent and dependent variables.

Variable domain	Variable coding	Variable calculation
		Dependent variables
Whether the firm is a fast internationalizer	FASTINT	Value 1 - in case the firm achieves at least 25% export share of total revenue and enters 3 different foreign markets during 3 years since foundation; otherwise 0
Whether the firm is a born global	BORNGLO	Value 1 - in case the firm achieves at least 25% export share of total revenue and enters 3 different foreign markets (including at least 1 outside Europe) during 3 years since foundation; otherwise 0
		Independent variables
The duration of past entrepreneurial experience	BOARDEXP	The maximum number of years the managers have past managerial experience
The diversity of past entrepreneurial experience	NOOFFIRMS	The number of past managerial positions the managers have had
The scale of past entrepreneurial experience	TURNOVER	Maximum annual turnover (LN) in firms the managers have past managerial experience
The sectoral variety of past entrepreneurial experience	NACES	Number of different NACE codes in firms the managers have past managerial experience
The scale of past export-related experience	EXPORTSALES	Maximum annual export sales (LN) in firms the managers have past managerial experience
The scale of past European export-related experience	EEXPORT	Maximum annual European export sales (LN) in firms the managers have past managerial experience
The scale of past outside-Europe export-related experience	WEXPORT	Maximum annual outside-Europe export sales (LN) in firms the managers have past managerial experience
The intensity of past export-related experience	MAXSHARE	Maximum export share in firms the managers have past managerial experience
The market diversity of past export-related experience	COUNTMARKET	Maximum number of foreign markets in firms the managers have past managerial experience
The market diversity of past European export-related experience	COUNTEMARKET	Maximum number of European export markets in firms the managers have past managerial experience
The market diversity of past outside-Europe export-related experience	COUNTWMARKET	Maximum number of outside-European export markets in firms the managers have past managerial experience

Note: Managers are defined as the board members of firms officially accounted in the business registry. In Estonia, private SMEs follow a corporate governance system where board members are subordinate to owners, they are responsible for all firm's activities and have the signatory right by law.

set can still create a bias. A possible solution is to generate multiple subsets from the original population, and therefore, k-fold cross-validation is applied, meaning that the sample is divided into k subsamples (10 in this study) so that k-1 is used to estimate the model and the remaining one as an evaluation subsample, while the process is repeated k times. The test (i.e., evaluation) results will be averaged over the 10 different k-folds in this paper. Below, the application peculiarities of the four methods have been explained, while due to the well-known nature of these methods, their detailed descriptions are not provided. Concerning the latter, it must be also emphasized that this paper does not seek to introduce new classification methods or modify the existing ones. Instead, its novelty lies in being the first paper that systematically outlines the value of managers' past experience in predicting young firms' fast internationalization that is among the most important topics in international business research.

To obtain models with only significant variables, a stepwise logistic regression was applied. Namely, among the forward and backward conditional methods the one which resulted in the highest prediction accuracy was chosen. Stata 15 software was used.

From the numerous decision tree composition approaches, one of the most well-known of them – C4.5 [45] – was chosen. Decision tree composition was implemented in WEKA 3.8 software with J48 classifier, while the full training set's pruned models were presented in the paper.

The application of the rough sets method results in decision rules that specify how to assign observations into decision classes based on the values of (selected) input variables [46]. The rough sets model was composed by using RSES software, while likewise with the decision tree, full training set models were presented.

The neural networks method was applied with the most typical architecture of a multilayer perceptron. The application was carried out in SPSS 26 with two hidden layers, while sigmoid activation function was used in hidden and output layers. As the neural networks method applies all independent variables in the analysis, the presentation of the whole neural network was replaced by just indicating the normalized importance of variables. As unlike the decision tree and rough sets, neural networks could lead to substantially different content of the networks (i.e., synaptic weights in them) for each run, the normalized importance of variables was averaged over 10 runs.

Besides bringing out the classification accuracies of different techniques, an important contribution of the paper is summarizing the variables that are useful for predicting which firms would become born globals and general fast internationalizers. As each of the four applied methods is based on a unique calculative logic, there are no universal guidelines

how to extract and compare useful variables. Thus, for each of the four methods, the following approach was applied. In case of the logistic regression, as the stepwise methods result in only significant variables to be included, the final models can be used directly for the documentation of useful variables. In case of the decision tree, variables occurring in it were used. In case of rough sets, variables present in the extracted rules were used. As the neural networks method is the only method of the four in case of which all variables are applied in the final models, an additional approach had to be implemented to account which of them were the most useful. For that purpose, variables with normalized importance with at least 51% were used. Finally, the results concerning useful variables were consolidated over the four applied methods by accounting for their frequencies.

IV. RESULTS

The descriptive statistics with statistical tests indicating the differences in means (Brown-Forsythe robust ANOVA) and medians (independent samples median test) are provided in Appendix D. These tests show that both (non-)born globals and (non-)fast internationalizers were primarily distinguished by variables focusing on past export-related entrepreneurial experience, rather than by general entrepreneurial experience variables. Specifically, when general experience variables were not significant at $p < 0.01$ with any tests, then export experience variables in turn mostly were. In addition, the two variables focusing on world market experience (WEXPORT, COUNTWMARKET) and experience from a variety (number) of foreign markets (COUNTMARKET) seemed to matter the most, when the results from statistical tests were viewed in a consolidative manner.

The logistic regression method (LR) led to an accuracy of 85.0% in predicting BORNGLO, while the same figure for FASTINT was 78.8% (see the variables and coefficients of the respective models in Tables 4 and 5). For born globals, the variety of significant predictors was larger than for fast internationalizers. Still, besides three export-related experience variables (EXPORTSALES, WEXPORT, COUNTMARKET), in the BORNGLO prediction model, one general experience variable (TURNOVER) was significant as well. While having more export experience (i.e., higher values for specific variables) was important to become a born global, the variable TURNOVER indicated that young firms' managers mostly lacked previous managerial experience in high-turnover companies. The latter could point to a specific segment of managers who serve in the management board mostly in the earlier phases of firms' life cycles. In turn, the FASTINT model was very straightforward with only a single export-related predictor (i.e., COUNTWMARKET). In summary, LR results indicated that to become a born global, managers must have obtained a variety of past export-related entrepreneurial experience, while to become a fast internationalizer, only experience in faraway markets matters.

The decision tree analysis (DT; see Figures 1 and 2 for how to detect a born global or a fast internationalizer step-by-step) yielded a higher accuracy (i.e., 92.5%) for BORNGLO than LR, while for FASTINT the result (78.8%) was exactly the same. A substantial difference in the useful predictors existed

TABLE 4. Logistic regression model for BORNGLO.

Variable	B	S.E.	p-value	Exp(B)	VIF
TURNOVER	-1.464	0.673	0.030	0.231	2.41
EXPORTSALES	1.062	0.596	0.075	2.891	2.55
WEXPORT	0.183	0.102	0.073	1.201	1.72
COUNTMARKET	0.360	0.212	0.089	1.434	2.45
Constant	1.985	3.911	0.612	7.280	

Note: obtained from backward regression by eliminating insignificant variables. B – coefficient, S.E. – standard error, Exp(B) – exponential of B, VIF – variance inflation factor.

TABLE 5. Logistic regression model for FASTINT.

Variable	B	S.E.	p-value	Exp(B)
COUNTWMARKET	0.374	0.110	0.001	1.454
Constant	-2.491	0.478	0.000	0.083

Note: obtained from forward regression by eliminating insignificant variables. See abbreviations of column headings in Table 4.

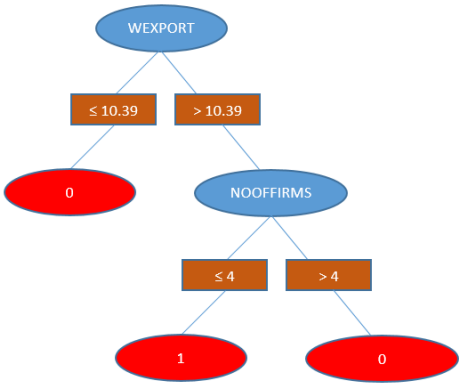

FIGURE 1. Decision tree model for BORNGLO (the numbers for the red end nodes depict the values for BORNGLO).

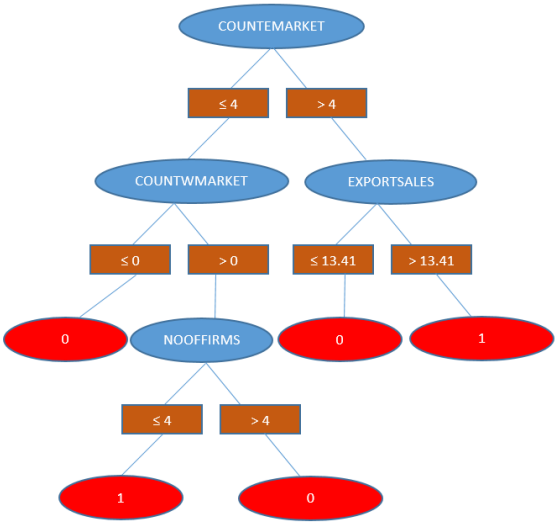

FIGURE 2. Decision tree model for FASTINT (the numbers for the red end nodes depict the values for FASTINT).

when compared with LR. Namely, the amount of predictor variables in the decision tree for FASTINT was larger than for BORNGLO. Born globals could mostly be predicted by using the scale of past outside-Europe export experience (WEXPORT), while to some extent the diversity of past entrepreneurial experience in the form of the number of past board positions (NOOFFIRMS) mattered as well. The range of useful predictors for fast internationalizers was wider, although the diversity of European and outside-Europe markets (i.e., COUNTEMARKET and COUNTWMARKET) mattered the most. Concerning all export experience variables, larger values pointed to either BORNGLO = 1 or FASTINT = 1, while less diverse entrepreneurial experience (i.e., more concentration on a few firms in the past) led to the same conclusion. This provided some supplementary evidence to LR, based on which it could be hypothesized that respective managers are serial (export) entrepreneurs.

When compared with LR and DT, the rough sets analysis (RS) offered an alternative view of how to predict born globals and fast internationalizers. Tables 6 and 7 provide rules based on their strength. The strength (the last column in the respective tables) means that the given number of firms can be predicted correctly to the class provided in the column ''Decision BORNGLO'' or ''Decision FASTINT'' by using the respective rule (i.e., values of specific variables) in each row. As the firms that were not born globals (BORNGLO = 0) and not fast internationalizers (FASTINT = 0) formed the majority groups, rules in Table 6 and 7 were set to account for these groups. The rules for BORNGLO were stronger than for FASTINT and yielded to comparable accuracies (90.0% and 81.2%) with those from LR and DT. The strongest rules for BORNGLO indicated that to become a born global, managers' previous outside-Europe export experience was crucial (either COUNTWMARKET or WEXPORT were present in all rules with the highest strength of 33). The latter result was similar to that obtained from DT, i.e., WEXPORT in the first decision node, while WEXPORT was also present in the LR model. The rules for FASTINT were much weaker than for BORNGLO. Generally, they indicated that to become a fast internationalizer, past experience should exceed a single export market and outside-Europe experience is necessary. The latter finding was supported by both LR and DT. In the FASTINT rules, for the first time the sectoral variety of past entrepreneurial experience (NACES) appeared as well.

The fourth method, neural networks (NN), yielded the best results for both dependent variables, i.e., BORNGLO and FASTINT (see Table 8). The accuracies were respectively 93.8% and 86.3%. For BORNGLO, five out of seven variables portraying entrepreneurs' export experience were important predictors in the NN. Still, the variables depicting outside-Europe export experience held a slightly more prominent role. In summary, concerning general entrepreneurial experience, there was an exact match with LR, while almost the same can be said about RS concerning export-related entrepreneurial experience. For FASTINT, the important predictors were rather similar to BORNGLO, while export experience variables obtained even a larger importance. Still, for FASTINT, these variables were more dispersed than those obtained with other methods.

TABLE 6. Rough set model for BORNGLO.

Rule number	NOOFFIRMS	COUNTMARKET	COUNTWMARKET	COUNTEMARKET	WEXPORT	NACES	Decision BORNGLO	Strength
1		1			0		0	33
2		1	0				0	33
3				1	0		0	33
4			0	1			0	33
5						1	0	24
6	1				0		0	20
7	1		0				0	20
8	1	1					0	14
9	1			1			0	14

Note: Each rule includes the combination of values of the respective independent variables, based on which the decision for dependent variable BORNGLO value (0 for all rules) is made. Strength means the number of firms characterized by this rule.

TABLE 7. Rough set model for FASTINT.

Rule number	NOOFFIRMS	COUNTMARKET	NACES	WEXPORT	MAXSHARE	Decision FASTINT	Strength
1	1	1				0	14
2			4	0		0	14
3		0	4			0	10
4				0	1	0	9
5		0			1	0	9

Note: Each rule includes the combination of values of the respective independent variables, based on which the decision for dependent variable FASTINT value (0 for all rules) is made. Strength means the number of firms characterized by the given rule.

TABLE 8. Normalized importance (NI, %) of variables in neural networks for BORNGLO and FASTINT.

Variable	BORNGLO NI, %	FASTINT NI, %
BOARDEXP	20	47
NOOFFIRMS	32	50
TURNOVER	63	72
NACES	41	46
EXPORTSALES	41	62
EEXPORT	56	48
WEXPORT	59	51
MAXSHARE	29	26
COUNTMARKET	52	72
COUNTEMARKET	52	76
COUNTWMARKET	55	66

Note: Normalized importance (NI) indicates the role of each variable in the neural network relative to the most important variable in predicting the binary outcome. As the results are averaged over ten different neural networks, none of the NIs takes a value of 100%.

TABLE 9. The classification accuracies through four applied methods.

Dependent variable / Methodology	FASTINT	BORNGLO
Logistic regression (LR)	78.8%	85.0%
Neural network (NN)	86.3%	93.8%
C4.5 decision tree (DT)	78.8%	92.5%
Rough sets (RS)	81.2%	90.0%

Note: evaluation sample accuracies in 10-fold cross-validation procedure.

TABLE 10. Important variables for BORNGLO prediction through different methods.

Model	LR	DT	RS	NN	Count	Mean
BOARDEXP					0	1.25
NOOFFIRMS		+	+		2	
TURNOVER	+			+	2	
NACES			+		1	
EXPORTSALES	+				1	1.86
EEXPORT				+	1	
WEXPORT	+	+	+	+	4	
MAXSHARE					0	
COUNTMARKET	+		+	+	3	
COUNTEMARKET			+	+	2	
COUNTWMARKET			+	+	2	

Note: method abbreviations are provided in Table 9.

As NN was the most accurate of the four methods, an additional analysis in the form of partial dependence plots has been provided for it in Appendixes E and F. These plots indicated the role of change in the values of individual variables on the probability (ranging from 0 to 1) to become a BORNGLO or FASTINT. The straighter the line, the less the change in the value of a specific independent variable altered the respective probability. It can be concluded that in the case of BORNGLO, the fluctuation in the values of export-related experience could significantly alter the probability of becoming a born global firm. It should of course be emphasized that as the population of BORNGLO = 1 firms was very small, the results could be to some extent influenced by specific observations. In case of FASTINT, fewer variables could alter the probability of the outcome based on their values.

The results over the four applied methods have been consolidated into Table 9. The accuracies of different methods did not vary substantially and were equally high, while the neural networks method yielded the highest accuracy with a few percentage points. The results surpassed the prediction accuracy of 79.8% of the only available directly comparable study by Kahiya [20], thus providing a proof that a variety of different methods accompanied by a novel dataset composed of a wide range of experiential variables can be used to solve the classification problem of which young firms internationalize early and rapidly. When compared with other areas, the accuracies for BORNGLO exceeded for instance the mean 1-year range accuracy in bankruptcy prediction (see [47]).

The following conclusions can be made about the useful predictors for a born global status (see Table 10).

TABLE 11. Important variables for FASTINT prediction through different methods.

Model	LR	DT	RS	NN	Count	Mean
BOARDEXP					0	1.00
NOOFFIRMS		+	+		2	
TURNOVER				+	1	
NACES			+		1	
EXPORTSALES		+		+	2	1.71
EEXPORT					0	
WEXPORT			+	+	2	
MAXSHARE			+		1	
COUNTMARKET			+	+	2	
COUNTEMARKET		+		+	2	
COUNTWMARKET	+	+		+	3	

Note: method abbreviations are provided in Table 9.

TABLE 12. The usefulness of managers' past entrepreneurial experience in predicting fast internationalization of young firms: conceptualization from empirical evidence.

Born global type fast internationalizer	General fast internationalizer
General entrepreneurial experience: 1) ***Average***: diversity of past entrepreneurial experience; scale of past entrepreneurial experience 2) ***Weak***: sectoral variety of past entrepreneurial experience 3) ***No***: duration of past entrepreneurial experience	**General entrepreneurial experience**: 1) ***Average***: diversity of past entrepreneurial experience 2) ***Weak***: sectoral variety of past entrepreneurial experience; scale of past entrepreneurial experience 3) ***No***: duration of past entrepreneurial experience
Export-related entrepreneurial experience: 1) ***High***: scale of past outside-home continent export-related experience; market diversity of past export-related experience 2) ***Average***: market diversity of past home continent export-related experience; market diversity of past outside home continent export-related experience 3) ***Weak***: scale of past export-related experience; scale of past home continent export-related experience 4) ***No***: intensity of past export-related experience	**Export-related entrepreneurial experience**: 1) ***High***: market diversity of past outside home continent export-related experience 2) ***Average***: scale of past export-related experience; scale of past outside home continent export-related entrepreneurial experience; market diversity of past export-related experience; market diversity of past home continent export-related experience 3) ***Weak***: intensity of past export-related experience 4) ***No***: scale of past home continent export-related experience

Note: no (variable present for none of the methods), weak (for 25% of the methods), average (for 50% of the methods), high (for 75%-100% of the methods) respectively refer to usefulness scores from Tables 10 and 11 as 0, 1, 2, 3-4. As Estonia is situated in Europe, in the conceptualization "Europe" is referred to as the home continent and "outside Europe" as outside the home continent. For the exact variables reflecting each of those dimensions, see Table 3.

The scale of outside-Europe past entrepreneurial experience (WEXPORT) was the best predictor. This was logically interconnected to the definition of a born global, i.e., exporting to some extent to markets located outside the home continent's (in the case of Estonian firms, Europe's) borders. Similarly, different variables about the general or specific market diversity (COUNTMARKET, COUNTEMARKET, COUNTWMARKET) played important roles. General entrepreneurial experience variables were not so useful for prediction; the diversity (NOOFFIRMS) and the scale (TURNOVER) of past entrepreneurial experience were the most frequent to appear.

TABLE 13. A typology of fast internationalizers.

Type	Description
born globals	internationalize soon after establishment and achieve a relatively high export share in a few years; in addition, according to some authors, born globals should also expand outside their own continent; "soon" usually means in 3 years or less (although, e.g., according to Sui and Baum [61], they should do it in 2 years or less), "high" means at least 25%
born regionals	otherwise, similar to born globals but these firms only expand to the markets in their own region
born internationals	otherwise, similar to born globals but these firms only expand to the markets that are located on their home continent; these can be also only their neighboring markets
international new ventures	internationalize relatively fast and successfully, but in the internationalization literature, "fast" usually means up to six years for such firms (still, e.g., Kahiya [20] used a three-year threshold); moreover, many authors have not set a minimum export share or a minimum number of foreign markets
(general) fast internationalizers	this term can encompass firms belonging to the first three groups, but also some international new ventures; this group is seen as the opposite to traditional (slow) internationalizers: the latter expand more slowly and usually start from a few neighboring markets

Note: This table only encompasses the types mentioned in the main text of this study and the definitions are mainly based on the overviews by Rodríguez-Ruiz et al. [62] and Vissak and Masso [63]; for some additional types (sub-types of international new ventures), see, e.g., Baum et al. [64], Hallbäck and Larimo [65] and Oviatt and McDougall [66].

TABLE 14. Theoretical and theme variety of the literature on export prediction: some examples.

Study	Main theories/ literature	Main results
Studies that predicted whether firms (may) become early internationalizers		
Baum et al. (2015) [18]	internationalization literature, resource-based view	born globals and born regionals have high international growth orientation and more prior international experience; high product differentiation can impede fast expansion to other continents, networks are important for born-again globals
Hull et al. (2020) [19]	literature on born globals, literature on firms' failure (decision to quit)	innovative firms using more information sources are more likely to become born globals and they are less likely to fail
Kahiya (2013) [20]	literature on export barriers	the used 8 export barrier variables are 80% accurate to distinguish between exporter types
Lautanen (2000) [21]	literature on internationalization and diffusion of innovations	smaller firms and those with more foreign language skills are more likely to start exporting in less than four years
Studies that predicted other export-related characteristics		
Burton & Schlegelmilch (1987) [7]	export literature	attitude and marketing variables are more important in differentiating between exporters and non-exporters; exporter groups do not differ significantly from one another but coefficients increase slightly
Child et al.(2017) [49]	literature on international business and business models, resource-based view, transaction cost perspective, institutional and cognitive perspectives	the four used factors are able to predict which of the three business models a firm chooses; choices vary by industry and depend on decision-makers' previous experience
Ciravegna et al.(2019) [50]	internationalization literature, entrepreneurship literature	initial internationalizer type (entrepreneurial, serendipitous or strategic) affects firms' future export behavior (e.g., becoming a multinational, expanding in the region or exiting from foreign markets)
Draz et al. (2016) [8]	literature on exporting SMEs	larger firms, firms registered with original equipment manufacturers, those in industrial clusters, with highly ranked inspection labs and educated personnel are more likely to achieve export success
Fletcher (2001) [51]	internationalization literature	most factors predict inward, outward and, to a smaller extent, also linked internationalization but de-internationalization is motivated by other factors
Hessels & Terjesen (2010) [9]	resource dependency theory, institutional theory	institutional theory explains why firms export, resource dependency theory explains the choice between direct and indirect exporting
Landa-Torres et al. (2012) [10]	literature on firms' international activities; methodological literature	the best solution had seven groups of variables of which six groups were significant for predicting export success or failure
Lu et al. (2014) [11]	literature on firms' export behavior	pure exporters' productivity is higher than non-exporters' productivity but lower than other exporters' productivity; pure exporters need larger foreign markets compared to their home market
Lu et al. (2017) [12]	literature on intermediaries and foreign trade	most productive firms export directly while less productive firms use intermediaries or do not export at all
Razzolini & Vannoni (2011) [13]	literature on firms' export decisions and productivity	direct exporters have higher productivity than indirect exporters; non-exporters' productivity is the lowest; exporters are larger than non-exporters
Smith (2005) [14]	literature on export performance determinants	the used set of variables provides accurate classification; 5 determinants are especially important
Smith (2007) [15]	literature on cultural differences and export performance determinants	the used set of variables provides accurate classification; 6 determinants are especially important
Wagner & Zahler (2015) [16]	international trade literature; literature on spillovers	followers are larger and export more than pioneers; they are more likely to enter if the pioneer survives for more than 1-2 years
Wolff & Pett (2000) [17]	internationalization literature, the stage model, resource-based view	smaller firms' export intensity is higher; if they have resources, they can use the same patterns as larger firms

Note: For composing this table, we searched for the literature with keywords international*, export, born global, born international or international new venture and predict* from Scopus and Web of Science databases.

The following conclusions can be made about the useful predictors for a fast internationalizer status (see Table 11). Similarly to born globals, variables about the general or specific export market diversity (COUNTMARKET, COUNTEMARKET, COUNTWMARKET) or scale (EXPORTSALES, WEXPORT) were important, while interestingly,

TABLE 15. The importance of managers' and/or owners' experience for fast internationalization.

Study	Data	Method(s)	Main results
Andersson & Evangelista (2006) [67]	interview data (Sweden and Australia, 3 firms from each)	within- and cross-case analysis	founders' international experience (for instance, from working in multinational firms in the home country or abroad or studying abroad) can be important for fast internationalization; however, some firms without such experience also internationalize fast
Arte (2017) [68]	interview data (India, 6 firms)	cross-case analysis	the founders' prior international and industry experience is important for fast internationalization
Bai et al. (2017) [69]	survey data (China, 196 firms)	partial least squares analysis	the international experience (from studying or doing business) of returnee entrepreneurs is important for internationalization as it contributes to the firm's pool of internationalization knowledge
Bengtsson (2004) [70]	interview data (Sweden, 1 firm)	content analysis	the founders', managers' and board members' prior internationalization experience (for instance, from doing business with or in some foreign countries) is important for born globals' fast internationalization
Cannone et al. (2014) [71]	interview data (Italy, 8 firms)	cross-case analysis	the founders' experience from studying, working or living abroad is very important for born globals' internationalization: for instance, they tend to expand to the countries where the founders lived before
Chetty & Campbell-Hunt (2004) [72]	interview data and other data sources (New Zealand, 16 firms)	cross-case analysis	the founders' prior international experience (not necessarily form the same industry) was crucial for born globals' early internationalization; such experience was also important for other internationalizers
Cunningham et al. (2012) [73]	interview data (Poland and Hungary, 7 firms in total)	cross-case analysis	some firms can internationalize fast even if their founders have no international experience (in terms of studying or working abroad); for some others, industry experience or international experience in a local firm was relevant
Danik et al. (2016) [74]	interview data (Poland, 10 firms)	content analysis	the founders' international co-operation experience and previous foreign market knowledge were important triggers for establishing born globals and thereafter, expanding successfully to foreign markets
Domurath & Patzelt (2019) [75]	survey data (Germany, 100 firms)	hierarchical linear regression analysis	the entrepreneurs' prior founding experience tends to delay first international sales, while prior domestic work experience tends to reduce foreign sales intensity; prior international experience (working abroad) led to earlier internationalization but did not affect sales intensity
Evangelista (2005) [76]	interview data (Australia, 6 firms)	cross-case analysis	most of the studied firms had a founder who had lived, worked, done business or studied abroad; some had established local firms or worked in a similar firm in the home country; such experience was useful for internationalization
Franco & Haase (2016) [77]	interview data (Portugal, 2 firms)	content analysis	both born globals internationalized successfully although the founders did not have any direct international experience (e.g., from working or studying abroad), but both spoke foreign languages and one had studied at home in a university that had many foreign students
Ghannad & Andersson (2012) [78]	interview data (Sweden, 3 firms)	within- and cross-case analysis	some born globals can internationalize successfully without any previous international experience; however, the founder's wish to experience doing international business (e.g., to travel and meet new people) can become a driver of fast internationalization
Gittins et al. (2015) [79]	interview data (Hungary, 3 firms)	cross-case analysis	entrepreneurs' experience from working or studying abroad (for at least 2 years) before foundation was important for establishing born globals
Gleason et al. (2006) [80]	various data sources (USA, 465 firms)	logistic regression analysis	compared to slow internationalizers, born globals' founders, managers and board members have more international managerial and/or board experience
Gruenhagen et al. (2018) [53]	interview data (Australia, 700 firms)	negative binomial regression models, logistic regression analysis, correlation analysis, simple slopes analysis	breadth of founders' international experience (number of foreign countries where the respondent had worked for at least 3 months) affects international new ventures' subsequent international activities positively but depth (adult years spent abroad) lacks a significant direct effect
Hallbäck & Larimo (2007) [65]	interview data (Finland, 8 firms)	cross-case analysis	founders' and managers' previous industry experience (from working on international assignments in the home country or abroad) but also experience from studying abroad is important for fast internationalization
Hermel & Khayat (2011) [81]	interview data (France, 3 firms)	cross-case analysis	the manager's previous positive past international experience (from working in an exporting firm or consulting international firms) is important for a firm's fast internationalization
Johanson & Martín Martín (2015) [82]	interview data (Spain, 45 firms), secondary data sources	statistical comparison between firm groups	experience (gained via using various entry modes and entering different countries) is important for born internationals' internationalization; older born internationals have wider experience than younger ones but for both, managers' pre-existing experience is also important
Kowalik et al. (2017) [83]	survey data (Poland, 233 firms)	regression analysis, correlation analysis, statistical comparison between firm groups	top management's experience in doing business in foreign markets was important for fast internationalizers but also for other internationalizers
Kraus et al. (2017) [84]	survey data (4 European countries, 623 firms)	structural equation modelling (PLS-SEM)	entrepreneurs' prior international experience (from studying or living abroad) contributes positively to born globals' initial international opportunity recognition; experience from working abroad and from business travels was insignificant
Laanti et al. (2007) [85]	interview data (Finland, 4 firms)	within- and cross-case analysis	founders and/or managers' international business experience (from the same industry or from other industries) is important for born globals' internationalization
Li et al. (2012)	survey data (USA, 278	regression analysis	the relationship between international experience (time spent abroad before joining the

TABLE 15. *(Continued.)* **The importance of managers' and/or owners' experience for fast internationalization.**

[86]	firms)		firm) and early internationalization was curvilinear (took an inverted U-shape: the slope was positive with little experience and negative with more experience); the reason: in very volatile industries, lack of experience may have a positive effect as inexperienced firms are less cautious
Love et al. (2016) [87]	UKTI's survey data (UK, 1900 firms)	ordered probit analysis	firms that hired internationally experienced managers had higher export shares and more export markets, and they were active in more regions (however, as the data were cross-sectional, it was not clear if such managers helped firms to become more international or if international firms were attractive to such managers)
McCormick & Somaya (2020) [29]	data from World Bank Enterprise Surveys (15 countries, 3733 firms: both born globals and other exporters)	two-limit Tobit regression analysis, logit models, the selection model, CEM pretreated Tobit model	compared to older exporting firms, young born globals benefit more from involving managers with international experience, and also cross-national owners
Naudé & Rossouw (2010) [88]	World Bank's survey data (China, 3948 firms)	two-step regression analysis	if a firm is foreign-owned, then having an entrepreneur with previous export experience increases the probability of early internationalization; on the other hand, for locally owned firms, the effect is the opposite
Nemkova (2017) [89]	interview data (UK, 7 founders or managers and 4 industry experts)	template analysis	international experience (e.g., from working or living abroad) is helpful for discovering and reacting to foreign market opportunities
Nummela et al. (2016) [90]	interview data (Finland and Ireland, 2 firms from each)	within- and between-case analysis	some firms internationalized fast as their founders had international experience; some others despite the lack of experience; all failed (in one firm, experience led to overconfidence)
Odorici & Presutti (2013) [91]	interview data (Italy, 8 firms)	within- and between-case analysis with NVIVO	entrepreneurs' experience from living abroad, but also personal contacts created during past work experience abroad were important for early internationalization
Park & Rhee (2012) [92]	survey data (Korea, 271 firms)	structural equation modelling, multiple regression analysis	managers' experience (work experience, experience from international travels and speaking foreign languages) was important for building a knowledge base and through that, achieving successful internationalization
Pellegrino & McNaughton (2017) [93]	interview data, documents (8 firms)	cross-case analysis	founders' previous international business experience was useful for some of the studied born globals, while some also had to learn from their own experience
Tiwari & Korneliussen (2018) [94]	case study data (Nepal, 9 born globals)	cross-case analysis	entrepreneurs' prior experience from working in similar export businesses belonging to their family members and, as a result, better understanding of target markets and export procedures, helped the case firms to internationalize early
Ughetto (2016) [95]	survey data (different countries from 5 continents, 242 born globals)	OLS, structural equation modelling	entrepreneurs' experience from establishing other firms affected born globals' growth positively while experience from the same industry was insignificant
Verbeke et al. (2014) [96]	Kauffman Firm Survey dataset (2177 firms)	logistic regression analysis	immigrant status affected early internationalization positively and the impact was strong, while the number of businesses created before founding a new firm had a weak positive impact on the new firm's internationalization
Vissak et al. (2012) [97]	survey data (China, 380 firms including 104 born globals)	statistical comparison between firm groups	some firms become born globals even if their managers have limited or no prior international experience (e.g., from attending trade fairs or making pre-entry visits, working in exporting firms or abroad, studying abroad) or limited experience from working in non-exporting firms in the same industry
Ying Huang & Huei Hsieh (2013) [98]	interview data (USA, 1 firm), field observations	content analysis	the founder's extensive international experience (gained during 20 years of working in an exporting firm) was very important for the case firm's internationalization
Zhang et al.(2009) [99]	survey data (China, 148 firms)	regression analysis, second-order confirmatory model	compared to traditional exporters, born globals have more international experience (in terms of having done international business but also being internationalization-oriented)

Note: To obtain a more systematic understanding of the interconnections of fast internationalization and managerial experience, this table encompasses papers irrespective of the applied methods.

world market experience still had the most substantial role. Thus, exporting to Europe was a much easier task for the managers who had earlier outside-Europe experience than for those with only earlier European experience. Compared to born globals, general entrepreneurial experience variables were slightly less useful for the prediction of fast internationalizers.

V. DISCUSSION AND CONCEPTUALIZATION

Based on the results introduced in the previous section, we created a conceptual framework about the usefulness of experience-related variables in the prediction of born globals and general fast internationalizers (Table 12). Table 12 differentiates between general and export-related entrepreneurial experience.

The first and foremost contribution to the international business literature is that if a firm tries to internationalize quickly after foundation, its manager's prior export-related experience matters more than general entrepreneurial experience (for instance, past board memberships). Thus, entrepreneurial learning effects are specific, rather than general. This conclusion supports the findings of McCormick and Somaya [29] according to whom for young firms, managers' prior international experience is especially important as they

TABLE 16. Descriptive statistics of variables with statistical tests.

Variable / Statistic by group	BORNGLO (BG)						FASTINT (FI)						Total			ANOVA test p-value for BGs	Median test p-value for BGs	ANOVA test p-value for FIs	Median test p-value for FIs
	0			1			0			1									
	Mean	Std. Dev.	Median	Mean	Std. Dev.	Median	Mean	Std. Dev.	Median	Mean	Std. Dev.	Median	Mean	Std. Dev.	Median				
BOARDEXP	7.90	4.18	7.44	7.79	4.16	6.39	7.45	3.73	6.69	9.42	5.20	10.12	7.89	4.15	7.20	0.944	0.709	0.076	0.422
NOOFFIRMS	3.54	4.12	2.00	4.00	4.96	2.50	3.53	4.17	2.00	3.78	4.32	2.00	3.59	4.18	2.00	0.770	0.880	0.828	0.967
TURNOVER	13.41	2.09	13.31	14.12	2.71	12.95	13.21	1.95	13.18	14.40	2.58	13.67	13.48	2.15	13.29	0.378	0.709	0.038	0.789
NACES	3.13	2.62	2.00	4.38	1.85	4.00	2.95	2.21	2.00	4.28	3.41	3.50	3.25	2.57	3.00	0.193	0.284	0.053	0.402
EXPORTSALES	11.40	2.25	11.60	13.52	2.66	12.75	11.15	2.19	11.32	13.22	2.30	12.75	11.61	2.37	11.80	0.015	0.264	0.001	0.181
EEXPORT	11.23	2.59	11.60	13.14	2.92	12.49	10.95	2.57	11.32	13.05	2.41	12.58	11.42	2.67	11.67	0.055	0.709	0.003	0.181
WEXPORT	1.84	4.20	0.00	8.60	5.56	10.69	1.48	3.94	0.00	6.06	5.73	8.71	2.51	4.77	0.00	0.000	0.001	0.000	0.000
MAXSHARE	0.48	0.37	0.39	0.81	0.23	0.86	0.47	0.38	0.38	0.66	0.30	0.72	0.51	0.37	0.46	0.015	0.062	0.052	0.181
COUNTMARKET	2.56	2.59	2.00	6.25	4.95	4.50	2.11	1.80	1.00	5.72	4.64	3.00	2.93	3.07	2.00	0.001	0.054	0.000	0.001
COUNTEMARKET	2.39	2.44	2.00	5.13	4.42	2.50	1.98	1.70	1.00	5.00	4.26	3.00	2.66	2.78	2.00	0.008	0.584	0.000	0.018
COUNTWMARKET	0.32	0.92	0.00	1.63	1.60	1.00	0.18	0.50	0.00	1.39	1.79	1.00	0.45	1.07	0.00	0.001	0.001	0.000	0.000

Note: ANOVA and median test p-values in the last columns indicate whether the means or medians of respective variables are significantly different for (non-)born globals or (non-)fast internationalizers.

have not had time to learn from their own activities. However, compared to their study that only used two indicators for measuring experience – experience from exporting and experience from managing a foreign firm – this study selected a considerably wider variety of experience measures.

Second, when looking in detail into the types of export-related experience, the following can be concluded. For both to become a born global or a general fast internationalizer, managers' outside home-continent experience matters the most. For the former, the scale (amount of outside-Europe export sales), while for the latter, the diversity (number of outside-Europe export markets) of such experience matters more. Home continent experience provides mostly average results in explaining the studied types of internationalizers and seems to matter to a certain extent less for born globals that are more outside-home continent focused than general fast internationalizers. The conclusion about the importance of outside-home continent experience supports the case study results of Taylor and Jack [31] stating that fast internationalizers tend to enter familiar markets, but even a geographically distant market may seem familiar and attractive, if the managers have previously had activities there. Moreover, as entering outside-home continent markets is, in general, associated with greater risks and uncertainties, the results can indicate that managers who already have prior experience in such markets are more confident in entering outside-home continent markets or other markets with their new firm, too [37].

Third, general entrepreneurial experience has at best an average importance in predicting different types of fast internationalization. Still, from the respective variables, the diversity of past experience is of the highest importance. This variable reflects the potential of a manager to build up a large and diversified product-market portfolio, as already proven on the example of old firms (see, e.g., [33]). Still, focusing on too many firms in the past seems to portray a manager to whom internationalization is not important. Thus, having experience from a few past firms seems to be the greatest asset for fast internationalization. From another angle, the length of past managerial experience does not have a role in internationalizing early and rapidly. Thus, it can be hypothesized that life-long experience is not always an asset, probably because of increased rigidity in decision-making and as a result, lower readiness for trying something new [27]. This conclusion supports some earlier studies stating that being involved in a managerial position for a lengthy time makes people to be less interested in excessive risk taking [48] and, therefore, entering far-away markets [28].

Finally, past export-related entrepreneurial experience accompanied by general entrepreneurial experience can explain much of the fast internationalization decision of a young firm. Although the paper focused on the predictive context, not on the exact causal relationship, the applied experience variables are among the most likely candidates to portray a causal relationship.

VI. PRACTICAL IMPLICATIONS

We herewith provide specific guidelines for different practitioners who aim to distinguish quick and early exporters among young (manufacturing) firms. Such stakeholders can be, for instance, governmental export support agencies, investors, creditors or firms' boards/owners planning exporting as part of a strategic change.

First, the paper clearly indicates that for a new firm to start quickly exporting to distant markets, managers or other individuals responsible for internationalization should have previous export experience. When thriving to enter the global market, the best candidates for the job are individuals who were previously active in firms with a high scale of outside-continent sales. In turn, the best candidate for home-continent sales has previously exported to a large number of different countries. In case of large countries like the United States, the latter could also mean that for achieving countrywide sales, a firm probably needs a salesperson with experience from various states.

Second, general entrepreneurial experience is less important for internationalization: its prediction abilities are much weaker than in the case of export experience. Still, when export experience is missing, having worked for several

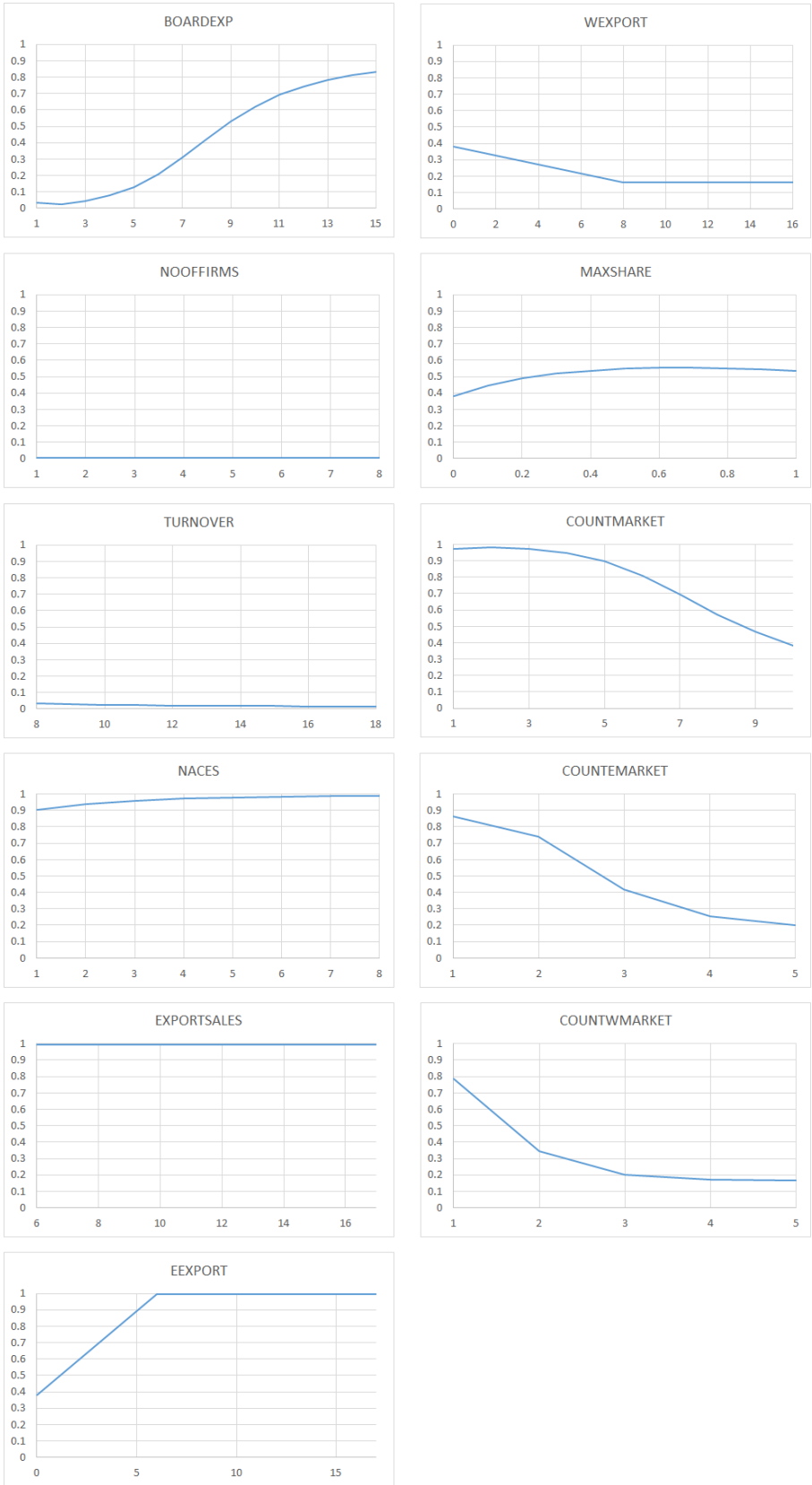

FIGURE 3. Partial dependence plots for the neural networks model of BORNGLO (y-axis: probability to become a BORNGLO; x-axis: all possible values of the respective predictor variable).

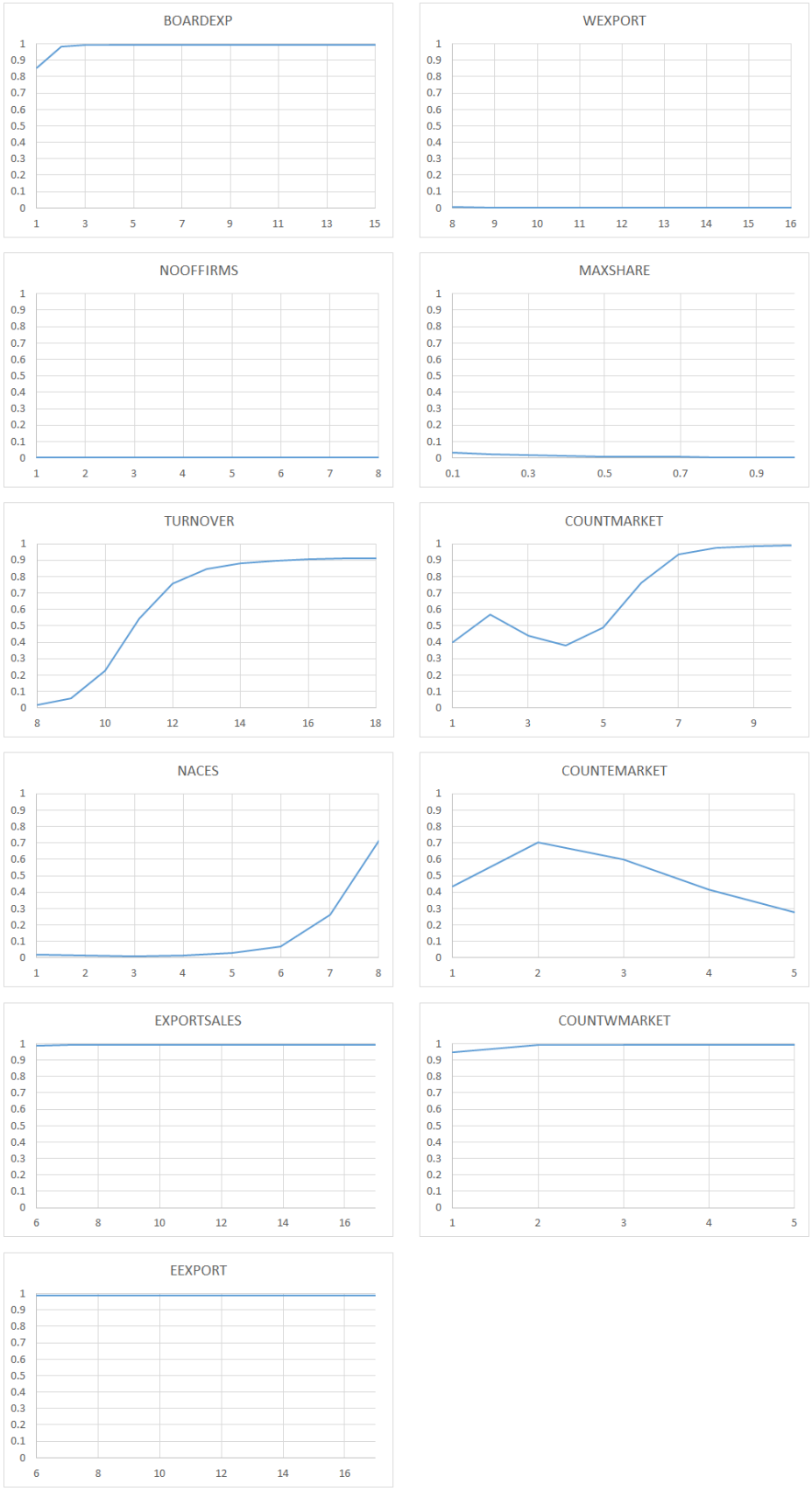

FIGURE 4. Partial dependence plots for the neural networks model of FASTINT (y-axis: probability to become a FASTINT; x-axis: all possible values of the respective predictor variable).

companies before seems to be beneficial when thriving to become a quickly internationalizing firm: such experience can indicate that the manager has wider business networks, and network relationships can be useful for internationalization.

Third, when coming to the methodological considerations, then we would not pinpoint any specific machine learning method enabling to achieve particularly high prediction accuracies of the phenomenon. The accuracies for different tools vary by a few percentage points. Still, classical statistical tools such as logistic regression seem to be somewhat less useful, lagging almost ten percentage points behind when compared with the best machine learning tools.

Last but not least, in the fourth section, several ready-made decision support systems have been provided that the interested stakeholders can directly put into action.

VII. CONCLUSION

This paper aimed to find out how useful managers' past general and export experience is in predicting whether young firms become fast internationalizers. For that purpose, the whole population of young Estonian firms founded in 2012-2013 was used. As dependent variables, born global and general fast internationalizer status were applied, while 11 independent variables were used to depict general and export-related entrepreneurial experience. The prediction was executed with four different methods: logistic regression, decision tree, rough sets and neural networks.

The results indicate that early and rapid internationalizers can be predicted with high precision, while born global firms with a higher accuracy (at least 90% for all machine learning methods) than general fast internationalizers. Export-related experience variables are more useful in predictions than those depicting general experience. The results enabled to conceptualize which forms of managerial experience matter the most for young firms that internationalize quickly.

The paper is not free from limitations. The whole population is quite small, thus individual observations can have a considerable influence on the results. As noted in the paper, the population size is affected by constraints concerning the length of usable time series. Derived from the small population size, it was not possible to find out whether there was a match between past and new export markets (or geographic regions).

Future research possibilities partly emerge from the limitations. The prediction accuracies could be enhanced by accounting for more specific experience variables like managers' prior export experience from each particular foreign market: for instance, in the form of duration or scale. Moreover, some additional foreign experience related variables, such as making pre-entry visits and attending trade fairs, could be added in case of collecting survey data. In addition, the usage of a more extensive set of variables about the managers – e.g., their educational background, past employment other than being an executive, entrepreneurial risk behavior in the past – would besides resulting in potentially more accurate predictions enable to contribute to the debate about the causal mechanisms of fast internationalization decisions.

APPENDIX A
A TYPOLOGY OF FAST INTERNATIONALIZERS

See Table 13.

APPENDIX B
THEORETICAL AND THEME VARIETY OF THE LITERATURE ON EXPORT PREDICTION: SOME EXAMPLES

See Table 14.

APPENDIX C
THE IMPORTANCE OF MANAGERS' AND/OR OWNERS' EXPERIENCE FOR FAST INTERNATIONALIZATION

See Table 15.

APPENDIX D
DESCRIPTIVE STATISTICS OF VARIABLES WITH STATISTICAL TESTS

See Table 16.

APPENDIX E
PARTIAL DEPENDENCE PLOTS FOR THE NEURAL NETWORKS MODEL OF BORNGLO (Y-AXIS: PROBABILITY TO BECOME A bornglo; X-AXIS: ALL POSSIBLE VALUES OF THE RESPECTIVE PREDICTOR VARIABLE)

See Fig. 3.

APPENDIX F
PARTIAL DEPENDENCE PLOTS FOR THE NEURAL NETWORKS MODEL OF FASTINT (Y-AXIS: PROBABILITY TO BECOME A FASTINT; X-AXIS: ALL POSSIBLE VALUES OF THE RESPECTIVE PREDICTOR VARIABLE)

See Fig. 4.

REFERENCES

[1] B. Chabowski, P. Kekec, N. A. Morgan, T. H. Hult, T. Walkowiak, and B. Runnalls, "An assessment of the exporting literature: Using theory and data to identify future research directions," *J. Int. Marketing*, vol. 26, no. 1, pp. 118–143, 2018.

[2] E. T. Kahiya, "Five decades of research on export barriers: Review and future directions," *Int. Bus. Rev.*, vol. 27, no. 6, pp. 1172–1182, 2018.

[3] L. C. Leonidou, C. S. Katsikeas, and D. N. Coudounaris, "Five decades of business research into exporting: A bibliographic analysis," *J. Int. Manage.*, vol. 16, no. 1, pp. 78–91, Mar. 2010.

[4] F. Morais and J. J. Ferreira, "SME internationalisation process: Key issues and contributions, existing gaps and the future research agenda," *Eur. Manage. J.*, vol. 38, no. 1, pp. 62–77, Feb. 2020.

[5] R. Romanello and M. Chiarvesio, "Early internationalizing firms: 2004–2018," *J. Int. Entrepreneurship*, vol. 17, no. 2, pp. 172–219, 2019.

[6] V. P. S. Steinhäuser, F. D. O. Paula, and T. D. L. V. A. de Macedo-Soares, "Internationalization of SMEs: A systematic review of 20 years of research," *J. Int. Entrepreneurship*, to be published, doi: 10.1007/s10843-020-00271-7.

[7] F. N. Burton and B. B. Schlegelmilch, "Profile analyses of non-exporters versus exporters grouped by export involvement," *Manage. Int. Rev.*, vol. 27, no. 1, pp. 38–49, 1987.

[8] U. Draz, M. Jahanzaib, and G. Asghar, "Identification of determinants for globalization of SMEs using multi-layer perceptron neural networks," *Mehran Univ. Res. J. Eng. Technol.*, vol. 35, no. 1, pp. 39–52, 2016.

[9] J. Hessels and S. Terjesen, "Resource dependency and institutional theory perspectives on direct and indirect export choices," *Small Bus. Econ.*, vol. 34, no. 2, pp. 203–220, 2010.
[10] I. Landa-Torres, E. G. Ortiz-Garcia, S. Salcedo-Sanz, M. J. Segovia-Vargas, S. Gil-Lopez, M. Miranda, J. Leiva-Murillo, and J. Del Ser, "Evaluating the internationalization success of companies through a hybrid grouping harmony search—Extreme learning machine approach," *IEEE J. Sel. Topics Signal Process.*, vol. 6, no. 4, pp. 388–398, May 2012.
[11] J. Lu, Y. Lu, and Z. Tao, "Pure exporter: Theory and evidence from China," *World Economy*, vol. 37, no. 9, pp. 1219–1236, 2014.
[12] J. Lu, Y. Lu, Y. Sun, and Z. Tao, "Intermediaries, firm heterogeneity and exporting Behaviour," *World Economy*, vol. 40, no. 7, pp. 1381–1404, Jul. 2017.
[13] T. Razzolini and D. Vannoni, "Export premia and subcontracting discount: Passive strategies and performance in domestic and foreign markets," *World Economy*, vol. 34, no. 6, pp. 984–1013, Jun. 2011.
[14] D. Smith, "A neural network classification of export success in japanese service firms: Performance predictability and determinant impact," *Services Marketing Quart.*, vol. 26, no. 4, pp. 95–108, Jun. 2005.
[15] D. Smith, "A cross-cultural classification of service export performance using artificial neural networks: Japan, Germany, United States," *J. Global Marketing*, vol. 20, no. 1, pp. 5–19, Feb. 2007.
[16] R. Wagner and A. Zahler, "New exports from emerging markets: Do followers benefit from pioneers," *J. Develop. Econ.*, vol. 114, pp. 203–223, 2015.
[17] J. A. Wolff and T. L. Pett, "Internationalization of small firms: An examination of export competitive patterns, firm size, and export performance," *J. Small Bus. Manage.*, vol. 38, no. 2, pp. 34–47, 2000.
[18] M. Baum, C. Schwens, and R. Kabst, "A latent class analysis of small firms' internationalization patterns," *J. World Bus.*, vol. 50, no. 4, pp. 754–768, 2015.
[19] C. E. Hull, Z. Tang, J. Tang, and J. Yang, "Information diversity and innovation for born-globals," *Asia Pacific J. Manage.*, vol. 37, no. 4, pp. 1039–1060, 2020.
[20] E. T. Kahiya, "Export barriers and path to internationalization: A comparison of conventional enterprises and international new ventures," *J. Int. Entrepreneurship*, vol. 11, no. 1, pp. 29–33, Mar. 2013.
[21] T. Lautanen, "Modelling small firms' decisions to export—Evidence from manufacturing firms in Finland, 1995," *Small Bus. Econ.*, vol. 4, no. 2, pp. 107–124, 2000.
[22] P. Braunerhjelm and T. Halldin, "Born Globals—Presence, performance and prospects," *Int. Bus. Rev.*, vol. 28, no. 1, pp. 60–67, 2019.
[23] E. Choquette, M. Rask, D. Sala, and P. Schröder, "Born Globals—Is there fire behind the smoke," *Int. Bus. Rev.*, vol. 26, no. 3, pp. 448–560, 2017.
[24] T. Vissak and J. Masso, "Job creation of exporters and non-exporters: Evidence from Estonia," in *International Business and Emerging Economy Firms*, vol. 2. Cham, Switzerland: European and African Perspectives, Palgrave Macmillan, 2020, pp. 103–127.
[25] J. Masso and O. Lukason, "Performance of selected Estonian firms financed with start-up grant: Ability to follow plans and grant usage efficiency," *Discuss. Estonian Econ. Policy*, vol. 18, pp. 253–265, 2010.
[26] O. Lukason and K. Käsper, "Failure prediction of government funded start-up firms," *Investment Manage. Financial Innov.*, vol. 14, no. 2, pp. 296–306, Aug. 2017.
[27] C. Barroso, M. M. Villegas, and L. Pérez-Calero, "Board influence on a firm's internationalization," *Corporate Governance, An Int. Rev.*, vol. 19, no. 4, pp. 351–367, 2011.
[28] O. Lukason and T. Vissak, "Export behavior and corporate governance," *Rev. Int. Bus. Strategy*, vol. 30, no. 1, pp. 43–76, Jan. 2020.
[29] M. McCormick and D. Somaya, "Born globals from emerging economies: Reconciling early exporting with theories of internationalization," *Global Strategy J.*, vol. 10, no. 2, pp. 251–281, May 2020.
[30] S. Chetty, A. Ojala, and T. Leppäaho, "Effectuation and foreign market entry of entrepreneurial firms," *Eur. J. Marketing*, vol. 49, nos. 9–10, pp. 1436–1459, 2015.
[31] M. Taylor and R. Jack, "Understanding the pace, scale and pattern of firm internationalization: An extension of the 'born global' concept," *Int. Small Bus. J.*, vol. 31, no. 6, pp. 701–721, 2013.
[32] A. Zucchella and E. Cotta Ramusino, "The role of equity investors in the internationalization strategies of infant technology-based firms," in *Corporate Governance and International Business. Strategy, Performance and Institutional Change*. Houndmills, U.K.: PalgraveMacmillan, 2008, pp. 90–111.
[33] V. Süsi and O. Lukason, "New member in the boardroom and subsequent strategic change in the product-market scope of the firm," *Rev. Int. Bus. Strategy*, vol. 30, no. 3, pp. 399–419, May 2020.
[34] M. Reavley, T. Lituchy, and E. McClelland, "Exporting success: A two-country comparison of women entrepreneurs in international trade," *Int. J. Entrepreneurship Small Bus.*, vol. 2, no. 1, pp. 57–78, 2005.
[35] T. Ilhan Nas and O. Kalaycioglu, "The effects of the board composition, board size and CEO duality on export performance: Evidence from turkey," *Manage. Res. Rev.*, vol. 39, no. 11, pp. 1374–1409, Nov. 2016.
[36] P. Westhead, M. Wright, and D. Ucbasaran, "The internationalization of new and small firms: A resource-based view," *J. Bus. Venturing*, vol. 16, no. 4, pp. 333–358, 2001.
[37] T. Vissak, B. Francioni, and S. Freeman, "Foreign market entries, exits and re-entries: The role of knowledge, network relationships and decision-making logic," *Int. Bus. Rev.*, vol. 29, no. 1, pp. 1–38, 2020.
[38] M. J. D. Roberts and E. Muralidharan, "Internationalization of service SMEs: Perspectives from Canadian SMEs internationalizing in Asia," *Global Bus. Rev.*, to be published, doi: 10.1177/0972150919887250.
[39] N. Nummela, T. Vissak, and B. Francioni, "The interplay of entrepreneurial and non-entrepreneurial internationalization: An illustrative case of an Italian SME," *Int. Entrepreneurship Manage. J.*, to be published, doi: 10.1007/s11365-020-00673-y.
[40] M. J. Ariza-Garzon, J. Arroyo, A. Caparrini, and M.-J. Segovia-Vargas, "Explainability of a machine learning granting scoring model in peer-to-peer lending," *IEEE Access*, vol. 8, pp. 64873–64890, 2020.
[41] F. Y. M. Chang and C. M. Webster, "Influence of innovativeness, environmental competitiveness and government, industry and professional networks on SME export likelihood," *J. Small Bus. Manage.*, vol. 57, no. 4, pp. 1304–1327, Oct. 2019.
[42] Z. Xiao, K. Gong, and Y. Zou, "A combined forecasting approach based on fuzzy soft sets," *J. Comput. Appl. Math.*, vol. 228, no. 1, pp. 326–333, 2009.
[43] S. Blanco, M. Miranda, and M. J. Segovia-Vargas, "Los factores determinantes del éxito en la actividad exportadora: Una aproximación mediante el análisis rough set," in *Tópicos Selectos de Optimización*, vol. 1. Mexico City, Mexico: Ecorfan, 2012, ch. 12, pp. 233–266.
[44] M. J. Segovia-Vargas, S. Salcedo-Sanz, and C. Bousoño-Calzón, "Prediction of insolvency in non-life insurance companies using support vector machines, genetic algorithms and simulated annealing," *FUZZY Econ. Rev.*, vol. 9, no. 1, pp. 79–94, 2004.
[45] J. R. Quinlan, *C4.5: Programs for Machine Learning*. San Mateo, CA, USA: Morgan Kaufmann, 1993.
[46] Z. Diaz-Martinez, A. Sanches-Arellano, and M. J. Segovia-Vargas, "Prediction of financial distress by means of rough sets and decision trees," *Innovar*, vol. 21, no. 39, pp. 83–100, 2011.
[47] P. du Jardin, "Dynamics of firm financial evolution and bankruptcy prediction," *Expert Syst. Appl.*, vol. 75, pp. 25–43, Jun. 2017.
[48] V. Süsi and O. Lukason, "Corporate governance and failure risk: Evidence from Estonian SME population," *Manage. Res. Rev.*, vol. 42, no. 6, pp. 703–720, 2019.
[49] J. Child, L. Hsieh, S. Elbanna, J. Karmowska, S. Marinova, P. Puthusserry, T. Tsai, R. Narooz, and Y. Zhang, "SME international business models: The role of context and experience," *J. World Bus.*, vol. 52, no. 5, pp. 664–679, 2017.
[50] L. Ciravegna, S. K. Kundu, O. Kuivalainen, and L. E. Lopez, "The timing of internationalization—Drivers and outcomes," *J. Bus. Res.*, vol. 105, pp. 322–323, 2019.
[51] R. Fletcher, "A holistic approach to internationalization," *Int. Bus. Rev.*, vol. 10, no. 1, pp. 25–49, 2001.
[52] N. E. Philp and R. Wickramasekera, "Management characteristics, attitudes and the decision to export," *J. Austral. New Zealand Acad. Manage.*, vol. 2, no. 1, pp. 1–11, Jan. 1996.
[53] J. H. Gruenhagen, S. Sawang, S. R. Gordon, and P. Davidsson, "International experience, growth aspirations, and the internationalisation of new ventures," *J. Int. Entrepreneurship*, vol. 16, no. 3, pp. 421–440, 2018.
[54] T.-Y. Shih and R. Wickramasekera, "Export decisions within Taiwanese electrical and electronic SMEs: The role of management characteristics and attitudes," *Asia Pacific J. Manage.*, vol. 28, no. 2, pp. 353–377, 2011.
[55] Y. S. Yang, R. P. Leone, and D. L. Alden, "A market expansion ability approach to identify potential exporters," *J. Marketing*, vol. 56, no. 1, pp. 84–96, Jan. 1992.
[56] R. G. Javalgi, D. S. White, and O. Lee, "Firm characteristics influencing export propensity: An empirical investigation by industry type," *J. Bus. Res.*, vol. 47, no. 3, pp. 217–228, 2000.

[57] H. Oberhofer and M. Pfaffermayr, "FDI versus exports: Multiple host countries and empirical evidence," *World Economy*, vol. 35, no. 3, pp. 316–330, 2012.

[58] P. Westhead, M. Wright, and D. Ucbasaran, "International market selection strategies selected by 'micro' and 'small' firms," *Omega*, vol. 30, no. 1, pp. 51–68, Feb. 2002.

[59] E. Yarbrough Jr, M. Abebe, and H. Dadanlar, "Board political experience and firm internationalization strategy: A resource dependence perspective," *J. Strategy Manage.*, vol. 10, no. 4, pp. 401–416, 2017.

[60] D. Manolopoulos, E. Chatzopoulou, and C. Kottaridi, "Resources, home institutional context and SMEs' exporting: Direct relationships and contingency effects," *Int. Bus. Rev.*, vol. 27, no. 5, pp. 993–1006, Oct. 2018.

[61] S. Sui and M. Baum, "Internationalization strategy, firm resources and the survival of SMEs in the export market," *J. Int. Bus. Stud.*, vol. 45, no. 7, pp. 821–841, Sep. 2014.

[62] F. Rodríguez-Ruiz, P. Almodóvar, and Q. T. K. Nguyen, "Intellectual structure of international new venture research: A bibliometric analysis and suggestions for a future research agenda," *Multinational Bus. Rev.*, vol. 27, no. 4, pp. 285–316, Dec. 2019.

[63] T. Vissak and J. Masso, "Export patterns: Typology development and application to Estonian data," *Int. Bus. Rev.*, vol. 24, no. 4, pp. 652–664, 2015.

[64] M. Baum, C. Schwens, and R. Kabst, "A typology of international new ventures: Empirical evidence from high-technology industries," *J. Small Bus. Manage.*, vol. 49, no. 3, pp. 305–330, 2011.

[65] J. Hallbäck and J. Larimo, "Variety in international new ventures-typological analysis and beyond," *J. Euromarketing*, vol. 16, nos. 1–2, pp. 37–57, 2007.

[66] B. M. Oviatt and P. P. McDougall, "Toward a theory of international new ventures," *J. Int. Bus. Stud.*, vol. 25, no. 1, pp. 45–64, Mar. 1994.

[67] S. Andersson and F. Evangelista, "The entrepreneur in the born global firm in Australia and Sweden," *J. Small Bus. Enterprise Develop.*, vol. 13, no. 4, pp. 642–659, 2006.

[68] P. Arte, "Role of experience and knowledge in early internationalisation of Indian new ventures: A comparative case study," *Int. J. Entrepreneurial Behaviour Res.*, vol. 23, no. 6, pp. 850–865, 2017.

[69] W. Bai, M. Johanson, and O. Martín Martín, "Knowledge and internationalization of returnee entrepreneurial firms," *Int. Bus. Rev.*, vol. 26, no. 4, pp. 652–665, 2017.

[70] L. Bengtsson, "Explaining born globals: An organisational learning perspective on the internationalisation process," *Int. J. Globalisation Small Bus.*, vol. 1, no. 1, pp. 28–41, 2004.

[71] G. Cannone, A. Pisoni, and A. Onetti, "Born global companies founded by young entrepreneurs. A multiple case study," *Int. J. Entrepreneurship Innov. Manage.*, vol. 18, nos. 2–3, pp. 210–232, 2014.

[72] S. Chetty and C. Campbell-Hunt, "A strategic approach to internationalization: A traditional versus a 'born-global' approach," *J. Int. Marketing*, vol. 12, no. 1, pp. 57–81, Mar. 2004.

[73] I. Cunningham, S. Loane, and P. Ibbotson, "The internationalisation of small games development firms: Evidence from Poland and Hungary," *J. Small Bus. Enterprise Develop.*, vol. 19, no. 2, pp. 246–262, 2012.

[74] L. Danik, E. Duliniec, and I. Kowalik, "The Polish born global firms: Founding processes and motives of early internationalization," *Transformations Bus. Econ.*, vol. 15, no. 2, pp. 111–130, 2016.

[75] A. Domurath and H. Patzelt, "Founder non-international experience and venture internationalization," *J. Int. Entrepreneurship*, vol. 17, no. 4, pp. 494–519, Dec. 2019.

[76] F. Evangelista, "Qualitative insights into the international new venture creation process," *J. Int. Entrepreneurship*, vol. 3, no. 3, pp. 179–198, 2005.

[77] M. Franco and H. Haase, "Internationalisation of born Globals: The role of strategic alliances," *Eur. J. Int. Manage.*, vol. 10, no. 2, pp. 181–201, 2016.

[78] N. Ghannad and S. Andersson, "The influence of the entrepreneur's background on the behaviour and development of born globals' internationalisation processes," *Int. J. Entrepreneurship Small Bus.*, vol. 15, no. 2, pp. 136–153, 2012.

[79] T. Gittins, R. Lang, and M. Sass, "The effect of return migration driven social capital on SME internationalisation: A comparative case study of IT sector entrepreneurs in central and eastern europe," *Rev. Managerial Sci.*, vol. 9, no. 2, pp. 385–409, Mar. 2015.

[80] K. C. Gleason, J. Madura, and J. Wiggenhorn, "Operating characteristics, risk, and performance of born-global firms," *Int. J. Managerial Finance*, vol. 2, no. 2, pp. 96–120, Apr. 2006.

[81] P. Hermel and I. Khayat, "The role of resources: Micro-firms internationalization in the French context," *J. Small Bus. Enterprise Develop.*, vol. 18, no. 2, pp. 298–310, May 2011.

[82] M. Johanson and O. Martín Martín, "The incremental expansion of born internationals: A comparison of new and old born internationals," *Int. Bus. Rev.*, vol. 24, no. 3, pp. 476–496, 2015.

[83] I. Kowalik, L. Danik, and T. Sikora, "Entrepreneurial orientation elements in the polish international new ventures," *Baltic J. Manage.*, vol. 12, no. 2, pp. 194–213, Apr. 2017.

[84] S. Kraus, T. Niemand, M. Angelsberger, A. Mas-Tur, and N. Roig-Tierno, "Antecedents of international opportunity recognition in born global firms," *J. Promotion Manage.*, vol. 23, no. 3, pp. 386–406, May 2017.

[85] R. Laanti, M. Gabrielsson, and P. Gabrielsson, "The globalization strategies of business-to-business born global firms in the wireless technology industry," *Ind. Marketing Manage.*, vol. 36, no. 8, pp. 1104–1117, 2007.

[86] L. Li, G. Qian, and Z. Qian, "Early internationalization and performance of small high-tech 'born-Globals,'" *Int. Marketing Rev.*, vol. 29, no. 5, pp. 536–561, 2012.

[87] J. H. Love, S. Roper, and Y. Zhou, "Experience, age and exporting performance in UK SMEs," *Int. Bus. Rev.*, vol. 25, no. 4, pp. 806–819, 2016.

[88] W. Naudé and S. Rossouw, "Early international entrepreneurship in China: Extent and determinants," *J. Int. Entrepreneurship*, vol. 8, no. 1, pp. 111–187, Mar. 2010.

[89] E. Nemkova, "The impact of agility on the market performance of born-global firms: An exploratory study of the 'Tech City' innovation cluster," *J. Bus. Res.*, vol. 80, pp. 257–265, 2017.

[90] N. Nummela, S. Saarenketo, and S. Loane, "The dynamics of failure in international new ventures: A case study of finnish and irish software companies," *Int. Small Bus. J: Researching Entrepreneurship*, vol. 34, no. 1, pp. 51–69, Feb. 2016.

[91] V. Odorici and M. Presutti, "The entrepreneurial experience and strategic orientation of high-tech born global start-ups: An analysis of novice and habitual entrepreneurs," *J. Int. Entrepreneurship*, vol. 11, no. 3, pp. 268–291, 2013.

[92] T. Park and J. Rhee, "Antecedents of knowledge competency and performance in born Globals: The moderating effects of absorptive capacity," *Manage. Decis.*, vol. 50, no. 8, pp. 1361–1381, 2012.

[93] J. M. Pellegrino and R. B. McNaughton, "Beyond learning by experience: The use of alternative learning processes by incrementally and rapidly internationalizing SMEs," *Int. Bus. Rev.*, vol. 26, no. 4, pp. 614–627, 2017.

[94] S. K. Tiwari and T. Korneliussen, "Exporting by experiential knowledge: A study of emerging market micro firms," *Int. Marketing Rev.*, vol. 35, no. 5, pp. 833–849, 2018.

[95] E. Ughetto, "Growth of born globals: The role of entrepreneur's personal factors and venture capital," *Int. Entrepreneurship Manage. J.*, vol. 12, no. 3, pp. 839–857, 2016.

[96] A. Verbeke, M. Amin Zargarzadeh, and O. Osiyevskyy, "Internalization theory, entrepreneurship and international new ventures," *Multinational Bus. Rev.*, vol. 22, no. 3, pp. 246–269, 2014.

[97] T. Vissak, X. Zhang, and K. Ukrainski, "Successful born Globals without experiential market knowledge: Survey evidence from China," in *Handbook of Research on Born Globals*. Cheltenham, U.K.: Edward Elgar, 2012, pp. 353–379.

[98] H. Ying Huang and M. Huei Hsieh, "The accelerated internationalization of born global firms: A knowledge transformation process view," *J. Asia Bus. Stud.*, vol. 7, no. 3, pp. 244–261, 2013.

[99] M. Zhang, P. Tansuhaj, and J. McCullough, "International entrepreneurial capability: The measurement and a comparison between born global firms and traditional exporters in China," *J. Int. Entrepreneurship*, vol. 7, no. 4, pp. 292–322, Dec. 2009.

[100] B. Ramaseshan and G. N. Soutar, "Export barriers in the western australian horticulture industry," *J. Int. Food Agribusiness Marketing*, vol. 6, no. 4, pp. 53–70, Apr. 1995.

[101] S. Remya and R. Sasikala, "Decision support system for international trade analysis using FuzzyC4.5 based predictive analytics," in *Proc. Int. Conf. Circuits Syst. Digit. Enterprise Technol. (ICCSDET)*, Dec. 2018, pp. 1–7.

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