An Expert System for Systematic International Market Selection

Siv Marina Flø Grimstad*
Email: sika@ntnu.no
Telephone: 0047 70161263
NTNU-Norwegian University of Science and Technology,
Department of International Business
Larsgårdsvegen 2
6009 Ålesund
Norway

Richard Glavee-Geo
E-mail: rigl@ntnu.no
NTNU-Norwegian University of Science and Technology,
Department of International Business
Larsgårdsvegen 2
6009 Ålesund
Norway

Abeddaa Soufiane
E-mail: soufiane.abeddaa@gmail.com
NTNU-Norwegian University of Science and Technology,
Department of International Business
Larsgårdsvegen 2
6009 Ålesund
Norway

Ibrahim A. Hameed
E-mail: ibib@ntnu.no
NTNU-Norwegian University of Science and Technology,
Department of ICT
Larsgårdsvegen 2
6009 Ålesund
Norway

Keywords: International market selection, Fuzzy expert system, case study, decision making

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Reference to this paper should be made as follows: Grimstad, S.M.F., Glavee-Geo, R., Soufiane, A. and Hameed, I.A. (2022) 'An expert system for systematic international market selection', *Int. J. Export Marketing*, Vol. 4, No. 4, pp.410–431.

Abstract

We tested and examined the use of systematic international market selection (IMS) in the case of a library software/automation provider in a Nordic country. The purpose of our study was to investigate how the case company defined the most suitable markets for entry, using a multi-criteria fuzzy expert decision support system. The study contributes to the IMS literature by highlighting the key issues that define the right market for entry. The study also shows how managers can supplement experiential knowledge with a systematic rational decision-making process in international market expansion. A fuzzy expert approach was used to test the data collected from the case company, a Nordic MNC, anonymised using the name International Library Systems. Qualitative data were collected from semi-structured interviews with key informants in the case company. The quantitative data used, were secondary data drawn from various statistical sources. The top two countries chosen by the system, confirmed the company's initial choice. The findings indicated the ability of the proposed rule-based expert system to maintain a consistent logic for the managers, allowing them to follow a more formal procedure than one based solely on intuition. when selecting new markets to enter.

1. Introduction

Globalisation has reshaped the international business environment, pushing firms to conduct their business in a multi-dimensional and fast-moving ecosystem characterised by stronger competition, lower barriers, and a beyond-country border expansion. However, the environment in which each firm operates is defined by the strategic decisions it takes in the process of internationalisation (Papadopoulos & Martín Martín, 2011). International market selection (IMS) is an important issue in the market expansion of firms. Although scholars have considered this topic in the past, approaches thus far have not fully solved the problem of foreign market selection (Marchi, Vignola, Facchinetti & Mastroleo, 2014). The stakes are very high because defining the right market may determine the success or failure of a firm's expansion. This involves the development of marketing programmes, the coordination of foreign operations, and on a higher scale, the shape of its global competitive positioning strategy (Papadopoulos & Denis, 1988).

International market selection is a central feature of international business (Papadopoulos & Martín Martín, 2011; Root, 1994). It is also diverse and complex, especially given the large choice of alternative market opportunities that a firm can consider. These can vary, or be similar, in size, income, infrastructure, market access, and so on, and the key to successfully discriminating between options and determining which market might be worth entering, lies within those differences and similarities (Brewer, 2001; Cavusgil, Kiyak and Yeniyurt, 2004; O'Farrell & Wood, 1994).

Early studies have shown that the process of internationalisation is often sequential and can involve an incremental commitment to the markets entered (Johanson & Vahlne, 1977). More current studies have concluded that network relationships and the focal firm's position in a network is central in deciding which new international markets to enter (Coviello, 2006; Johanson & Vahlne, 2009). Others have found that different dimensions of the institutional

environment (e.g., regulatory, normative, and cultural) have an effect on market expansion (Budeva & Torres-Baumgarten, 2021). In any case, choosing the right market is seen as an important milestone in supporting the internationalisation strategy of a firm (Kumar, Stam & Joachimsthaler, 1994; Papadopoulos, Chen & Thomas, 2002). Despite this, surprisingly few scholars have conducted empirical studies of the IMS process that provide detailed description of how this process should be conducted (Ahi, Kuivalainen & Bahreinian, 2019).

Firms should be aware of the importance of IMS, because mistakes arising from it often occur as a result of inadequate evaluation of markets: "…the outcomes are almost always more expensive than the costs associated with a systematic evaluation that would have prevented their occurrence" (Rahman, 2003, p. 119). There has been research in IMS since the 1960s, although the difficulty in developing good and generalisable models remains an issue. It is currently positioned between qualitative assumptions and insufficiently tested operational models (Papadopoulos *et al.,* 2002).

The objective of the present study is to supplement the extensive research on IMS. Gripsrud and Benito (2005) called for more research that combined the advantages of systematic and behavioural IMS approaches. We tested and examined the use of systematic IMS in the specific case of a library software/automation provider that was anonymously identified as International Library Systems and is located in one of the Nordic countries. We adopted an often-used method in the IMS literature, a multicriteria-selection approach, to determine the right target market (Kumar *et al*., 1994; Marchi *et al*., 2014).

The purpose of the present study was to create a model that could best identify the most appropriate markets for firm internationalisation. We applied a fuzzy expert model to limit the probability of error. In particular, we sought to find answers to the following research questions:

RQ1: What are the prerequisites that define the right target market(s)? In other words, what are the main determinants for making the best choice in IMS?

RQ2: What are the key criteria by which to fine-grain the selection?

We applied the model to the process of IMS in a multinational enterprise (MNE) that was investigating which markets would be the best and second-best to target, and which should be considered for future market expansion operations. The service nature of the firm added different layers of complexity to the process of IMS. For instance, the client–supplier interaction may be a more significant issue in IMS for a service firm than for a manufacturing firm. Frameworks and models developed to understand international market expansion and operations by manufacturers require modification when they are applied to the service sector (O'Farrell & Wood, 1994).

The present study contributes to the IMS literature by highlighting the key issues/pre-requisites that define the most suitable market(s) to enter. We define suitable markets as market(s) that fits the vision and internationalisation strategy of the firm's international expansion. It demonstrates that service companies can fine-grain the market selection process by integrating qualitative and quantitative information into a decision support system. It also shows how managers can supplement experiential knowledge with a systematic rational decision-making process in international market expansion.

The article is organised as follows. In the next section, we review the relevant literature and theories on internationalisation. This is followed by an examination of the study's conceptual framework and propositions, the methodology, the data analysis and findings, and a discussion about the results and their implications. Finally, we underscore the limitations and offer a number of suggestions for future research.

2. Literature and theory review

2.1. Introduction to the Relevant Internationalisation Theories

There are a number of different theoretical perspectives on the internationalisation behaviour of firms. The most common are the internationalisation process, or the stages theory (Johanson & Vahlne, 1977; 1990; 2009), the eclectic paradigm (Dunning, 1988; 2003; Hill, Hwang & Kim, 1990), which is influenced by transaction cost economics (Williamson, 1979; 1981), and network theory (Snehota & Håkansson, 1995; Coviello, 2006). Each have different concerns with respect to IMS and consequent entry modes. It is important to note that the relevance of each theory in explaining IMS behaviour will depend on a firm's particular circumstances. Solberg and Askeland (2006) developed a framework to explain the underpinnings of each theory. It is constructed around two important dimensions: (1) a firm's preparedness for internationalisation; and (2) the degree of the industry's globalisation. The first refers to the extent to which the firm is internationalised at time *t*. This can be assessed using different degrees of measurability both from an operational and a strategic perspective. Operational indicators include the percentage of sales that are achieved abroad, the proportion of foreign employees, and the number of countries in which the firm is established. Industry globality refers to the transition that occurs from a multi-local industry to a global industry, or in other words, the degree of homogeneity across markets (usually heterogenous in multi-local industries), and the degree of interconnectedness of the competition, which refers to the degree to which the firm's competitive position within one country influences its position in another. Figure 1 shows the framework that has been developed based on these two dimensions.

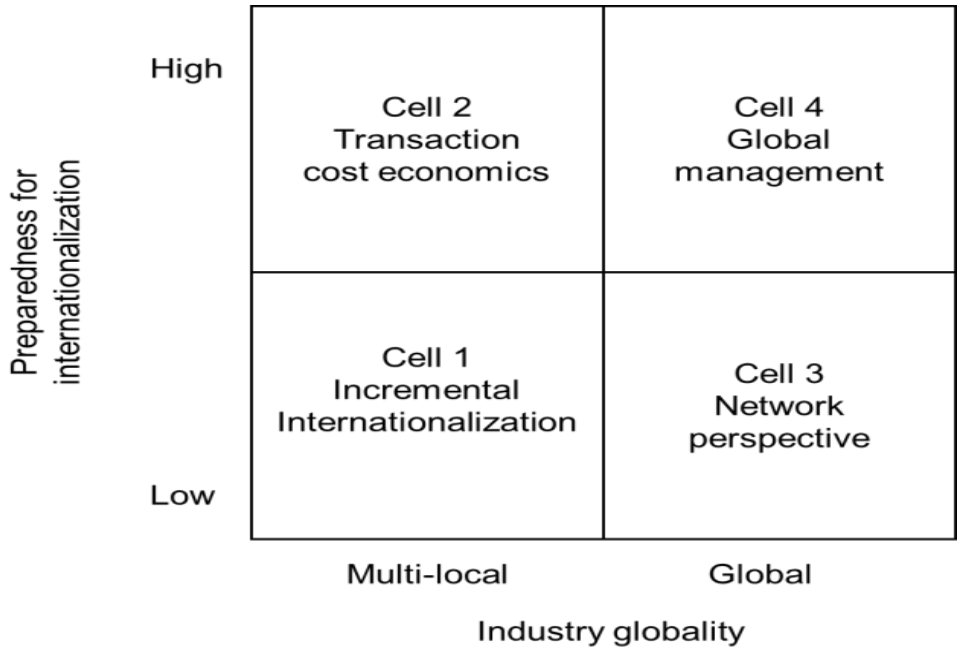

Fig. 1. Framework for classifying internationalisation theories (Solberg & Askeland, 2006, p. 3)

Each cell describes a specific theory and the circumstances in which one theory is more relevant than the others (Solberg & Askeland, 2006). It is important to consider each firm's level of preparedness for internationalisation and the industry's level of globalisation when defining the most relevant explanatory theory. Moreover, a number of important postulates for each of these theories make a direct contribution to IMS approaches. Table 1 summarises these theoretical perspectives.

Table 1. Summary of theoretical perspectives of internationalisation

Attribute	Uppsala model	Eclectic framework	Network theory
Basic theory	Resource-based theory, in addition to the acknowledgement of network theory in recent updates	Transaction cost theory, international trade theory, resource-based theory	Network-based theory
Unit of analysis	Firm	Firm	Firm's network
Explanatory variables	Dynamic capabilities Learning and trust Network position	Ownership, locational, and internalisation advantages	Formal and informal relationships
Decision criteria	Volume and degree of restraint of committed resources	Trade-offs between risk, return, control, and resources	Network opportunities
Mode of entry	Follows an establishment chain: range from export entry modes, contractual entry mode, to the investment entry modes	Independent, cooperative, and integrated mode	Collaborative modes
International market selection influence	Psychic distance and degree of resource commitment	Locational advantages	Relationships as a mean to access resources outside the firm's boundaries

Sources: Andersen (1997); Root (1994); Vahlne and Johanson (2013)

2.2. International Market Selection (IMS)

Several versions of IMS have been proposed. Root (1994) suggests that it comprises five elements: (1) the choice of a target product/market; (2) objectives and goals with regard the particular country; (3) the choice of a mode of entry for penetration; (4) the marketing plan for penetration; and (5) the control system used to monitor performance in the target market. Kotler and Keller (2012) also suggest a five-stage approach but incorporate IMS in the second stage: (1) decide whether to go abroad; (2) decide which market to enter; (3) decide how to

enter; (4) decide on the marketing programme; and (5) decide on the marketing organisation. Cavusgil *et al.* (2012) place IMS decision making in the third stage of their schema: (1) analyse organisational readiness to internationalise; (2) assess the suitability of the firm's products and services for foreign markets; (3) screen countries to identify attractive target markets; (4) assess the industry's market potential, or the market demand, for the product(s) or service(s) in selected target markets; (5) choose qualified business partners, such as distributors or suppliers; and (6) estimate company sales for each target market. These approaches are iterative with loop possibilities, which makes international entry strategy "a continuing open-minded process" (Root, 1994, p. 3).

2.2.1. Overview of the international market selection literature

As was shown above, one important phase in the internationalisation process of a firm is to choose the right market to enter (Cavusgil *et al.,* 2012; Kotler & Keller, 2012; Root, 1994). International market selection is the process that a firm follows to begin its international expansion. It comes before the final in-depth assessment of a specific market and should not be confused with the idea of "going international" (Papadopoulos & Denis, 1988). Few attempts have been made to offer a detailed synthesis of the literature with respect to the available models, their methodologies, and their practical applicability, although Papadopoulos and Denis (1988) have provided an inventory, taxonomy, and review of normative quantitative models. The development of an IMS model that combines generalisability to various industries and relevant predictive power for decision makers is still a great challenge. The proposed models have been either insufficiently tested or are too complex to apply in practice (Papadopoulos *et al*., 2002).

2.2.2. International market selection approaches

We now address the different aspects of IMS, on which our conceptual model of the process was built. This was used to address the case company's IMS issue. The literature distinguishes

between two normative approaches for addressing foreign market selection: the qualitative and the quantitative. The former involves a thorough analysis of information of a potential set of country markets, while the latter involves a quantitative analysis of secondary data on a large number of foreign markets, or even all of them (Papadopoulos & Denis, 1988). The qualitative approach aims to generate a short list of country markets to consider, based on established objectives and constraints. The quantitative approach, which represents the majority of normative models proposed in the literature (Figure 2), can be divided into two categories: market grouping methods, a clustering based on similar macro- or micro indicators, and market estimation methods, which discriminate between markets according to their potential based on several criteria, ranking them by preference (Papadopoulos & Denis, 1988).

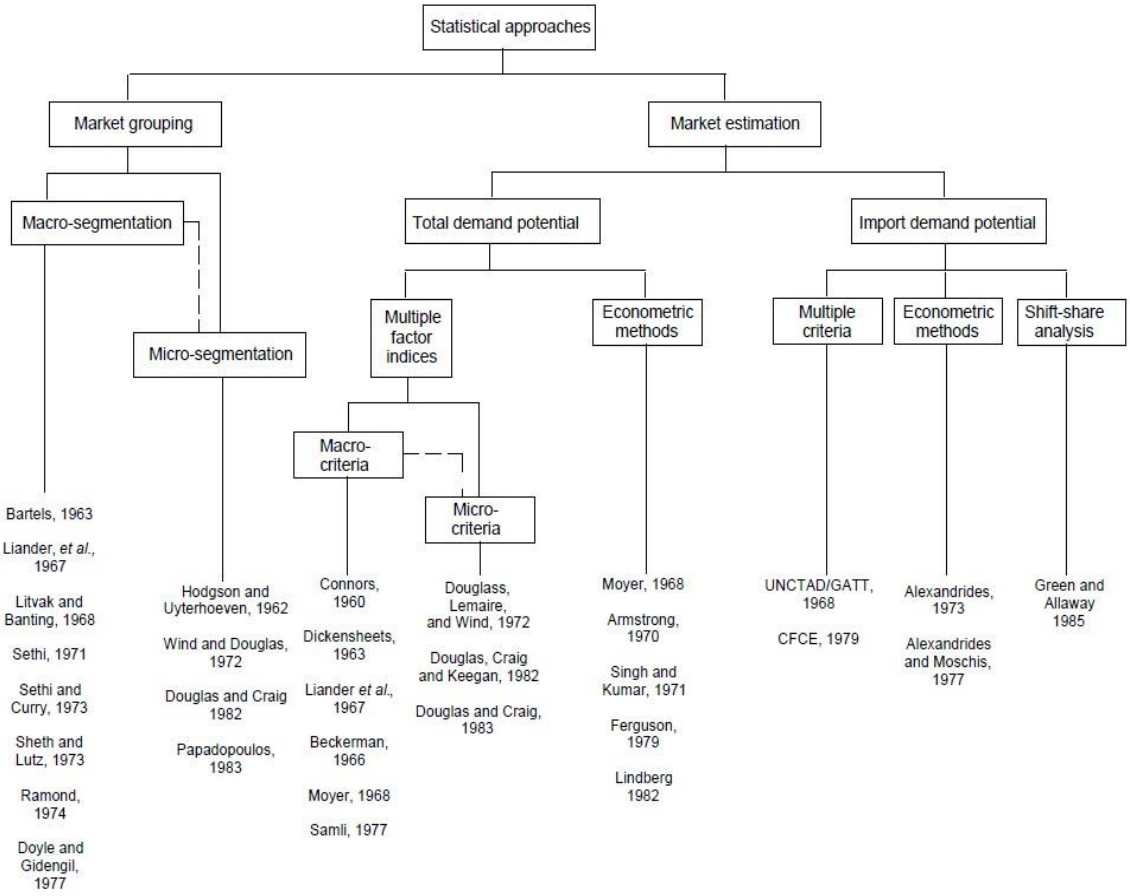

Fig. 2. Inventory and taxonomy of statistical approaches to IMS (Papadopoulos & Denis, 1988)

Despite the existence of different qualitative and quantitative techniques, little evidence has been found of the systematic use of such methods by firms. It has been argued that organisations are not entirely rational when it comes to IMS, which makes it a very unpredictable and unconventional process, and therefore less likely to be applied systematically (Brewer, 2001; Papadopoulos & Denis, 1988).

2.2.3. Systematic and non-systematic perspectives

The systematic perspective implies that decisions made within the IMS process are structured and formalised and follow a certain rational order, which means that the analysis is carried out in a way that uses specific rules and procedures. According to previous investigations (Andersen & Buvik, 2002; Hisrich, 2012; Papadopoulos & Martín Martín, 2011) those rational stages are as follows:

- Problem definition: structure, define, and isolate the IMS problem from other topics
- Identification of the choice criteria: identify the relevant criteria or objectives, which might be indicators at the macro and industry level that will indicate market attractiveness
- Weighting of the criteria: define the weight of each indicator according to its importance to the firm's strategic objectives
- Generation of the alternatives: identify attractive markets and generate a list of alternatives
- Alternative rating: rate each country's market according to the market selection criteria
- Optimal decision: make a choice based on a trade-off between criteria or consider a specific level of one of the important dimensions (referred to as compensatory and non-compensatory models)

Conversely**,** the non-systematic perspective follows informal methods and rules of thumb that can be used at any step of the process; this seems to be more of a descriptive approach to the way firms behave when they are selecting their target markets. The most well-known hypothesis is psychic distance. This is used as an incremental disjointed decision-making model for addressing IMS (Andersen & Buvik, 2002; Johanson & Vahlne, 1977; Papadopoulos & Martín Martín, 2011). Table 2 illustrates the main differences between both perspectives:

Table 2. Differences between systematic and non-systematic approach of the international market selection (IMS) process

Approach/ Dimension	**Systematic**	**Non-systematic**
Decision problem	Selection of country	Selection of country
Level of analysis	The selling firm	The selling firm
Purpose	Normative	Descriptive
Decision-making model	Rational	Disjointed incrementalism
Time horizon	Not specified	Not specified
Connections to other decision problems	IMS treated as an isolated decision	IMS as a function of the firm's internationalisation
Information search type	Extensive	Little/none
Type of information	Country/market indicators	Perceived psychic distance (subjective)
Sources of information	Secondary data	Experiential knowledge

Source: adapted from Andersen & Buvik (2002, p. 351)

3. Conceptual framework and propositions

In this section, we highlight the conceptual framework (Figure 3) which is anchored to the three stages model described below. In general, the literature (e.g., Cavusgil, 1985; Kumar *et al*., 1994), highlights various IMS models that are useful for the evaluation of potential foreign

markets, and which are consistent with a sequential and gradual selection process that consists of the following.

(1) The screening stage (preliminary screening), which lists the foreign markets that are worth investigating on the basis of macro-level indicators such as political stability, socio-cultural factors, and geographic distance. The goal is to eliminate the countries that do not meet the firm's objectives at a macro level. In addition, firm managers use the lists they have established in their own minds, consisting basically of all countries, minus those they recognise as being unfeasible on account of practical considerations (Brewer, 2001; Kumar *et al.*, 1994). This preliminary stage should minimise two risks: ignoring countries that offer good prospects by including all countries in the screening and investigating countries that are poor prospects by making use of secondary available data, since they are economical and can be quickly acquired (Root, 1994).

(2) The identification stage (in-depth screening) assesses the industry's market potential, which includes market size and market growth rate. This stage aims to assess the industry's attractiveness for the countries that have been short-listed. The objective is to identify markets that offer minimum or better levels of potential returns, based on industry specific information such as level of competition, market potential, and entry barriers. These are considered to be amongst the most valued indicators of attractiveness. This process then leads to the identification of countries to be considered for deeper analysis. Usually, this stage involves a trade-off between size and growth (Brewer, 2001; Cavusgil, 1985; Kumar *et al*., 1994; Root, 1994). However, it is often the case that industries may have few available key indicators by which to determine the strength of demand within foreign markets (Rahman, 2003).

(3) The selection stage evaluates how attractive the selected markets are with respect to the firm's objectives, constraints, and expansion strategy. A deeper analysis is required at this stage, and information such as profitability and product adaptation, can be used to select the optimal

market and make resource allocation decisions. Unlike the two previous stages, this stage relies more on primary than secondary data, because of the need for firm-specific information (Brewer, 2001; Cavusgil, 1985; Kumar *et al.*, 1994; Rahman, 2003). Once the process is complete, the compatibility of management objectives and the results from the above approach must be evaluated. If inconsistencies arise, a reassessment might be needed. The process is therefore iterative and incorporates a feedback loop so that other relevant criteria and indicators can be introduced. Finally, an in-depth analysis is necessary to achieve a more accurate selection of the targeted foreign market(s) (Douglas, Samuel & Keegan, 1982).

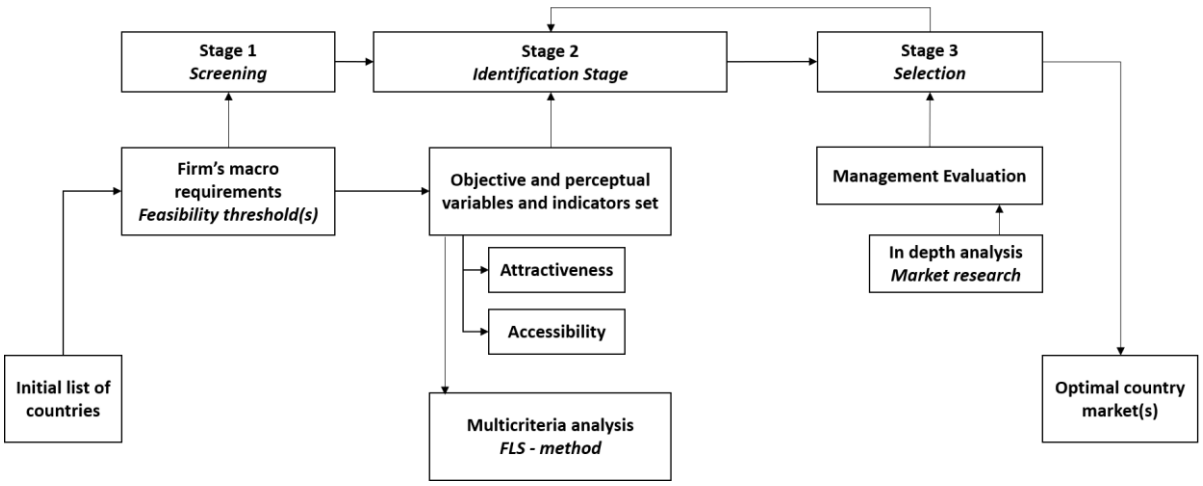

Fig. 3. Conceptual framework of the international market selection process

In developing the model, a set of selected variables commonly used in the literature, were included. These cover both objective dimensions (quantitative) and perceptual dimensions (qualitative, e.g., psychic distance and perception of strategic objectives) (Marchi *et al.*, 2014). There is no consensus in the literature on the conceptual framework and related concepts to be used to explain the IMS process. The present framework is based on the most important contributions to internationalisation theories (Andersen, 1997; Dunning, 1988; 2003; Hill, *et al*, 1990; Johanson & Vahlne, 1977; 1990; 2009; Snehota & Håkansson, 1995)

and the IMS literature (Alexander, Rhodes & Myers, 2007; Brewer, 2001; Cavusgil *et al*., 2004; Papadopoulos & Denis, 1988). Accordingly, we have formulated two propositions based on the conceptual model and the study's research questions:

P1: The model allows management to reduce decision-making risk and to confirm the relevance of the chosen variables for the IMS process to the case company.

P2: The target country/countries identified by the model comply with the management's rational decision-making process regarding international market selection.

4. Methodology

We followed the deductive approach (Bryman & Bell, 2015), using a conceptual framework to synthesise the existing knowledge of IMS and to answer our research questions. The fuzzy expert approach was used to test the data collected from the case company. Qualitative data were collected from semi-structured interviews of key informants in the case company. The quantitative data used were secondary data drawn from various statistical sources. We investigated the determinants of IMS and sought to explore and understand why the firm prioritised one country's market over another. In doing so, we tried to highlight the systematic process that a service company needs to follow in its IMS process. Next, we present a short overview of the case company.

4.1. The Case Company

Our case company, anonymously labelled as; International Library Systems, is a Nordic MNC. It provides high-end information technology (IT) solutions in five core business areas: healthcare, intelligence and national security, defence, government agencies and large corporations, and libraries and learning. Established in 1985, it is one of the largest, privately owned software and information technology (IT) companies in the Nordic region. Its yearly

revenue is more than USD 150 million and it employs more than 900 people (representing more than 23 nationalities) worldwide. It has partners in 15 countries and has sold solutions to customers in more than 50 countries. It has subsidiaries in Australia, Finland, France, Germany, New Zealand, Singapore, Sweden, the United Arab Emirates, the United Kingdom, and the United States. The library and learning business unit and its library management system, which is mainly directed at public libraries, are the foci of the present study.

One reason why this company was chosen was because it had expressed the need to gain and deepen its knowledge of IMS. Consequently, the vice-president, the product manager, and his team were highly committed to the research since the issue faced is real and existed during the period of the study. Also, the firm's previous IMS (which concerned the library and learning business unit) consisted mainly of choices based on client enquiries emanating from nearby markets. For example, entry into the Swedish market began with an outsourcing job that concluded with the acquisition of the client. Greenland followed, due to the existence of strong networks with the Swedish business; attempts to enter markets elsewhere were simply responses to unsolicited orders. Therefore, the management expressed the need for a more proactive and strategic approach towards international expansion choices.

Moreover, the firm has a monopoly at home; the product is designed for public libraries in almost all municipalities in the country. This offers little room for further local expansion. In addition, the business unit has not yet achieved its strategic growth objectives. Finally, this kind of project is very large scale, and requires considerable investment for it to be implemented. The IMS issue is therefore even more sensitive, given that any inappropriate choice may yield great losses.

4.2. The Three-Stage Process of IMS Evaluation

The first stage of the IMS process involved the definition of a threshold requirement to eliminate countries that did not merit investigation. The screening did not include all countries

because of limited data availability and time constraints. Hence, a predefined list (Table 3) was drawn up based on: (1) the interest expressed by the management; (2) the countries with potential, such as those with pre-existing networks (e.g., other business units' offices and existing partners and suppliers); and (3) countries that were geographically proximate or perceived to be culturally similar.

Table 3. Predefined country targets

Predefined country markets	
Netherlands	New Zealand
France	United Arab Emirates
Belgium	USA
Luxembourg	Norway
Monaco	Iceland
Switzerland	Ireland
UK	Canada
Morocco	Austria
Algeria	Qatar
Tunisia	Malaysia
Egypt	Sweden
Australia	Czech Republic
Finland	Poland
Germany	Croatia
Romania	Latvia
Singapore	

Source: authors

For the second stage, countries' attractiveness was assessed, using both objective and subjective (perceptual) perspective variables, based both on the literature and the managers' (key informants') experiential knowledge and strategic orientation. The objective perspective included quantitative variables that were measured using secondary data from statistical sources. For the subjective (perceptual) perspective, we used insights from the interviews to

build and scale the managers' perceptions according to their experience and business knowledge. For the third stage, the different variables were integrated into a multi-criteria approach algorithm called a fuzzy expert system (FES). This system processes variables regardless of their quantitative or qualitative nature and considers their different weights and interconnections. Since its introduction by Zadeh in 1965, fuzzy set theory has been widely used in solving problems in a large number of real-life applications, and commercial products in a variety of fields. One of the reasons for its success is that fuzzy logic provides human-friendly and understandable knowledge representation that can be used in expert knowledge extraction and implementation. Fuzzy set theory provides a means for calculating intermediate values between the crisp values associated with being absolutely true (1), or absolutely false (0). Those values between, and including 0 and 1, are called degrees of truth or membership. The fuzzy logic system (FLS) attempts to mimic human actions, and comprises of four main components: fuzzifier, rules, inference engine, and defuzzifier. Its structure is shown in Figure 4. The fuzzifier maps each numerical input variable into a fuzzy set. Rules have an *if-then* structure; for example, the fuzzy rule shown in Equation (1) describes percentage market size in terms of urbanisation and population.

IF Urbanization is *low* AND Population is *high* THEN Market size is *medium* (1)

Each IF part of a rule is called its antecedent, and the THEN part of a rule is called its consequent. Rules relate to input fuzzy sets and to output fuzzy sets. All the rules are collected into a rule base. The inference engine decides which rules from the rule base are fired, and what their degrees of firing are, by using the fuzzy sets provided and the fuzzy operators on the sets. The inference engine provides an aggregated fuzzy output set by combining each rule's degree of firing with that rule's consequent fuzzy set. The defuzzifier receives the

aggregated fuzzy output sets and produces the crisp outputs that are then passed to the real world or to a new FLS in the IMS fuzzy tree, shown in Figure 4.

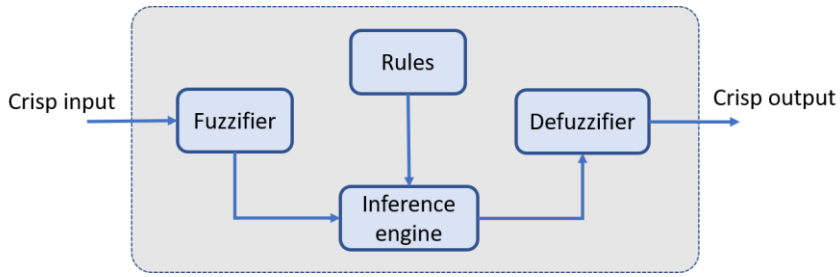

Fig. 4. General structure of a fuzzy logic system (Mendel, Hagras, Tan, Melek & Ying, 2014).

4.3.Description of the Model Variables

Both objective and subjective variables (see Appendices A and B) were included in the multi-variable approach, the FES. The variables, which were based on the management's experiential knowledge, were assigned a specific weight to shape the accuracy of the output. Each of the six chosen subjective (perceptual) variables represented a dimension. This was inspired by the previous literature (Alexander *et al*., 2007; O'Farrell & Wood, 1994; Magnani, *et al*, 2018; Marchi *et al*., 2014). As was noted above, qualitative interviews were carried out with key informants in the case company (Appendix C). The insights we gained from these interviews were used to confirm the variables drawn from the literature and helped to define and operationalize those dimensions into indicators and then items (22 in all), to facilitate the extraction of the information. After the interviews, a special follow-up form that contained all the items was sent to the interviewees, so that their perceptions could be translated to a scalable level. The form measured each item from one to 10 with respect to each country, and the average score of the items represented the score of the dimension. This integration of subjective variables into the model was also a way of compensating for the potential lack of data from secondary sources (Marchi *et al*., 2014). The objective variables were described by

dimensions. Each dimension was explained by indicators then sub-indicator(s). All corresponding data, relating to the ease of doing business with the country, its risk, and so on, were collected from secondary sources (e.g., from World Bank, World Trade Organisation, United Nations, and Organisation for Economic Cooperation and Development databases), and some indicators were estimated using specific calculations.

4.4. Fuzzy Expert System: Definition, Links, and Weights

A FES is based on any imprecise, vague, or uncertain concepts in an investigation. These concepts have some degree of truth, which means they are neither completely false nor completely true and will therefore belong somewhere between 0 and 1 (Marchi *et al.*, 2014). Those concepts can be described in a linguistic format, such as high and low or cold and hot; such descriptions are commonly referred to as *membership* (Marchi *et al*., 2014). The choice of the FES for the present study makes sense because the concepts involved, and the data collected for selecting target markets, are quite uncertain and can be described linguistically. Our FES consisted of 37 parameters in total (i.e., indicators, variables, and intermediary variables). Figure 4 shows how the inputs are connected to each other and how they converge into the final output country markets by score. The final output is the overall evaluation of each country market according to the combination of all parameters and their respective weights. Figure 5 shows the FES tree for the IMS.

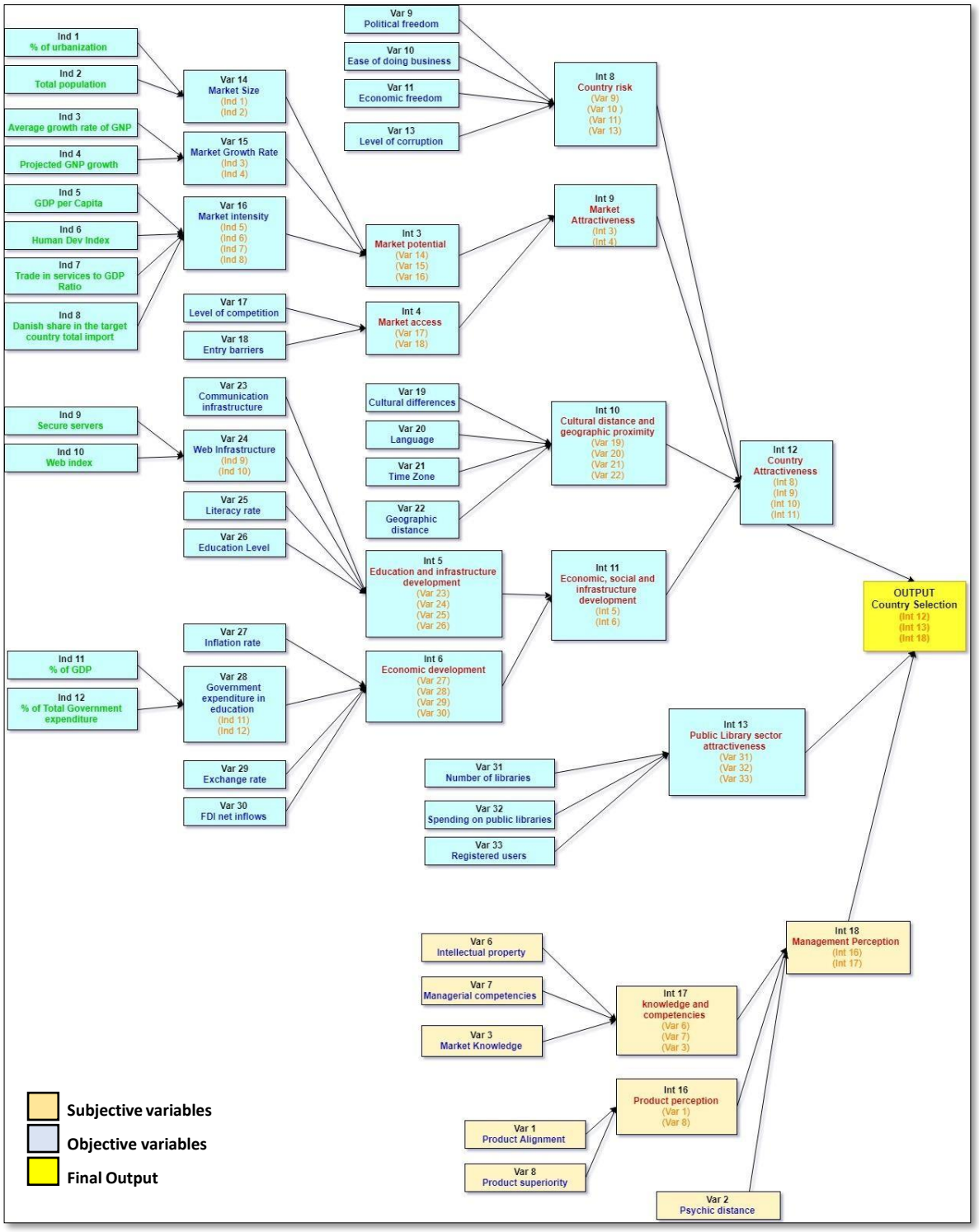

Fig. 5. Fuzzy expert system tree for international market selection

The variables were weighted and adjusted again during the building of the FES to maintain the consistency of the normalised data, since applying a weight to a variable implies

a change in range from [0–1] to [0–1] * W. To maintain the importance expressed by these weights, especially when variables are combined to give an aggregated variable, there are two questions. Which weight will the aggregated variable have? How is it going to reflect the original weights? This adjustment cannot be a simple extension of the range, because it consistently affects the importance originally expressed. Therefore, and to keep its relevance, the following formula was included in the code. The formula maintained the importance assigned to the weights even when aggregated, (Saleh and Kim, 2009).

$$w_i = w_i \Big/ \sum_{i=1}^{n} w_i$$
$$x = x(1 + w_i) \tag{2}$$

5. Data analysis and findings

After running the FES on the 31 preselected countries, the following score ranking was achieved (see Table 4). Total and partial scores are displayed. Each country was ranked based on each of the system's defined parameters. This gave us an overview of which countries to focus on, which countries to consider, and which countries to avoid for the time being, or at least to place at the bottom of the list of priorities. The scores had a value within a range of [0–1].

Table 4. International market selection countries' ranking scores

Ranking	Country	Management Perception Score	Public Library Potential Score	Market Attractiveness Score	Country attractiveness Score	Country Selection Score
1	Australia	0,8523	0,8443	0,6468	0,6367	0,7611
2	UK	0,7123	0,8693	0,4636	0,1322	0,5930
3	Latvia	0,5000	0,5240	0,7672	0,7606	0,4729
4	Czech Republic	0,1445	0,5244	0,4638	0,4728	0,4729
5	Malaysia	0,5000	0,5197	0,3774	0,4712	0,4728
6	Romania	0,5000	0,5194	0,4646	0,4694	0,4728
7	Netherlands	0,5000	0,8450	0,5035	0,1340	0,4727
8	Germany	0,5000	0,8428	0,5151	0,4724	0,4727
9	Canada	0,1679	0,8536	0,4651	0,4725	0,4726
10	France	0,1731	0,8513	0,5068	0,4725	0,4725
11	Iceland	0,5000	0,5000	0,6353	0,4407	0,4724
12	Finland	0,5000	0,8263	0,1332	0,1524	0,4723
13	Ireland	0,5000	0,1829	0,6568	0,6718	0,4706
14	Switzerland	0,5000	0,6678	0,4648	0,2743	0,2153
15	Luxembourg	0,7123	0,1763	0,4650	0,2720	0,1670
16	Sweden	0,5000	0,6046	0,1357	0,1321	0,1432
17	Morocco	0,5000	0,5248	0,4648	0,2092	0,1426
18	Croatia	0,1731	0,1802	0,4648	0,4723	0,1350
19	Poland	0,5000	0,5225	0,2144	0,1643	0,1340
20	Qatar	0,5000	0,1762	0,2144	0,1642	0,1340
21	Tunisia	0,5000	0,1765	0,1510	0,1599	0,1332
22	Austria	0,5000	0,5246	0,1258	0,1573	0,1328
23	USA	0,1583	0,5000	0,4651	0,1322	0,1324
24	Algeria	0,5000	0,5000	0,4646	0,1526	0,1320
25	Belgium	0,5000	0,5314	0,1352	0,1322	0,1315
26	Egypt	0,5000	0,5222	0,2144	0,1473	0,1311
27	United Arab Emirates	0,5000	0,1768	0,2144	0,1473	0,1311
28	Norway	0,5000	0,5252	0,5581	0,1455	0,1308
29	Singapore	0,5000	0,1465	0,5035	0,4725	0,1304
30	Monaco	0,5000	0,1761	0,5275	0,1388	0,1297
31	New Zealand	0,8837	0,1825	0,4647	0,1348	0,1293

Source: authors

Based on the ranking, we were able to differentiate between four levels of interest that discriminated between countries of high potential and countries of low potential, according to their respective scores. This was an arbitrary judgement based on the distribution of the results. This separation could be refined with results pertaining to a new set of countries or a new refinement of the settings. In addition, the partial scores (e.g., management perceptions, public library potential, market attractiveness, and countries' attractiveness scores) could be used to isolate a candidate country to decide whether it might be worth investigating even though it might have a low total score.

Australia and the United Kingdom were ranked equal first in this analysis. These two countries should therefore be the target of more in-depth analysis and primary market research. The countries showing reasonable potential were Latvia, the Czech Republic, Malaysia, Romania, the Netherlands, Germany, Canada, France, Iceland, Finland, and Ireland. These

were followed by countries with slightly less potential: Switzerland and Luxembourg. The results showed that the countries that should be avoided for the time being, because of their relatively low attractiveness, were Sweden, Morocco, Croatia, Poland, Qatar, Tunisia, Austria, the United States, Algeria, Belgium, Egypt, the United Arab Emirates, Norway, Singapore, Monaco, and New Zealand. The first 13 countries with high scores were not only those that were considered rich countries, or that neighboured those that were, but also those with good macroeconomic indicators and political stability. In addition, they had a good combination of specific indicators relating to the public library market, namely, the number of libraries, the number of users, and spending on public libraries.

The findings were partially in line with the management assumptions that were expressed during the interviews with regard to the countries the interviewees perceived to be the most interesting in terms of market entry (e.g., the Netherlands, the United Kingdom, and Finland). Our findings thus supported the explicit choice of the company and gave them a well-founded base for making a less risky decision with regard to processing those countries further (and supporting propositions P1 and P2). The company should also consider other candidates from the top score list and accordingly make a trade-off in terms of the countries to be prioritised. However, two other countries mentioned by the management as good potential target markets, achieved low scores, namely, New Zealand and Norway. One reason for this may be that these countries scored highly on entry barriers (0.27 and 0.18, respectively) and on level of competition (8 and 2, respectively). Norway had a high entry barrier in terms of IT services, and a low score on the number of public libraries, compared with other countries. In addition, there was a strong presence of competitors. The same went for New Zealand, with respect to entry barriers and the number of public libraries. In other words, as was suggested above, some countries may be perceived to be of high potential at first sight, because they are rich countries or they represent a high proximity to, or cultural similarity and

psychic distance with the case company's country of origin (Johanson & Vahlne, 1977; 2009). The informants stated that according to their estimation, some of these markets did not merit consideration because the non-public libraries would be very costly to approach and would not be worth the total investment and risk. At the time of the study, the company was involved in a tendering process in the Netherlands and a prospective approach, with respect to the United Kingdom. Therefore, we can assume that the FES reflected the management's evaluation based on a more solid logic, approaching the issue differently, but remaining aligned with the company's strategic thinking.

6. Discussion and implications

International market selection is clearly a very delicate and complex aspect of business. Its critical role in defining entry strategy makes the approach used for the selection especially important, even crucial. Traditional approaches, as widely described in the literature, have always lacked practical translation into real business contexts. The present study was an attempt to find a more formal and workable solution that went beyond normative and conceptual methods. The specific goal was to test an extended model of IMS that has been investigated by previous researchers (e.g., Marchi *et al*., 2014). The findings answered the research questions outlined and subsequently confirmed our propositions. The key issues or prerequisites to define the right market(s) to enter, are to use a mix of carefully selected qualitative and quantitative indicators, weigh these according to their importance and run it in a FES model, as described above. The model provides an appropriate and more systematic way to assess the attractiveness of a market, and is a useful tool to prevent costly mistakes in the IMS decision-making process. The key criteria to fine-grain the selection is not only to assess how large market potential there are in each new country market in terms of it being wealthy and having high purchasing power, but also whether there exists high entry barriers or strong competition in the potential market(s). In addition, specific indicators relating to the

industry in question, might be of great importance for choosing the right market to enter. In this case, the public library market, factors such as the number of libraries, the number of users, and spending on public libraries are found to be important factors to collect data on, to help identify the market(s) with the best potential.

The present study shows that the FES was a useful tool for IMS and an additional support, in defining the most suitable markets for the case company to enter. Its flexibility allows for more fine-tuning, and it can accommodate more criteria, or redefine the initial ones. Ultimately, it enables continuous analysis because new data and parameters can be fed into it.

The FES displayed a network of interactions between a number of parameters that were linked to each other. This implies that the strength of the model, lay in the definition of those links. The system is a tool that, if used properly, may be of considerable help in terms of decision making and risk reduction. This is important, as it maintains a consistent logic for the managers and allows them to engage in a more formal analytical process than one based solely on intuition, which risks missing relevant influential parameters. In addition, any cognitive distortions in the decision-making process, can be avoided while considering the firms' objectives, constraints, and priorities. One of the main benefits of this system is that it is possible to target specific scores and to find answers based on incomplete results. It is also easy to discover which parameters had the greatest influence. Moreover, the use of the knowledge gathered from prior analysis, will be an important means of reshaping the model tree and the initial settings into an even more accurate and relevant tool.

The final results will help to shape the case company's next steps in terms of more detailed market research and strategy development. Scarce resources can thereby be conserved, and managers can focus on achieving worthy and realistic targets. The FES can continue to help in designing the appropriate market entry strategy. The management will be

presented with more valuable options, and the risk of missing the right opportunities will be reduced.

The present study shows that the managers can avail themselves of a tool that allows them to integrate quantitative and qualitative approaches into their decision making. They can capitalise on both secondary data and their experiential knowledge, using a systematic approach to narrow down their set of choices. In addition, the use of such a decision support system, offers a high degree of flexibility in the firm's strategic orientation, allowing the managers to reshape the system in ways that better serve their new objectives. They can identify exactly the secondary data to invest in. Moreover, they can be more cost effective when preparing in-depth market research on the countries the system selects, and the insights it provides.

7. Research limitations and future studies

The present study has a number of limitations. The FES proved itself to be a useful decision support system that can aid firms in their IMS and market entry decision-making process. The model was robust with respect to the changes that occurred when the parameter-related data changed. However, it revealed a high sensitivity in respect of changes in the settings of the system's composition, rules, and relationships. This is a good sign, but at the same time a disadvantage, since a slight imbalance in the settings, or an underestimation of some parameters, might reduce the accuracy and relevance of the outcome. The model should be applied to an increased number of, and different types, of companies, to determine its flexibility and adaptability to different contexts and its general relevance for IMS and decision making. In addition, the results might point out top score countries, but the difficult evaluation of trade-offs to identify the favourite option(s) still remains in the hands of the managers. Other challenges in the development of a FES include the lack of data for some countries in the case of certain indicators, and in some instances secondary sources may not be current and reliable.

The settings of the FES are therefore a challenge because they are so sensitive. The closer the settings are to reality, the more the FES is able to predict relevant outcomes.

International market selection is a complex topic. This is because of the many factors involved, the features of the process, and the degree of information and knowledge required for correct decision making. In addition, the level of analysis and the characteristics of the decision makers influence the quality of the IMS process. Managers' rationality is constrained by their cognitive limitations, the amount of time needed to make decisions, and the availability of information. This, coupled with the imperfection of available models, increases the complexity of IMS. There is always an inherent risk with the stepwise process. There is a danger that opportunities might be lost when they should have been grasped from the beginning, or options might be included that ought to have been rejected. This adds to the complexity of the process and makes it an extremely delicate one (Papadopoulos *et al*., 2002; Papadopoulos & Martín Martín, 2011).

Future researchers could consider other types of analyses and crosscheck with the actual results presented by the model. The following two approaches could be followed: (1) clustering analysis, wherein clusters of countries with similar patterns are developed, which could be a good proxy to confirm the model's results; and (2) multiple discriminate analysis, which could provide insights into how the final results of the model actually trace back to the elements influencing the construction of the patterns that lead to such groupings. The IMS process could also be applied to other industries, different sized firms, and other market situations. This would require alternative strategic orientations, to improve the validity of the process and to create adjustable models for practical use. The design and testing of the model require close collaboration and knowledge sharing between its designer and management. Investigating the process of collaboration and the resources involved might be of use when developing effective future models. Such issues present opportunities for further study.

REFERENCES

Ahi, A., Kuivalainen, O. & Bahreinian, M. (2019). A systematic approach to international market selection: measuring the attractiveness of emerging economies in the case of the timber industry. *International Journal of Export Marketing*, 2019 Vol.3 No.2, pp.105 – 118.

Alexander, N., Rhodes, M. & Myers, H. (2007). International market selection: Measuring actions instead of intentions. *Journal of Services Marketing*, 21 (6), 424–434.

Andersen, O. (1997). Internationalization and market entry mode: A review of theories and conceptual frameworks. *Management International Review*, 37 (2), 27–42. http://www.jstor.org/stable/40228431.

Andersen, O. & Buvik, A. (2002). Firms' internationalization and alternative approaches to the international customer/market selection. *International Business Review*, 11 (3), 347–363. https://doi.org/10.1016/S0969-5931(01)00064-6

Anderson, J. C., Håkansson, H. & Johanson, J. (1994). Dyadic business relationships within a business network context. *Journal of Marketing*, 8 (4), 1-15. https://doi.org/10.1177/002224299405800401

Brewer, P. (2001). International market selection: Developing a model from Australian case studies. *International Business Review*, 10 (2), 155–174. https://doi.org/10.1016/S0969-5931(00)00049-4

Bryman, A. & Bell, E. (2015). *Business research methods (4th ed.)*. Oxford: Oxford University Press, United Kingdom.

Budeva, D. & Torres-Baumgarten. G. (2021). The effect of institutional distance on international market selection: comparing export to foreign direct expansion. *International Journal of Export Marketing*, 4(2), 127 – 149.

Cavusgil, S. T. (1985). Guidelines for export market research. *Business Horizons*, 28 (6), 27–33. https://doi.org/10.1016/0007-6813(85)90082-5

Cavusgil, T. S., Kiyak, T. & Yeniyurt, S. (2004). Complementary approaches to preliminary foreign market opportunity assessment: Country clustering and country ranking. *Industrial Marketing Management*, 33 (7), 607–617. https://doi.org/10.1016/j.indmarman.2003.10.005

Cavusgil, T. S., Knight, G. A. & Riesenberger, J. R. (2012). *International business: The new realities (2nd ed.)*. Pearson, Boston, MA.

Coviello, N. E. (2006). The network dynamics of international new ventures. *Journal of International Business Studies*, 37(5): 713–731. https://doi.org/10.1057/palgrave.jibs.8400219

Douglas, S. P., Samuel, C. C. & Keegan, W. J. (1982). Approaches to assessing international marketing opportunities for small and medium sized companies. *Columbia Journal of World Business*, 17 (3), 26–32.

Dunning, J. H. (1988). The eclectic paradigm of international production: A restatement and some possible extensions. *Journal of International Business Studies*, 19 (1), 1–31. https://doi.org/10.1080/08853908808523656

Dunning, J. H. (2003). The eclectic (OLI) paradigm of international production: Past, present and future. *International Business and the Eclectic Paradigm: Developing the OLI Framework*, 8 (2), 21–39. https://doi.org/10.1057/palgrave.jibs.8400010

Gripsrud, G. & Benito, G. R. G. (2005). Internationalization in retailing: Modelling the pattern of foreign market entry. *Journal of Business Research*, 58 (12), 1672–1680. https://doi.org/10.1016/j.jbusres.2004.11.003

Hill, C. W. L., Hwang, P. & Kim, W.C. (1990). An eclectic theory of the choice of international entry mode. *Strategic Management Journal*, 11 (2), 117–128. https://doi.org/10.1002/smj.4250110204

Hisrich, R. D. (2012). *International entrepreneurship: Starting, developing, and managing global venture (2nd ed.)*. SAGE, Thousand Oaks, CA.

Johanson, J. & Vahlne, J-E. (1977). The internationalization process of the firm - a model of knowledge development and increasing foreign market commitments. *Journal of International Business Studies*, 8 (1), 23–32.

Johanson, J. & Vahlne, J-E. (1990). The mechanism of internationalisation. *International Marketing Review*, 7 (4), 11–23. https://doi.org/10.1108/02651339010137414

Johanson, J. & Vahlne, J-E. (2009). The Uppsala internationalization process model revisited: From liability of foreignness to liability of outsidership. *Journal of International Business Studies*, 40 (9), 1411–1431. https://doi.org/10.1057/jibs.2009.24

Kotler, P. & Keller, K. L. (2012). *Marketing management (14th ed.)*. Prentice Hall, Upper Saddle River, NJ.

Kumar, V., Stam, A. & Joachimsthaler, E. (1994). An interactive multicriteria approach to identifying potential foreign markets. *Journal of International Marketing*, 2 (1), 29–52. https://doi.org/10.1177/1069031X9400200103

Magnani, G., Zucchella, A. & Floriani, D. E. (2018). The logic behind foreign market selection: Objective distance dimensions vs. strategic objectives and psychic distance. *International Business Review*, 27 (1), 1–20. https://doi.org/10.1016/j.ibusrev.2017.10.009

Marchi, G., Vignola, M., Facchinetti, G. & Mastroleo, G. (2014). International market selection for small firms: A fuzzy-based decision process. *European Journal of Marketing*, 48 (11/12), 2198–2212.

Mendel, J. M., Hagras, H., Tan, W.-W., Melek, W. W. & Ying, H. (2014). *Introduction to type-2 fuzzy logic control: Theory and applications*. Wiley-IEEE Press, Hoboken, NJ.

O'Farrell, P. N. and Wood, P. A. (1994). International market selection by business service firms: Key conceptual and methodological issues. *International Business Review*, 3 (3), 243–261. https://doi.org/10.1016/0969-5931(94)90004-3

Papadopoulos, N., Chen, H. & Thomas, D. R. (2002). Toward a trade-off model for international market selection. *International Business Review*, 11 (2), 165–192. https://doi.org/10.1016/S0969-5931(01)00054-3

Papadopoulos, N. & Denis, J.-E. (1988). Inventory, taxonomy and assessment of methods for international market selection. *International Marketing Review*, 5 (2), 208–238. https://doi.org/10.1108/eb008357

Papadopoulos, N. & Martín Martín, O. (2011). International market selection and segmentation: Perspectives and challenges. *International Marketing Review*, 28 (2), 132–149. https://doi.org/10.1108/02651331111122632

Rahman, S. H. (2003). Modelling of international market selection process: A qualitative study of successful Australian international businesses. *Qualitative Market Research: An International Journal*, 6 (2), 119–132. https://doi.org/10.1108/13522750310470127

Root, F. R. (1994). *Entry strategies for international markets*. Lexington Books, Lexington, MA.

Saleh, I. & Kim, S. (2009). A fuzzy system for evaluating students' learning achievement. *Expert Systems with Applications*, 36 (3) Part 2, 6236–6243. https://doi.org/10.1016/j.eswa.2008.07.088

Snehota, I. & Håkansson, H. (Ed.s) (1995). *Developing relationships in business networks*, Routledge, London, UK.

Solberg, C. A. & Askeland, V. (2006). The relevance of internationalization theories: A contingency framework in Fai, F.M. and Morgan, E.J. (Eds.), *Managerial issues in international business*. Palgrave Macmillan, London, UK, 9–32. https://doi.org/10.1057/9780230800700_2

Vahlne, J-E. & Johanson, J. (2013). The Uppsala model on evolution of the multinational business enterprise – from internalization to coordination of networks. *International Marketing Review*, 30 (3), 189–210. https://doi.org/10.1108/02651331311321963

Williamson. O.E. (1979). Transaction Cost Economics: The Governance of Contractual Relations. *Journal of Law and Economics*, 22 (2), 233-262. https://doi.org/10.1086/466942

Williamson, O.E. (1981). The Economics of Organization: The Transaction Cost Approach. *American Journal of Sociology*, 87 (3), 548-577.

Zadeh, L. A. (1965). Fuzzy sets, information and control. *The Journal of Symbolic Logic*, 8 (3), 338–353.