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ABSTRACT

This paper examines the content of internationalization strategies of knowledge-intensive, small and medium sized enterprises (SMEs). A theoretical framework is presented which is derived from Dunning's Eclectic Paradigm and which provides an explanation for the international configuration of knowledge-intensive SMEs. The framework is tested on a sample of publicly traded knowledge-intensive, international SMEs originating from a small, open economy.

Results support the proposed framework and show that patterns of ownership, location and internalization of R&D, production, marketing and after-sales services are significantly different from each other. In contrast to firms from traditional industries, findings show that R&D, marketing and after-sales services constitute the ownership advantage of the SMEs in the sample, are incorporated within their value added chain and internalized by them. While R&D is mostly located in the home country, marketing and after-sales services tend to be located in the host country. Moreover, the findings show that the internationalization strategies of knowledge-intensive SMEs differ from that of traditional, larger MNEs. Difference between the two is salient especially in terms of the centrality of production in the determination of internationalization strategies.

INTRODUCTION

Born-global companies, i.e. small or medium-sized enterprises (SMEs) that are multinational from inception or from a very early phase in their life span, are receiving increasing attention (e.g. Bell, 1995; Bloodgood et al., 1996; Dana et al., 1999; Keeble et al., 1997; McNaughton, 2000; Oviatt and McDougall,1994, 1999; Rugman and Wright, 1999). Business opportunities are becoming increasingly international and national confines are disappearing, thus creating new patterns of behavior for small and medium sized businesses. Oviatt and McDougall (1999) pose that in the late 1990s about two percent of emerging businesses worldwide were global from inception and a quarter of all SMEs around the world derived a major portion of their revenues from foreign countries. Furthermore, they stated that the pace in which SMEs internationalize is increasing. Reasons for this increase can be found in the reduction in cost of international transportation and communication and shortening of the product and industry life cycle. Thus, 'born-globals' are SMEs that derive most of their income from foreign markets, have started their organizational lives while exploiting international opportunities and are international in their orientation and configuration.

Although the phenomenon of 'born-global' SMEs is becoming increasingly common, a comprehensive theory supporting both the internationalization process of SMEs and their international business configuration, relevant to the economic conditions of the third millennium, is still lacking (Dunning, 1993a; Oviatt and McDougall, 1999). It is only natural therefore that researchers increasingly are focusing their attention on theories or paradigms to explain these phenomena (Almor, 2000; Coviello and McAuley, 1999; Liesch & Knight, 1999; Nilsen and Liesch, 2000; Oviatt & McDougall, 1994). Most studies that focus on the internationalization of SMEs (Oviatt & McDougall, 1994; Coviello & McAuley, 1999; Nilsen & Liesch, 2000) claim that the traditional theories of FDI and internationalization are insufficient to explain the process. After all how can one explain the fact that SMEs, with their limited resources, are able to operate globally as though they were a large multinational corporation? Various papers suggest the development of a paradigm based on a combination of several conceptual frameworks, namely: the Eclectic Paradigm (Dunning, 1977, 1988), the "stage" model (Johanson & Vahlne, 1977, 1990; Welch & Luostarinen, 1988) and the network perspective (Johanson & Mattsson 1988, 1992; McNaughton and Bell, 1999; Sharma 1992).

This paper aims to contribute to the understanding of internationalization of SMEs by proposing a conceptual paradigm for the configuration of the internationalization of knowledge-intensive SMEs from small, open economies (SMOPEC). The paper aims to challenge the repeated need of combining schools of thought (Oviatt & McDougall, 1994; Coviello & McAuley, 1999; Nilsen & Liesch, 2000) by offering a coherent explanation to the international configuration of SMEs based on a revised version of Dunning's Eclectic Paradigm. Surprisingly, Dunning's eclectic Paradigm has received a minor place in the extensive efforts to explain the international behavior of SMEs and even when utilized it was mainly in comparison to the stage model and the network approach (Coviello & McAuley, 1999).

The reasons to focus on knowledge-intensive SMEs from SMOPECs are three-fold. First, a large percentage of newly international SMEs is characterized as knowledge-intensive and this percentage is expected to increase in the coming years (Korot and Tovstiga, 1999). Second, small, developed countries exhibit a large proportion of firms with a high trans-nationality index (UNCTAD, 1999), this may be explained by the fact that, by definition, these markets will be very small (or even negligible) in the home country, therefore internationalization among SMEs is prolific in SMOPEC countries (Keeble et al., 1997; McNaughton, 2000). Third, knowledge-intensive SMEs frequently introduce a new technology that is so unique that it might be claimed that those SMEs are actually inventing their own markets and are driven to the international markets in order to exploit first mover advantages and monopolistic gains (Keeble et al., 1997; McNaughton, 2000).

The above mentioned reasons are widely accepted throughout the relevant literature as the main triggers for knowledge-intensive SMEs from small open economies to become international from inception (or almost form inception), thus creating a context in which a large percentage of born-globals will exist.

In the next section relevant literature will be reviewed and we will show how previous research has tried to formulate a concept that is based upon the above- mentioned schools of thought. Subsequently, we will present a conceptual framework based on modifications to Dunning's Eclectic Paradigm that explains the international configuration of knowledge-intensive SMEs located in SMOPEC countries. The paradigm is then tested on data measuring internationalization processes of Israeli, knowledge-intensive SMEs. The last section of the paper will present our findings and discuss their implications.

THEORETICAL FRAMEWORK

Classic FDI and internationalization literature can be divided into several major schools (Coviello & McAuley, 1999): (1) the 'economic school', (2) the 'behavioral school' and (3) the network approach. The 'economic school' (e.g. Buckley & Casson, 1976; Dunning, 1977, 1988; Hirsch, 1976; Williamson, 1975), views internationalization as a pattern of investment in foreign markets explained by rational economic analysis of ownership, location and internalization. According to this approach firms choose their optimal structure for each stage of production by evaluating the cost of economic transactions. The firm's organizational structure and its choice of location and ownership of specific value-chain activities (Porter, 1980) are determined by criteria of cost minimization.

The 'behavioral school' views internationalization as an ongoing process of evolution whereby the firm increases its international involvement as a function of heightened knowledge and market commitment (Aharoni, 1966; Johanson & Wiedersheim-Paul, 1975; Johanson & Vahlne 1977, 1990).

A third approach (Johanson & Mattsson 1988, 1992; McNaughton and Bell, 1999; Sharma 1992) views the firm's internationalization as an entrepreneurial process based on an institutional and social network that supports the firm in terms of access to information, human capital, finance and so on (Vatne, 1995). The organization relies on multilateral interdependencies for its internationalization process (Axelsson and Johanson, 1992; Forsgren, 1989), which enable the firm to find suitable international partners.

Each of the three approaches adds different dimensions to the concept of internationalization. The 'economic school' analyzes the content of internationalization by focusing on choice of location and ownership of specific value-chain activities. The 'behavioral school' analyzes the internationalization process while the network approach looks at the role informal inter-firm relationships play in the internationalization process. This paper focuses on the content and configuration, rather than on the process, of SME internationalization. Therefore, we utilized the 'economic school' approach and specifically Dunning's Eclectic Paradigm (Dunning 1977, 1980, 1988, 1993a, 1993b) in order to study the internationalization of knowledge-intensive SMEs. Because of the unique characteristics of knowledge-intensive SMEs we need to modify and adapt this paradigm in order to utilize it in explaining internationalization of these specific SMEs.

EXPLAINING SME INTERNATIONAL CONFIGURATION BY MEANS OF THE ECLECTIC PARADIGM

Dunning's Eclectic Paradigm is based on three cumulative conditions that are necessary to become a successful MNE: ownership advantages, location advantages and internalization advantages (thus, the OLI paradigm).

Theory suggests that the configuration of international, knowledge-intensive SMEs is driven by conditions that differ from those ruling traditional industries, thus creating strategic options for the SME that may differ from the traditional options. Below, Table 1 presents a framework for examining the configuration of the international knowledge-intensive SMEs. The framework is based on relating the OLI paradigm to the major primary value activity chain (VAC) of the SME. In this paper we focus on four major generic stages of the value-added chain: R&D, production, marketing & sales and after-sales services. Table 1 explains how each stage of the VAC is related to the OLI paradigm. Below, we discuss the four stages of the VAC of the international SME in terms of ownership advantage, location advantage, and internalization advantage.

Ownership advantage in the Eclectic Paradigm relates to the possession of intangible assets or core know-how that gives the firm a competitive advantage over its competitors and that can be exported. The main competitive advantage of knowledge-intensive SMEs lies in their core know-how to develop, market and service knowledge-intensive products. Knowledge-intensive SMEs frequently create sustainable competitive advantages (SCAs) around their unique R&D (Amin and Thrift, 1994). The resource-based theory views ownership of technology as one of the most important bases for the development of sustainable competitive advantages. As Dunning himself acknowledges (Dunning, 1993b), proprietary technology is a resource around which the profit earning potential of a firm is developed (Grant, 1998) and entry barriers are created

TABLE 1– THE ECLECTIC-PARADIGM AND ITS RELATION TO THE VALUE ADDED CHAIN (VAC) OF KNOWLEDGE-INTENSIVE SMES

VAC	Ownership advantage	Location advantage	Internalization advantage
R&D	Basis for SCA, needs to be incorporated within the VAC	Home country has a comparative advantage in R&D	Internalization is needed as the whole VAC is dependent upon proprietary R&D
Production	Not necessarily. May be irrelevant (intangibles) or of minor importance	Not necessarily due to diseconomies of Scale and high labor costs in the home country	Usually not. Outsourcing may enable to exploit economies of scale and learning economies
Marketing and sales	Client base is an important SCA, thus marketing will be a part of the firm's VAC	Small and distant home country is in a location disadvantage compared to the host country	Usually firms are too small to exploit internalization advantages, but knowledge-intensive products require in-house marketing and sales force
After-sales service	Incorporation within the VAC allows to develop special supplier-customer relations, increase customers loyalty and to support propriety know-how	Small and distant home country is in a location disadvantage compared to the host country	Internalization is important as it protects against diffusion of knowledge, but may be a disadvantage if one needs to serve mass markets

(Wernerfelt, 1984). Thus, unique know-how and proprietary technology are exactly the *ownership-specific advantage* that Dunning refers to, or more specifically the advantage that stems from ownership of assets (Oa) (Dunning, 1988; 1993b).

Marketing, sales and after-sales services allow the SME to build up long term relations with a client base and to receive feedback regarding their technology. Moreover, as technology is the core-capability of the firm, which forms the basis for its SCAs, tight supplier-customer relations may lead to further innovations that the firm will prefer to keep as proprietary for itself. Moreover, as knowledge-intensive products require more frequent interactions between the supplier and its customers relatively to low-tech firms (Almor & Hirsch, 1995), marketing and after-sales services are crucial factors in building customers loyalty and for the development of a strong clientele base. This again is consistent with the resource-base view of the firm (Wernerfelt, 1984). It is expected therefore that SMEs will prefer to incorporate both R&D, marketing and after-sales services in their VAC, in order to protect and upgrade proprietary knowledge and its client base which are their core asset advantages (Oa).

In contrast to the classical application of the OLI paradigm, production usually does not provide a basis for SCAs as it either involves copying the developed knowledge, such as software, to a medium through which it can be transported, or embedding it in a chip, motherboard etc., as a part of a complete system. In the first case the production skills do not provide a basis for SCAs as they are very common and can be easily provided by others. In the second case, substantial economies of scale are involved which do not allow the SME to incorporate the production process. In either case, there will not be any ownership advantages for the firm concerning the production process, therefore SMEs may not incorporate this function.

Thus we hypothesize that:
(1) Knowledge-intensive SMEs will incorporate R&D, marketing, sales and after-sales services in their value-added chain more frequently than production activities and perceive their R&D, marketing, sales and after-sales services as their SCAs.

Location advantages relate to (1) advantages existing in the host country such as access to cheaper country-specific inputs (raw materials, labor etc.), as well as to (2) the required proximity to markets and to consumers. We assume that a location advantage exists in the home country regarding the R&D stage of knowledge-intensive products (at least in developed SMOPEC countries such as Sweden, Finland, Israel and Ireland). This comparative advantage stems from the local network and cluster of knowledge-intensive companies of which the SME is a part (Keeble et al., 1997; Porter, 1990), as well as from the fact that the development of these products requires skilled, professional, labor, which the home country is endowed with.

A second aspect of the location advantage concerns the distance of SMOPEC firms from their target market. Although not discussed extensively by Dunning, location advantage not only concerns host country advantages, but also distance from the target market, thereby creating a location disadvantage for the SME. The major target markets of knowledge-intensive SMEs are the US, the Pacific Rim and South East Asia and the European Union. Most SMEs will be located at a distance from, at least part, of their target markets.

Knowledge-intensive SMEs frequently sell their products outside their home country, as the home country usually does not provide a large enough market for the technology developed and manufactured by the SME. Therefore, The SMEs are located at a distance from their target markets, thus needing to "pay" a certain premium for distance. This premium takes the form of higher transportation costs compared to potential local competitors, slower response times, problematic after sales support, as well as higher interaction costs with potential clients. In addition such SMEs will encounter cultural differences (i.e. Hofstede, 1980; Hymer, 1976; Kogut & Singh, 1988) as well as higher information flow costs (Buckley & Casson, 1976; Casson 1994, 2000) in comparison to local competitors.

Clearly, all firms operating internationally have to cope with the above-mentioned disadvantages. While the larger MNE is able to cope with such problems through expansion of its marketing and after sales services infrastructure by, for instance, acquiring local firms (in the major host countries) which own an existing marketing and services infrastructure, this option is beyond the means of most SMEs not only because of scarce financial resources, but mostly because of lack of managerial resources and adequate international experience (Buckley, 1989; Gomes-Casseres, 1997) Location disadvantage can be solved partly by creating strategic alliances with local companies, by choosing to sell products OEM (thereby foregoing contact with the final user of the technology), by focusing on one or two large markets where the SME will establish a local presence or by serving a global niche that has relatively few customers (Gomes-Casseres, 1997; Keeble et al. 1997; McNaughton, 2000). We expect that the SME will employ at least one of the above strategies to enhance its proximity to the target market. As some of the mechanisms to compensate for the location disadvantages are related to the SME's internalization decision, we'll come back to this dilemma later in the section.

Location of production will be determined according to a wide range of rather contradicting considerations, such as: economies of scale, labor costs, local networks, knowledge and managerial capabilities. Not all of these considerations might be generalized, but some observations can be made. SMEs from SMOPEC countries may find it difficult to utilize economies of scale as they are comparatively limited with production resources (both capital and labor), in comparison to firms from large countries. Moreover, as labor costs are comparatively high in countries such as Sweden, Finland, Ireland and Israel, there will not be any location advantages in those countries for placement of production facilities. On the other hand, many SMEs may be too small to move their production to 'cheap labor' developing countries and will therefore manufacture in the home country even though this does not provide a location advantage. In addition, many SMEs manufacture products that are in the early stages of the Product Life Cycle (Vernon, 1966) and need therefore be manufactured in close proximity to other functions such as R&D.

Other SMEs that manufacture intangible products (software, internet applications, telecommunication etc.) will be indifferent to the location of production as manufacturing costs are relatively negligible for their operations. Therefore, we hypothesize that:
(2) R&D will be located in the home country in order to exploit local advantages; marketing and after-sales services will be located outside the home country in order to overcome location disadvantages. No preferences will be found for the location of production.

Internalization advantages relate to the ability to create superior profits by using the advantages that the firm owns, rather than by selling them or leasing them to third, international parties. The distinction between ownership and internalization is not always clear cut (Ietto Gillies, 1997) and interrelations between the two exist. Nevertheless, the internalization advantage of the R&D function seems to need little additional explanation. As stated before, R&D knowledge forms the basis for the firm's SCAs and will therefore need to be internalized and kept proprietary in order to strengthen the sustainability of the advantage.

Once knowledge is developed, production mainly involves embedding the knowledge in a tangible device such as a CD-Rom disc, motherboard or other electronic means. Sometimes these costs are negligible, for instance when creating a copy of software. Other times they involve large economies of scale and learning economies, as in the case of producing an electronic chip. In either case, there is no compelling reason to internalize production. Thus, while production may be incorporated in the value-added chain, it will not necessarily be internalized, but may very well be preformed by independent firms.

Internalization of marketing and after-sales services on the other hand is more complicated. Internalization of those functions is required due to the knowledge content of the SMEs products that requires both high skill and specific marketing expertise and due to the need to protect propriety know-how. On the other hand internalization of marketing and after-sales services means that the market is served by the firm itself. This is quite a demanding task for SMEs, having usually scarce managerial and financial resources. One way to internalize marketing and after-sales services is to target a market niche that consists of few customers. Indeed, many SMEs will try to create profits by focusing on relatively few transactions that provide maximum value per transaction, by selling to industrial customers or to specific market niches. However, if the firm's client base consists of a large group of customers, spread around the globe, internalization becomes almost impossible.

When serving industrial customers or specific market niches, the absolute number of clients is much smaller than when the firm serves mass-market consumers. If the firm serves a small number of industrial customers or is targeting market niches, the need for a substantial marketing, distribution and after-sales services infrastructure is reduced and a modest marketing entity may enable the firm to operate successfully. When the SME focuses on a small number of clients with similar characteristics and similar product demand (a global niche), the SME may even serve those clients directly from its home base. The SME will provide sales and after-sales services by sending engineers and other professionals to the client on an individual basis, thereby creating a 'virtual MNE' and reducing the need for a sizeable marketing and services infrastructure.

By definition, most knowledge-intensive SMEs will find it quite difficult to serve a large customer base, as they need to have intensive interactions with their clients, because of the nature of knowledge-intensive products (Almor and Hirsch, 1995). Moreover, SMEs are often limited in resources such as managerial skills, international experience, human resources and finance. Therefore, the resource in constraint for such firms is marketing, sales and after sales services infrastructure[i]. Thus, we hypothesize that:
(3a) Knowledge-intensive SMEs will internalize R&D more frequently than production.
(3b) Firms that have internalized marketing and after-sales services will mainly serve industrial customers or market niches and not large and dispersed group of clients.

EMPIRICAL ANALYSIS: METHODOLOGY AND DATA

This study focuses on knowledge-intensive SMEs that exhibit a high degree of international behavior. The SMOPEC country chosen for the study was Israel. Israel is regarded an international leader in terms of contribution of hi-tech to overall exports as well as in terms of the high number of Israeli SMEs traded on the American NASDAQ stock exchange (Almor, 2000). According to Israel's Central Bureau of Statistics, 69% of Israel's industrial exports in 1999 were accounted for by knowledge-intensive industries (when excluding diamonds).

A second indicator of Israel's proclivity regarding knowledge-intensive industries exists in the sheer number of Israeli firms traded on NASDAQ. In 1999, approximately 120 Israeli firms were traded on NASDAQ, of which about 80% were defined as knowledge-intensive. Although Israel has a population of only six million people and is smaller in size than the Netherlands, it is home to the second largest group of non-US companies traded on NASDAQ. Already by 1995, the number of NASDAQ-listed Israeli firms nearly equaled the number of all other foreign firms combined, excluding Canadian companies (Blass and Yafeh, 1998).

The first step in this study was to identify the research sample, which was defined according to the following criteria:

1. - Knowledge-intensity. Various definitions exist to classify knowledge-intensive industries (e.g. Almor & Hirsch, 1995). In this study we employed share of investment in R&D as percentage of the firm's total sales as a means of classification. Firms investing five percent or more in R&D were classified as knowledge-intensive.

2. - Small and medium sized enterprises (SMEs). Various definitions can be found in literature

[i] As opposed to traditional industries where the resource in constraint is often production infrastructure.

regarding size. In this study 'number of employees' was used as a measure of size. Buckley (1997) and Storey (1994) used the term SMEs in reference to enterprises employing less than 500 employees. However, the size threshold may vary (Dana et al., 1999) per country and per industry. SME definitions are based on firms operating in *local* markets. In this study we focused on *international* enterprises that are small to medium sized, i.e. small and medium sized as compared to regular MNEs. Therefore we limited ourselves to firms smaller than 1000 employees. Everything larger than that was not included in the sample. In the final sample only 9 firms employed more than 500 employees, furthermore, the median value of number of employees was 163[ii].

3. - International behavior. In order to identify SMEs that generate a significant part of their sales outside Israel, we decided to focus on those that are traded outside Israel. One reason to trade a company outside one's home country is to signal internationality to clients, business partners and investors alike (Almor, 2000). Therefore, we assume that Israeli SMEs traded outside Israel will be international in their business behavior.

Initially, 120 Israeli companies that were traded on NASDAQ (US) and/or on various EU stock exchanges during the year 2000, were identified. All firms that were not defined as knowledge-intensive or were larger than 1000 employees were excluded from this list. The remaining firms in the sample were approached and requested to take part in a face-to-face interview, which allowed the researchers to gather data by means of a structured questionnaire. The final sample included 56 knowledge-intensive, international SMEs.

The firms in the sample can be divided according to four industries: (1) software (38%), (2) information and telecommunications - ICT (20%), (3) electronics (27%) and (4) 'other', which included pharmaceutics, bio-technology and medical technologies (15%). Identification of the industries and classification of the firms according to industry was based on self-categorization of the firms.

Descriptive data show that the firms have a unique profile. Table 2 present percentages, median values, standard deviations and range of the variables and measures.

TABLE 2 - DESCRIPTIVE STATISTICS OF 56 KNOWLEDGE-INTENSIVE, INTERNATIONAL SMES LOCATED IN ISRAEL (DATA ARE FOR THE YEAR 1999)

Variable	Percentage of SMEs in the sample	Median	Sd.	Range
Descriptive variables:				
Year SME was established	-	1990	7.2	1950-1996
No. of employees	-	163	266.6	15-1050
Sales	-	$25M	$61M	$0 - 338M
R&D/sales	-	.16	.36	.03-2.46
Serving industrial customers	87	-	-	-
Operating in niche markets	76	-	-	-
NASDAQ IPO-ed	67	-	-	-
EU IPO-ed	27	-	-	-
Israel IPO-ed	6	-	-	-
Measures of internationalization:				
Country 1st product sold: Israel	29	-	-	-
Country 1st product sold: US	33	-	-	-
Country 1st product sold: EU	18	-	-	-
No. of countries served	-	30	18.7	1 - 86
% Israel based employees	-	70	25	1 - 100
% US based employees	-	13	17	0 - 84
% sales in Israel	-	2	20	0 - 99
% sales in USA	-	35	27	0 - 100
% sales in EU	-	25	21	0 - 85

[ii] Another parameter that is often used for classify SMEs is turnover (Cavusgil, 1984; Stray et al., 2001). Annual sales of the firms in the current sample do not exceed $ 350 Million.

Data in table 2 show that firms are small in terms of number of employees, as well as sales, they are innovative, and serve customers all over the world. The firms mainly operate in niche markets serving industrial customers.

The investigated SMEs hardly sell products in their home market. The majority of the firms in the sample started out in international markets, selling their first product outside the home country. However, their employees, as well as the senior management, are based in the home country. These descriptive data clearly show that the SMEs in the sample have a divergent configuration from the classical MNEs, which have usually started in their home country, have a larger and more dispersed customer base and have production operations, personnel and management scattered around the world (Dunning, 1980, 1993b, 1995; Johanson & Vahlne, 1977,1990). This divergence leads us to examine the international configuration of knowledge-intensive SMEs from SMOPECs and to ask if it is similar to that of classical MNEs.

RESULTS

The hypotheses that were detailed earlier were tested on the sample described above. The first hypothesis concerned ownership of functions providing the basis for SCAs. It was hypothesized that knowledge-intensive SMEs will incorporate R&D, marketing, sales and after-sales services in their value-added chain more frequently than production activities.

The Cochran-Mantel-Heanszel statistic, a non-parametric measure, was used to test the hypothesis. The Cochran-Mantel-Heanszel statistic serves for testing hypotheses regarding equality of two matched distributions, measured on a categorical (nominal) scale.

Results presented in Table 3 show that R&D, marketing & sales and after-sales services are incorporated significantly more frequently than production, thus supporting hypothesis 1.

The ownership advantage findings are further supported by the firm's perception of themselves. Sixty eight percent of the firms identified their 'unique technology' as one of their three most important sustainable competitive advantages. Seventy seven percent of the SMEs thought that 'understanding needs of client' is among their three most important strategic capabilities and 72% of the firms regarded their 'innovation' to be as such.

The second hypothesis concerned location of functions. It was hypothesized that R&D will be located in the home country and that marketing and after-sales services will be located outside the home country, it was further hypothesized that production will not present a specific pattern of location.

The Cochran-Mantel-Heanszel (CMH) statistic showed that a significant difference exists in patterns of location between R&D, marketing & sales and after-sales services and production (CMH value=37.88). R&D was located in the home country significantly more frequently than marketing & sales and after-sales services. Marketing & sales as well as after-sales services were located significantly more frequently outside the home country, compared to R&D and to production. No significant difference was found between location of production and R&D, but significance was just above the required norm (p=0.109).

Hypothesis 3a stated that SMEs prefer to internalize R&D more frequently than production. The Cochran-Mantel-Heanszel statistic showed that production was significantly less frequently internalized than R&D, thus supporting hypothesis 3a (see Table 3).

Hypothesis 3b stated that those firms that have internalized marketing and after-sales services mainly serve industrial customers or market niches and not large and dispersed groups of clients.

TABLE 3 - COCHRAN-MANTEL-HAENSZEL STATISTICS FOR 56 KNOWLEDGE-INTENSIVE, INTERNATIONAL SMES LOCATED IN ISRAEL

Variable	Df	Value	Probability
Full ownership of functions	1	7.14	.0075
Comparison of location of functions	2	37.88	<.0001
Location R&D - production	1	2.57	.109
Location R&D - MS and after-sales services	1	28.13	<.0001
Location production - MS and after-sales services	1	20	<.0001
Internalization of R&D - production	1	15.70	<.0001

Legend

MS - Marketing and sales.

Cross tabulations and Chi-Square tests showed that most firms in the sample serve industrial customers (87 percent of the sample) and market niches (76 percent of the sample), however, no significant relationship was found between internalization of marketing & sales and after-sales services and type of customers.

DISCUSSION

This paper examines the content of internationalization strategies of knowledge-intensive SMEs. A theoretical framework, providing an explanation for the international configuration of SMEs and derived from Dunning's Eclectic Paradigm, was presented and tested on a sample of knowledge-intensive SMEs located in a small, open economy and traded on NASDAQ.

The study focuses on knowledge-intensive SMEs, a fast growing group of firms that seems to behave differently from firms situated in traditional industries. Differences seem to exist in the degree of internationality relative to size and age, in the way the firms are configured and in the basis for their Sustainable Competitive Advantages (SCAs). The basic differences led us to hypothesize that the international configuration of knowledge-intensive SMEs, when analyzed it in terms of the Eclectic Paradigm, will be based on R&D as well as marketing and after-sales services, rather than on production. As R&D, marketing and after-sales services were expected to be the core competencies of knowledge-intensive SMEs, their ownership, location and internalization modes were expected to affect the internationalization content of such firms.

The model proposed in this paper and studied empirically shows that the firms in the sample have R&D facilities that are fully internalized, providing ownership advantages of knowledge, which form the basis for the firm's SCAs. The R&D function is located in the home country, thereby exploiting location advantages, such as local knowledge networks as well as comparative advantage resulting from the home country's endowment of skilled labor.

Production on the other hand, is not necessarily part of the value-added chain (VAC), and even if it is part of the VAC, it is not necessarily internalized and is not located according to principles guiding traditional industry. The fact that production is of lesser importance in its contribution to the firm's SCAs makes the ownership, location and internalization of production a minor issue for knowledge-intensive SMEs.

Marketing & sales, as well as after-sales services are viewed as providing an additional basis SCAs. Interactions with clients, as well as installation and maintenance of their technologies allow the SMEs to receive feedback and improve their technology and thus increase their SCA. Moreover, most knowledge-intensive SMEs market their products to a few, large customers. It may take years before an industrial potential customer becomes an actual customer. Thus, protection of the client base is vital for a SME's survival and competitiveness. Moreover, the relatively high sophistication level of products requires a highly skilled marketing and services force that needs to be instructed and updated periodically. Therefore, knowledge-intensive SMEs mostly incorporate marketing & sales as well as after-sales services within their VAC and provide these value activities mostly provided in-house. In contrast to the R&D function, however, these functions are usually located outside the home country, so as to diminish location disadvantages created by distance. Here one can note the influence of the SMEs' origin from a small, open economy with a negligible home market. Creation of some kind of international presence, in terms of marketing and after-sales services, is essential in order to compete with local competitors that do not have the burden of geographical and cultural distance from their market.

The findings in this paper address two phenomena: (1) SMEs taking part in the 'international game arena'; (2) knowledge-intensive SMEs, that develop and market products which are, at least partly, intangible, compete internationally in ways that are different from the traditional model, by internalizing R&D, marketing and after sales services and approaching global niches. These findings conform to other studies related to the internationalization of knowledge-intensive SMEs in North America (Gomes-Casseres, 1997; McNaughton, 2000) and the UK (Keeble et al., 1997; Stray et al., 2001) and thus reduce the odds that this study's results are affected by the sample (all Israeli firms).

Generalization of the findings has theoretical implications as well as implications for practitioners. Theoretically, the findings imply that traditional internationalization models have to be re-examined and tested for validity when analyzing behavior of small and medium sized enterprises that compete in the international market. Basically, we found that the Eclectic Paradigm can be employed, albeit needing correction, or rather modifications, for the different nature of such firms. This indicates that current FDI models, once adapted to specific characteristics of knowledge-intensive SMEs can still serve as a useful analytical tool. The question is if, for instance, the Upssala model is valid when explaining internationalization processes of knowledge-intensive SMEs, taking into account that 71% of all firms in the sample sold their first product outside the home country. The relevance of the Upssala model to the internationalization process of SMEs is debated in the relevant literature (Keeble et al., 1997; McNaughton, 2000; Stray et al., 2001) but not examined in this paper.

For practitioners, the findings imply that internationalization is not limited to big firms anymore. However, content of internationalization is unique for SMEs. Mostly, SMEs seem to serve few, large clients who are dispersed around the world, and who are mostly organizations themselves. These clients are served through marketing and after-sales activities that are located close to them. R&D activities on the other hand, are mostly located in the home country, thereby exploiting comparative advantages existing in that country, such as clusters of hi-tech companies and skilled labor endowment. These findings imply that organizational configuration is geographically dispersed (R&D usually located in the home country and marketing and after sale services in the host country), that most SMEs operate within global niches and may be successful doing so.

Coviello & McAuley (1999) were right to raise the question whether the content and process of SMEs internationalization is truly different from that of larger firms. The current paper offers a partial answer to the 'content' part of this question and more specifically to the question: does the international behavior of knowledge-intensive SMEs differ from that of larger knowledge-intensive firms? After all, the large MNEs of today (e.g. Microsoft, HP, IBM etc.) are different from the traditional MNEs as well. Clearly the ownership advantages of knowledge-intensive, large MNEs are similar to those of SMEs and lie in their R&D, marketing and after-sales services. As many of the large knowledge-intensive SMEs come from large countries with a large home market they usually can rely on their local sales to account for a substantial part of their turnover, thus their location disadvantage is less critical[iii].

The major difference, however, is the ability of large MNEs to develop a marketing and services infrastructure in host markets through direct investments (whether greenfield or through acquisitions) by exploiting their superior financial and managerial resources, their monopolistic power as well as their brand name. The international configuration of the SMEs discussed in this paper is unique, as they have to compensate for their distance from world's largest markets and for their limitation (in terms of time and cost) in building a substantial marketing and services infrastructure in their host markets. Internalization of marketing and after-sales services is a necessity, but can be utilized only to target niche markets (or industrial customers).

Although beyond the scope of this paper, it further raises the question of firm's growth. How, if at all, can such a SME become a MNE in the traditional sense of the term? Just like traditional SMEs that focus on a specific niche, these SMEs face a similar problem when pursuing aggressive growth strategies that will eventually, force them to abandon their niche for more lucrative markets. A better understanding of this issue may be derived from a systematic analysis of the preferred international business modes of knowledge-intensive SMEs. Thus, future studies may focus on the role of International Strategic Alliances (ISAs) in the internationalization of knowledge-intensive SMEs and on the contradictory role ISAs may play. Where as ISAs may compensate for the cost and difficulty of creating marketing and after-sales services infrastructures in distant markets (Gomes-Casseres, 1997), ISAs also threaten the ability of knowledge-intensive SMEs to protect their proprietary know-how. Is this conflict inevitable? Will any knowledge-intensive SME need to risk its core know-how and client base if it wishes to survive in the global market place? Are there any particular strategies that enable the SME to protect its know-how while leveraging on the marketing and sales infrastructure of larger MNEs? May international business networks provide a mechanism to reduce the need for formal ISAs? All these are critical questions that should be addressed in future studies.

[iii] Even though some leading multinationals such as Nokia and Eriksson come from SMOPEC countries as well.

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