

**Globalization Patterns of Emerging High  
Technology Companies:  
An Exploratory Analysis of Desktop  
Computing\***

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# **Globalization Patterns of Emerging High Technology Companies: An Exploratory Analysis of Desktop Computing\***

by

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## **ABSTRACT**

Two traditional models of global expansion were evaluated in an exploratory effort to explain the globalization patterns of emerging high-technology companies. Extensive field interviews were conducted with 19 Massachusetts-based companies that supply software or peripheral products for desktop computing to explore: their timing and aggressiveness in entering markets outside of North America; their structures and patterns for expansion; and their success.

Sample companies report non-domestic revenues ranging from 6% to 58% of their totals. Most companies achieved 10% non-domestic revenues with only modest efforts, although companies supplying communications products subject to government regulation faced much higher penetration barriers. Globalization success, defined here as how quickly a company achieves substantial percentage of revenues from non-domestic markets, is strongly linked to how aggressively senior management allocates internal resources to developing an overseas business model that approximates the company's U.S. model. The varied adoption rates of the desktop computing platforms themselves also affected globalization. The results support an integrated model of globalization that combines elements of the Vernon product cycle and Rugman internationalization process models.

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## **Globalization Patterns of Emerging High Technology Companies: An Exploratory Analysis of Desktop Computing**

Traditional evolutionary explanations of global involvement attribute a company's behavior either to product life-cycle effects or to the gradual reduction in perceived market expansion risk. In contrast the authors argue that global expansion patterns are intimately linked to a combination of external and internal forces:

1. the product/market space provides the opportunity for globalization;
2. senior management expectations and responsiveness to opportunity provide the means for globalization.

Aspects of the global market for certain classes of emerging technology products tend to accelerate global exposure, thus permitting firms specifically to address globalization issues earlier in their histories, and at a much smaller size, than is traditionally considered appropriate. Those firms that fail either to recognize early global opportunities or to respond to globalization pressures by allocating appropriate resources to the development of effective structures, underperform their more globally aggressive rivals.

### **Two Models of Globalization**

The traditional literature, developed primarily through study of large, multinational manufacturing companies, contains two contrasting views of how firms globalize. Raymond Vernon, in explaining the rapid growth and geographic spread of U.S.-based multi-nationals (MNCs) during the decades following World War II, framed globalization in the context of the *product cycle*. Initially, domestic (U.S.) market conditions caused a firm with appropriate capital, engineering and labor resource to respond by creating a new product for the home market. As the product matured, it was transferred to overseas markets via wholly-owned subsidiaries. Eventually, as the product became standardized or a commodity, all of the production would take place in lower-cost overseas facilities, often owned by third-party licensees, and the MNC would import foreign production even to satisfy its own U.S. market needs.<sup>1</sup>

Thirty years later Vernon noted, "...certain conditions of that period are gone. For one thing, the leading MNCs have now developed global networks of subsidiaries; for another, the U.S. market is no longer unique among national markets either in size or factor cost configuration. It seems plausible to assume that the product cycle

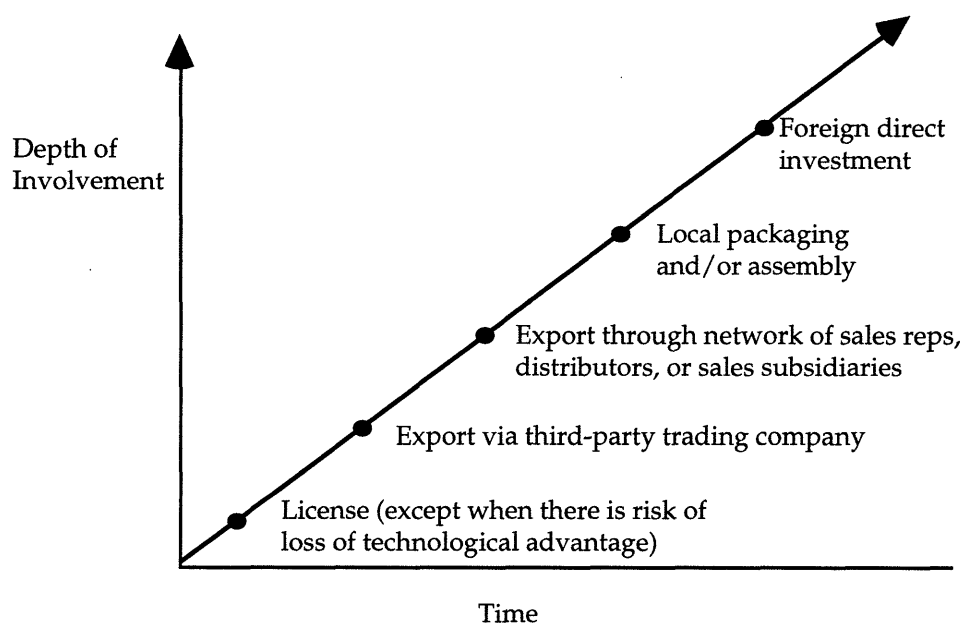
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<sup>1</sup> Raymond Vernon. "International Investment and International Trade in the Product Cycle". *Quarterly Journal of Economics*. Volume 80, May 1966.

will be less useful..."<sup>2</sup> He does, however, expect that "...strong traces of the sequence are likely to remain. One such trace is likely to be provided by the innovative activities of smaller firms...as they move from home-based innovation to the possibility of exports and ultimately of overseas investment."<sup>3</sup>

In the second approach, Rugman et al. utilized the concepts of transaction costs and risk in outlining "...the typical process by which a firm producing a standardized product will seek to involve itself in a foreign market. In this internationalization process the firm regards foreign markets as risky, since these markets are unknown to it. In terms of the special costs of doing business across national boundaries...the firm faces export marketing costs. To avoid such information costs and risks, its strategy is to go abroad at a slow and cautious pace, often using the services of specialists in international trade outside the firm. Over time, familiarity with the foreign environment will reduce the information costs and help to alleviate the perceived risks of foreign involvement."<sup>4</sup> The Rugman et al. model suggests that firms follow a globalization path that increases depth of

Figure 1. Rugman's Internationalization Process



<sup>2</sup> Raymond Vernon. "The Product Cycle Hypothesis in a New International Environment", in H. Wortzel and L. Wortzel, eds., *Strategic Management of Multinational Corporations: The Essentials*. New York, NY: John Wiley & Sons, 1985, p.

<sup>3</sup> Ibid., p.

<sup>4</sup> A.M. Rugman, D.J. Lecraw, and L.D. Booth. *International Business: Firm and Environment*. New York, NY: McGraw-Hill, 1985.

internal involvement over time, as in Figure 1<sup>5</sup>.

Our hypothesis is both more simple and direct, integrating aspects of the Vernon and Rugman models. From Vernon we perceive that the condition of the product and its market, not limited however to its life cycle stage, determines an opportunity space for global sales. From Rugman we acknowledge differences among firms in regard to their anticipated transaction costs and risks of globalization and argue that some firms are better prepared to seize global opportunities. Therefore, we see globalization as the combined outcome of these external and internal forces. The two traditional models will be explored concurrent with examination of our hypothesized integration of Vernon-related external opportunity generation combined with Rugman-based internal opportunity capture.

### **The Global Desktop Computing Market**

Michael Porter has defined the characteristics of a *global* industry as "... an industry in which a firm's competitive position in one country is significantly affected by its position in other countries."<sup>6</sup> He and Ted Levitt refer to the declining real cost of transportation and huge improvements in worldwide communications and travel infrastructure as major factors contributing to globalization. Levitt cites "... high-tech products, where the universal language of customers and users facilitates standardization"<sup>7</sup> as among those especially likely to converge quickly towards global competition. The multi-hundred billion dollar worldwide market for high technology desktop computing products—workstations, personal computers, and associated software and peripherals—certainly appears to fit nicely into the Levitt-Porter settings. Increasing competition in industries ranging from automobiles to banking has created similar end-user segments for high value-added computing power in most corners of the globe. Indeed, companies such as Apple, Microsoft, Lotus, Aldus, Sun, Novell, Compaq, IBM, Hewlett-Packard, Toshiba, and NEC compete throughout the globe with products whose core benefits and basic form and functionality are easily recognizable, regardless of the geographic location of the user.

Several aspects of the desktop computing industries make their globalization patterns particularly interesting. First, with the exception of a few electronics giants (e.g. the last four above), most of the key players in these industries are not

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<sup>5</sup> Ibid., p.

<sup>6</sup> Michael E. Porter. "Competition in Global Industries: A Conceptual Framework", in Michael Porter, ed., *Competition in Global Industries*. Boston, MA: Harvard Graduate School of Business Administration, 1986, p.

<sup>7</sup> Theodore Levitt. "The Globalization of Markets". *Harvard Business Review*. Volume 61, Number 3, May-June 1983.

traditional diversified multi-nationals. Rather they are young U.S.-based firms that have exploded from ground zero to global scale and prominence by exploiting pioneering products specifically aimed at these emerging markets. Furthermore, the value-to-weight and value-to-volume ratios of products in these segments are very high relative to traditional manufacturing industries, so that transportation costs can potentially be absorbed by needy end-users. This combination of young, non-traditional firms and easily-traded goods might be expected to result in globalization patterns unlike those of more traditional goods.

Second, the rapid convergence within these markets to standard architecture and platforms—UNIX, MS-DOS, Windows, Macintosh—seems to have created an environment uniquely supportive of the global penetration of new products.

Finally, although "...success...requires a search for sales opportunities in similar segments across the globe in order to achieve the economies of scale necessary to compete,"<sup>8</sup> much of the ongoing innovation in software and peripheral products within these markets continues to be driven by tiny start-up companies that might not ordinarily be considered appropriate in resources and scale to attack global markets. Thus the desktop computing industries seem good candidates for analysis to explore the current applicability of the traditional models of globalization.

### **Sample Selection and Possible Bias**

In order to facilitate an exploratory field test of alternative models for globalization, a population of target companies was defined to be:

- Massachusetts-based (for proximity)
- Independent firms (not divisions of other companies)
- Manufacturers of software or peripherals for PCs or workstations

As this study was intended to be exploratory only, we selected a convenience sample of these companies with the goal of providing examples of a range of products, company sizes, and company business models. Candidate companies were identified from several sources, including recent articles in local magazines and journals, participants in an export-related meeting of the Massachusetts Software Council, and various computer-industry listings in the *Massachusetts Technology Resource Guide*.<sup>9</sup> The goal for sample size was set at approximately 20 companies. Thirty companies were solicited to participate and full structured interviews were conducted with 20 companies. One company's data were subsequently excluded, as a large fraction of its international growth had been achieved by acquiring other

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<sup>8</sup> Levitt, op. cit.

<sup>9</sup> CorpTech. *Massachusetts Technology Resource Guide*. Woburn, MA: 1993.

product lines and companies, making its experience not comparable to the rest of the sample.

Clearly, the 19 companies ultimately included do not represent a scientific sample of the population of U.S.-based emerging companies serving desktop computing markets. Two possible biases must be kept specifically in mind when considering the results of this work. First, as all of the companies were Massachusetts-based, regional characteristics of product and business models as well as of international behavior may tend to cluster company patterns more closely than in a national sample. Also, a number of companies originally solicited for inclusion declined to participate, raising the possibility of a self-selection bias, particularly if those companies declined due to internal perception that their global activities were too limited or producing substandard results.

Because of the narrowly-defined nature of the sample companies, data for establishing the magnitude of any biases were quite difficult to find. A study recently published by the Bank of Boston found that the rate of export growth by all New England businesses trailed the rest of the country every year from 1988 to 1992, except in 1989.<sup>10</sup> A recent survey by *Inc.* magazine found that of the companies on the 1993 "Inc. 500" list of rapidly growing small companies (median 1992 sales of \$5.8 million), 38% did some international business, with revenues from international markets (including Canada) averaging 15% of the company total.<sup>11</sup> Finally, CorpTech, a provider of information on technology-based companies, found that while most technology manufacturers in its New England data-base did some international business, only 11.3% derive more than 25% of net revenues from international activities, another 11% have between 10-25%, and 30-35% of the companies generate less than 10%. More than 30% of the companies in its database report no international trading activity at all.<sup>12</sup> While none of the above reports provides a particularly good match for this study's sample, nor any insight into how the process of globalization might relate to a company's age or maturity, at least they provide points of reference for comparison with the sample companies.

Of the 10 companies that were approached but declined to participate, six had previously supplied data to CorpTech. Two of these companies had export revenues under 10% of their total, two were in the range of 10-25%, and two had reported over 25% non-domestic revenue. The other companies that refused to be interviewed were privately held and indicated they never released any information as a matter of policy. No obvious bias seems reflected in these 10 non-participants.

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<sup>10</sup> Bank of Boston. "New England Exports: Where Do We Go From Here?" Boston, MA: 1994.

<sup>11</sup> *Inc.* "Who's Going Global?" Volume 16, Number 3, March 1994.

<sup>12</sup> Data from CorpTech, Woburn, MA.

## **Research Methodology**

Data were gathered by personal interviews lasting between 30 and 90 minutes. Interviews were held either in person, or, in a few cases, by telephone. Each interviewee was a senior employee of the target company, usually currently holding or having held direct responsibility for international activities.

The interviews were conducted as structured historical accounts, in which the respondents were invited to describe their companies' founding history and domestic business model, the initial impetus for entering markets outside of North America, and the subsequent story of international expansion activities. Each respondent was also asked to provide specific quantitative data on revenues, growth, staffing, and global performance. The structured questions were designed to aid in the synthesis of patterns and benchmarks by measuring:

- At what size and age companies initiated globalization activities
- What initiated global activities
- Which markets were entered or avoided
- What structures were utilized
- What internal and external factors most affected performance

Data from the study are presented below, primarily in a descriptive manner, noting where appropriate the possible ties to the three competing globalization hypotheses described above. Implications of the data are pulled together in the Discussion and Conclusions section of this paper. Although the sample is small at  $n=19$ , Pearson chi-square statistical analyses were performed on a number of the testable inferences. The resulting probabilities of a Type 1 error have been computed and are reported in parentheses following the applicable statement. Given the small sample size, the relationships should be considered as only indicative rather than statistically validated. The Appendix contains information on the detailed characteristics of each numbered firm along with background explanations of these characteristics.

## **Readiness to Capture Global Opportunities**

The sampled U.S. companies embody various states of internal management readiness to pursue global markets. Pre-globalization readiness is evaluated along two primary dimensions: the presence or absence of staff with either global business experience or exposure to international environments; and the strategic importance that senior management attached to competing in global markets. One recent survey



of 20 high-tech companies found that an "ideal salesperson" included among his/her traits "multilingual and likes to travel".<sup>13</sup>

The start-up global skill-level was extremely poor throughout the sample. At the time of domestic release of their initial products, only three of the sample companies had staff members with substantial prior professional experience dealing with global markets, and in one of those companies the highly skilled individual was initially allocated solely to domestic activities. Thus, from a Rugman perspective most of these firms would be presumed to anticipate high transaction costs and/or risks in global undertakings.

The strategic importance nominally attached to global markets by senior management varies within the sample. Their global sensitivity clearly changed over time ( $p=0.01$ ), as seven of the eight companies that released their initial products during 1988 or later report having specific global intentions at domestic release. Only three of the 11 companies releasing products prior to 1988 report having a specific globalization strategy at product release, although seven of them describe the company as aware that markets outside of North America might ultimately be important, and four of those report a specific expectation of eventually targeting overseas markets. A broader analysis of strategic and promotional factors affecting high-tech sales growth during 1984-1988 neglected to even mention the words "global" or "international" in their data-gathering instrument.<sup>14</sup>

Interestingly, despite presumed differences in levels of managerial sophistication, companies funded by professional Venture Capital investors were no more likely to attach early strategic importance to global markets than the others (significant difference rejected by a Pearson chi-square test due to probability of a Type 1 error of exactly  $p=0.50$ ). The only product category showing even a tendency toward a distinct pattern was Programming/Development software, as 4 of the 5 companies in this category report early expectations that global markets might be important, in contrast with 6 of the remaining 14 firms ( $p=0.15$ ).

The most important factor determining the attitude towards global market opportunity seems to be the makeup of founders and early management: 9 of the 10 companies which specifically expected global markets to become important include in the management team someone who had worked previously in or with a company that did substantial business in global markets, or who had traveled or lived overseas and felt comfortable considering global activities. None of the 9

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<sup>13</sup> A. Coskun Samli, Gregory P. Wirth, and James R. Wills Jr. "High-Tech Firms Must Get More Out of Their International Sales Efforts". *Industrial Marketing Management*. Volume 23, 1994, 333-342.

<sup>14</sup> Kenneth Traynor and Susan Traynor. "The Efficacy of Strategic and Promotional Factors on the Sales Growth of High-Tech Firms". *IEEE Transactions on Engineering Management*. Volume 41, Number 2, May 1994, 126-134.

companies lacking such founder experience attached initial importance to global markets ( $p < 0.0001$ ).

### **Impetus for Global Expansion**

Triggers to begin international market activity came from four external sources: Domestic customers with overseas facilities; domestic distribution partners; overseas distribution partners; and overseas customers. All four external "pulls" represent opportunity forces that are essentially unrelated to stage of product cycle. The fifth impetus for expansion was a proactive decision from internal company management.

***Domestic Customer Pull*** The global needs of large multi-national companies who are already domestic customers might be expected to be a major driver for initiating overseas activities by their suppliers. Surprisingly, only one company (Software Programming Tools #2) reports that domestic customer transfer was an important initial consideration.

***Domestic Distribution Partner Pull*** Only two companies (#6, #8) report that a domestic distribution or trading partner was responsible for initiating contact with overseas markets. None of the three companies which had important OEM partners was first pulled to international markets by their OEM partners.

***Overseas Distribution Partner Pull*** Nine of the 19 companies in the sample, and seven of the 11 which released products prior to 1988, indicate that unsolicited contact by potential overseas distribution partners caused the company's first activity outside of North America. All of these companies were initially contacted by distribution partners from one or more European countries, but only one of the partners initiating these contacts solicited responsibility for pan-European master distribution. Only one of the nine companies (#13, Network Hardware for Macintosh) reports simultaneous interest from Japan, and that was for a product introduced in 1988.

Much of this early distributor contact took place at domestic industry trade shows to which overseas distributors sent representatives specifically searching for new products. Articles or advertisements placed by manufacturers in specialized domestic technical or trade journals with overseas subscribers also provided visibility to potential overseas distribution contacts.

***Overseas Customer Pull*** Three of the companies in the sample, all of whom had introduced domestically prior to 1985, were pulled into international activity in response to specific interest from European end-customers.

***Proactive Internal Push*** This impetus represents a departure from the others in that internal company management is the driver, not a respondent to external

forces. Seven of the companies in the sample, and six of the eight that introduced during or after 1988, describe a proactive internal decision to begin exploring overseas markets as the trigger for activity. Not surprisingly, these are primarily those companies that, at the moment of domestic product release, report having specific interest in eventually exploiting global markets.

### **Age and Size at Initiation of Global Activities**

The company's age is defined here as the years a product was available domestically prior to international activity beginning, a surrogate for stage of product life cycle. Despite the scarcity of skills and firm plans, most of the companies began

<u>N</u>	<u>Timing of First Overseas Activity</u>
9	During 1st year of domestic release
7	During 2nd year after domestic release
3	More than 2 years after domestic release

doing some level of overseas business within two years of domestic product release. Those companies with specific internal management expectations of global market penetration typically began proactively seeking out opportunity within the first year ( $p=0.04$ ), while the others responded to overseas channel pull as it developed. All three of the companies taking more than two years to initiate overseas activities introduced their products prior to 1988.

The product categories show little statistically significant differentiation in either the timing or source of the initial impetus to serve overseas markets. As most of the companies initiated global activity within two years of product shipment, they tended to be fairly small at the time.

<u>N</u>	<u>Company Revenues</u>	<u># Employees</u>
5	< \$1 Million	<10
11	2-5 Million	11-50
3	> 10 Million	>100

### **Globalization Patterns**

The global activities of the sample companies following their first exposure to overseas market opportunities can be classified along two basic dimensions: territorial scope and internalization. Territorial Scope describes the nature of geographic market coverage and expansion. Internalization refers to how much of a company's global activities were internalized, and how aggressively.

## **Territorial Scope**

The expansion patterns of the sample companies range from simultaneous rollout in all major European and Asian markets to supporting a slim portfolio of overseas markets. Four sets of factors are seen to limit or affect the territorial expansion programs of the sample companies: Regulatory; platform; local market; and familiarity.

*Regulatory Factors* Four companies initially introduced communications/networking hardware products that connected directly to telephone lines, and thus were subject to regulatory approval in each country in which they were sold. In particular, entry into France, Germany, and the U.K., which would normally be expected to be major markets for such products, required substantial incremental engineering investment and intervention with local governments. In each company's case, the impetus to enter a given market was the result of an overseas distribution partner's request, and was evaluated as a distinct incremental investment. Local competitors with more experience in meeting home-country specifications were also able to develop products, and thus the global market was fragmented into individual local markets.

Scandinavia, Italy, and Japan were the only countries to show up as a major overseas market for at least three of the four companies in this category. The only company reporting a high world-wide market share (65%) in a particular regulated product-line was Company #11, and that was for its Macintosh line only.

*Platform Factors* As each product operates on one or more computing platform, the potential for territorial expansion for any company is inherently limited by the penetration of appropriate platforms in non-domestic markets.

Companies supplying the Macintosh platform were basically able to introduce their products to all markets where the Macintosh had strong penetration by broadcasting the product's availability at specialized industry trade shows and via trade journals. All of the companies with Macintosh products list Japan, U.K., Italy, and Scandinavia as consistently strong overseas markets. With the exception of the one company with a regulated hardware product (#11), France was a strong market for Macintosh products as well. These company interviewees indicate that their overseas presence maps closely with the Macintosh installed base, and that their competitive share in overseas markets maps closely with the domestic market.

It is somewhat difficult to separate IBM-PC platform factors from regulatory factors, since three of the PC products are regulated network hardware. The only clear platform effect is the absence of Japan from PC platform companies' major markets, due to the huge installed base of non-IBM-compatible NEC personal computers. U.K., France, Germany, Benelux were consistently strong markets, with

Australia, Scandinavia, and Asia also identified as receptive to PC platform companies.

Workstation platform penetration overseas seems to track advanced-market expectations very well, as most of the sample workstation product companies introduced in European, Japanese, Australian, and Asia/Pacific markets nearly simultaneously, and the U.K., France, Germany, Japan were at the top of each company's major market listings. Although the platform is well-established, Market Factors were still observed in certain product categories.

*Market Factors* Two distinct kinds of local-market factors were observed. Product Localization, the practice of tailoring products to meet specific local market conditions (as opposed to government regulation), was nearly absent. Aside from changing power supplies and engineering the product to meet increasingly universal safety standards, the unregulated networking hardware group did no product tailoring whatsoever. Most vendors of software products entered each new overseas market initially with a standard U.S. domestic product. Half of them eventually engineered some level of product localization, usually limited to supporting European and/or Japanese character sets. Nearly all companies in the sample had arranged for local language translation of key marketing materials for major markets. The two markets for which such localization seemed especially important were France and Japan, and many of the lead distribution partners in these markets took the burden upon themselves of early language localization.

The second market factor—Market Maturity—is less about customer convenience and more about fundamental product usage patterns. Although companies supplying Programming/Development Software and Technical/Engineering Software (largely for the workstation platform) experienced fairly easy simultaneous rollout and acceptance in major markets, the experience of companies supplying advanced networking products was quite different. Each of the three most advanced network system management software companies had great difficulty selling product successfully in Japan until at least two years after initiating European business development. None of the three lists Japan as being in its top five overseas markets. Similarly, three of the four advanced networking/internetworking hardware companies (the exception being the Macintosh product) report that successful Japanese market entry lagged Europe by at least two years. Although three of these four companies do list Japan as a top five overseas market now, all indicate the Japanese demand as concentrated around relatively simple network activities such as printer sharing and e-mail rather than the strategic management of network operations and distributed knowledge which has become such a hot topic in the U.S. market.

***Familiarity Factors*** The final factor limiting a company's territorial expansion manifests itself in the order of geographic market expansion. Most companies' product introduction strategies appropriately track the penetration of platforms or the readiness of markets, although some of the lag associated with entry into Japan may reflect hesitation due to the perception of unfamiliarity. Eight companies entered Japan more than one year after establishing European market channels, and Japan is the only market in which a joint venture (one company) or a third-party consultant intermediary (one company) were utilized as primary long-term market entry structures.

Familiarity seems to impact most heavily on the decision of where to invest in overseas staffing, which resulted in several cases of using the U.K. as a European beachhead. Interestingly, most of the companies initially basing European regional management responsibility in the U.K. have since moved regional headquarters into France, Germany or the Benelux countries.

Similarly, of the four companies that both list Japan as a top market and have some direct employees overseas, only two have direct employees stationed in Japan. Four companies have direct staff in Australia and six companies have direct staff in the relatively cosmopolitan cities of Hong Kong or Singapore.

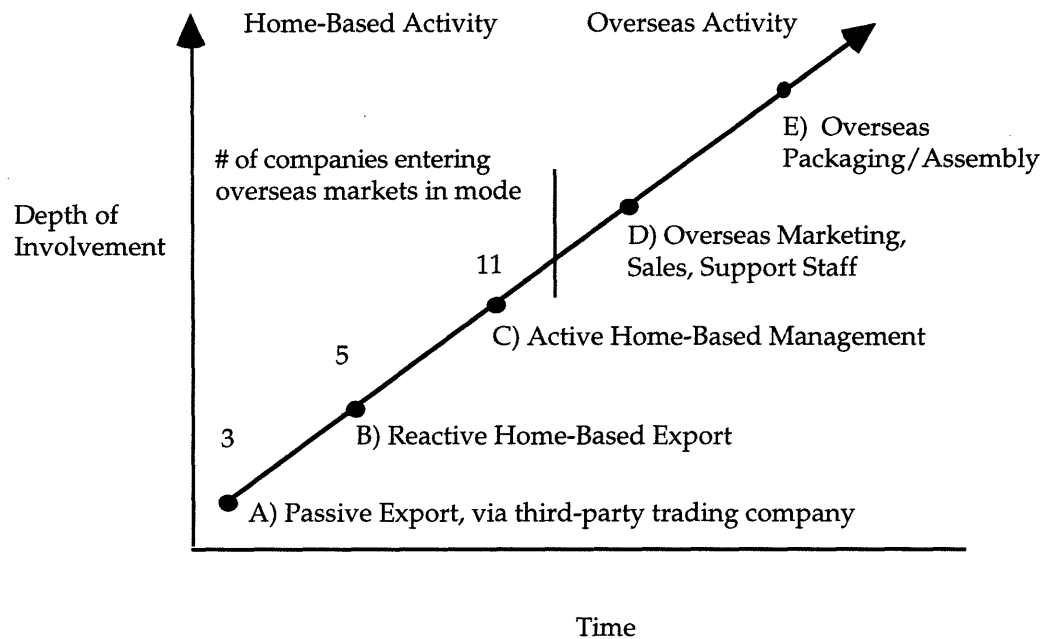
The regulatory, platform and most of the market factors discussed above are supportive indicators of external forces of global opportunities. Some elements of market (i.e., Japanese market lag) relate to Vernon's model and the familiarity issues do reflect Rugman's concerns for risk perception.

### **Internationalization**

The sample companies display several distinct operating modes representing different levels of internationalization of their global activities. Most of the companies progressed through one or more modes during the period under study. The modes of internationalization, as well as the initial mode employed by the sample companies entering global activities, are shown in Figure 2, paralleling the Figure 1 presentation of Rugman's model.

***Reliance on Third-Party Experts (Mode A)*** Three companies (#3, 6, 8) initially allocated most of the management responsibility for overseas market development to U.S.-based, third-party distribution partners, thus limiting their internalization of any knowledge of overseas markets. None of these companies surpassed 10% non-domestic revenues while operating in this mode. Of the 11 companies introducing products prior to 1988, seven of them hired the services of an outside international trade consultant to help guide global startup, even though only three of them utilized these resources as official distribution partners. Of the eight companies in

Figure 2. Initial Modes of Internationalization by the Sample Companies



the post-1987 period, in contrast, only two employed any third-party experts. The perceived value of international trade consultant expertise had clearly declined over time ( $p < 0.10$ ), as companies tended to utilize the advice of their own industry contacts rather than of international market experts. Several report relying heavily on information provided by major platform suppliers (Apple, Sun, Novell). This seems to indicate a fundamental difference in the perception of information-related risk by companies that felt they were entering a market defined by the global reach of the platform rather than the individual characteristics of local market end-users. Japan, as discussed above, was seen to be particularly different, and several companies report seeking specialized third-party advice regarding appropriate entry strategy or partner selection.

***Reactive Home-Based Support for Overseas Distribution Activities (Mode B)***

In this mode, companies typically had been directly solicited by overseas distribution partners, and had agreed to supply them with product in an arms-length, limited-support arrangement. No senior domestic-based management personnel allocated more than 50% of their time to the support of overseas activities. Although in a few cases representatives from the sample companies traveled overseas during the sign-up period, or to support specific installation activity, travel was generally light.

Five of the sample companies entered global activity in this mode, and the three that had begun by relying on third-party domestic distribution also transitioned into reactive direct support for overseas partners. Of these eight companies, the two supplying primarily the Macintosh market (#11, HW for Comm/NW-R; #13, HW for Comm/NW-U) quickly developed non-domestic revenues greater than 25% and 10% of their respective totals. The third company with a Macintosh-platform version of its core product in its line (#8, SW for Tech/Engineering) also managed to surpass 10% of total revenues while operating in this mode. None of the other five companies, four of which served largely PC-based networking applications and one of which supplied software development tools, surpassed 10%. The anomaly in the Macintosh market was attributed by all three companies to the unusually high level of sophistication and self-sufficiency displayed by the few, specialized, Macintosh-platform distribution partners that have developed in overseas markets where the Macintosh has had strong penetration (U.K., France, Japan).

*Active Home-Based Management of Distribution Activities (Mode C)* This mode of operation marks a departure from the prior modes in that senior company management identified overseas activities as worthy of internal resource allocation. As is demonstrated statistically in the later section on Globalization Performance, the investment of resources that had the highest impact was the dedication of a home-based manager to support and champion global business development. In three cases, substantial (but not 100%) personal attention from very senior company management substituted for a dedicated manager. In allocating a specific internal management person to global business development, early-moving companies seemed to select staff members with substantial experience selling their kind of products, while prior international business development experience was considered desirable but less important. Several of the individuals who successfully led globalization efforts on behalf of their companies had no specific international skills prior to taking on the coordination role. Late-moving companies, or those which perceived their globalization efforts to be proceeding poorly, tended to go outside and hire new staff with a proven track record of global success.

Other internal resources allocated to global activities by companies operating in this active mode include heavy travel expense, some limited product tailoring to fit local market requirements, and moderate levels of umbrella marketing expenses in support of overseas distribution partners.

11 of the 19 companies in the sample began their global activities in this fairly aggressive operating mode. The products supported by this more aggressive global stance from the beginning tended to be higher-priced, more complex products whose domestic distribution model were either VAR, Direct Telesales, or Direct Field Sales.



All eight companies that had previously operated less aggressively eventually transitioned into this mode as well.

Companies that operated in this mode tended to develop what one staff member called the "Primary Partner Model," in which, for each major overseas market (e.g., France, Japan) one distribution partner would be designated as the primary market interface. This partner would typically have responsibility for coordinating local marketing and sales activity, and managing additional tiers of distribution within its own market area, as well as providing ancillary support to nearby satellite markets (e.g., Spain relative to France).

***Local Management /Ownership of Overseas Distribution Activities (Mode D)***

While dedicating domestic management resources seems to have been fairly easy for the sample companies, the decision to hire or place direct employees in overseas locations remained a major risk hurdle. Not even the most aggressive companies hired direct overseas employees to manage distribution activities, prior to achieving 10% of total revenues from non-domestic sources and total company revenues in excess of \$3 million. 12 companies eventually supported varying levels of staff in overseas markets, including three companies that entered direct local market management by acquiring their primary European or U.K. distribution partners.

It is worth noting here the experience of the one company that was eventually excluded from the data analysis. This company was a supplier of modems and other regulated communications products, founded in the early 1970s, that had begun to supply to the desktop computing platforms in the early 1980s. It had largely avoided contact with global markets until the late 1980s, at which time its management recognized the global nature of the market for its products. Uniquely among all of the companies contacted for this study, this one company's entry into global markets was primarily via the direct acquisition of a U.K.-based manufacturer of networking products. Headquarters for all non-domestic activities was subsequently consolidated into the former U.K. company, and the U.S. head office performed almost no global business development activities. This company was so different from the rest of the sample, each of which had entered overseas markets with a domestic product, that we excluded it from the analyses.

The level of investment in overseas staff varies according to the companies' distribution model objectives. In most cases, the first step in going direct was to internalize the regional management and marketing coordination activities that had been performed previously by major market primary partners.

Three of the five companies that utilized VARs as the primary domestic channel invested in overseas regional management staff to coordinate support for local VAR channels, while the only distributor-model company to put local

employees in place is doing so in support of a gradual migration towards more VAR-channel activity.

Six of the seven companies whose primary domestic distribution model was Direct Field Sales hired local employees in overseas markets within four years of beginning non-domestic activities. In contrast, none of the four Direct Telesales companies invested in any overseas management structure. This result is perhaps not too surprising, as in the latter model a core of home-based telephone/fax support personnel can provide the appropriately high level of technical assistance to overseas distribution partners more efficiently than individuals distributed to each of the major markets. If, however, as in the Direct Field Sales Model, closing the sale with the end-user relies heavily on the real time, on-site performance of local technical salespeople and the availability of local support staff, a major investment in overseas employees has high leverage.

*Direct Global Investment in Other Value-Chain Activities (Mode E)* The distribution-related overseas employees and offices typically have responsibility for sales, some local technical support, and local implementation of corporate-driven marketing campaigns. Only two of the sample companies invested in overseas product assembly, and both of those investments are single plants established by hardware companies trying to be at the source of inexpensive components and low-cost labor. All other hardware companies in the sample still contract for components on the world market and perform final assembly in Massachusetts. All expect to continue to use the home plant as the manufacturing base for some time to come.

Similarly, in software only two of the companies have entered into formal local market republishing arrangements, either via direct local subsidiary or a distribution partner. The other software companies publish even tailored versions of software at home and export them.

## **Globalization Performance**

Each of the companies in the sample has followed a unique globalization path, with differing results. In addition, while several of the sample companies cited proprietary market research that they are utilizing for internal measurement of global opportunity, in general they were unwilling to share the confidential data on their specific market segments, making objective benchmarking more difficult. Finally, while the companies were quite open with information relating to revenues, very few companies were willing to share profitability information specifically related to their overseas business.

We first develop a rough anchor measure of the global market opportunity for desktop computing software and peripherals, and then assess the implications of actual company performance.

### The Global Market for Computing Equipment

Several different kinds of market information were considered in developing a rough proxy for the global market profile for desktop computing products during the period under study. The 1985 geographic distribution of the if-sold value of all computing equipment (including mainframes and minicomputers) shows the following distribution of market opportunity:<sup>15</sup>

<u>Market Area</u>	<u>%</u>
North America (including Canada and Mexico)	48
Europe (including the U.K.)	37
Far East (including Japan, other Asia, and Australia/New Zealand)	8
<u>Rest of the world</u>	<u>7</u>
Total	100

Desktop computers (including workstations, IBM-PC compatibles, Macintosh personal computers, and non-compatible personal computers such as the Japanese NEC products) were only introduced beginning in the late 1970s and early 1980s. A 1990 estimate of the installed base of desktop computers in major advanced markets, which is another way of thinking about market potential for software and peripheral products, follows:<sup>16</sup>

<u>Market Area</u>	<u>Million Units</u>	<u>%</u>
North America (U.S. and Canada)	67	62
Europe (including the U.K.)	27	25
Japan (NEC platform held 50-70% of installed base)	12	11
<u>Other Asia</u>	<u>2</u>	<u>2</u>
Totals	108	100

As the non-domestic revenues of all of the companies in the sample essentially consists of exports, another way to look at performance is to consider the U.S. computer industry's export revenue as a percentage of total revenue, again

<sup>15</sup> U.S. Department of Commerce Industry Marketing Statistics, 1985.

<sup>16</sup> Estimate by Business International, member of The Economist Group, 1990.

bearing in mind that mainframe and minicomputer equipment are included in the data.<sup>17</sup>

Total U.S. factory industry shipments	\$56 Billion
Exports (not including Canada or Mexico)	\$24 Billion
Export revenue as % of total	43%
<u>Distribution of Export Revenue from Top Markets</u>	
United Kingdom	13
Germany	12
Belgium/Netherlands	9
France	6
Japan	15
Singapore, Hong Kong	8
Australia	5
<u>All other markets</u>	<u>32</u>
Total	100

The 43% non-domestic revenue level above is relatively high in comparison to the *Inc.* and CorpTech data reported earlier. One possibility is that a very small percentage of the exporters are responsible for much of the export revenue in the U.S. Commerce sample. An alternate explanation, of course, is that the computer industry does, in fact, have characteristics that particularly encourage export trade.

**Proxy Benchmarks** The above data suggest that a small U.S.-based firm that quickly and consistently achieved 40+% of revenues from outside North America while still maintaining its overall revenue growth would be globalizing exceptionally well. Achieving 25-40% non-domestic revenues while maintaining overall growth might be a more realistic yet healthy goal in some product categories. Although none of the staff interviewed shared specific market research data, many of them confirm current internal corporate targets of 35-40% non-domestic revenues, while the goals of a few extremely aggressive companies are in the range of 50-55%.

### **Globalization Performance by the Sample Companies<sup>18</sup>**

On the whole, the sample companies were quite active in global markets. Within three years following domestic product release, four companies had developed non-domestic revenues greater than 40% of their totals and an additional

<sup>17</sup> U.S. Department of Commerce Industry Marketing Statistics, 1992.

<sup>18</sup> Readers interested in more detailed information can obtain from the senior author a series of benchmark tables -- percentage non-domestic revenues and how quickly they were achieved -- that specify each numbered company's performance in global markets, as well as the performance of various demographic subgroups.

six companies had surpassed 25%. In all, 89% (17) of the companies eventually developed non-domestic revenues consistently above 10% of their totals; 79% (15) of the companies exceeded 25%; and 32% (6) managed to cross the 40% non-domestic revenue threshold.

*Company Background Factors* Although many of the companies were pulled into overseas markets fairly early in their history, company performance was heavily dependent upon management's attention to globalization and dedication of resources. As expected in our hypothesized integrated model, companies whose management had expressed early specific interest in ultimately entering overseas markets were decidedly more effective than those whose management was either less aware of global opportunity or who purposefully adopted a "U.S. First" strategy. Ten of the 11 companies that entered global markets via home-based global managers developed non-domestic revenues greater than 10% of their total within one year of initiation, in contrast with only 2 out of 8 firms that used less aggressive entry modes ( $p=0.003$ ). Three of these 11 companies in fact developed overseas revenues greater than 25% of their total within the first year; an additional four reached the 25% benchmark within the second year of activity, and one additional company shipped more than 25% of product within the second year but saw somewhat less than 25% revenues realized due to non-parallelism in overseas versus domestic distribution structures. Fully 8 of these 11 had reached 25% overseas sales within the first 4 years of domestic product release, versus only 2 of the 8 less aggressive entrants. ( $p=0.04$ )

Even companies that transitioned from passive to active modes simply by dedicating management resources were able to accelerate greatly the pace of globalization. Of the eight companies that transitioned from less aggressive modes of operation, three passed the 10% non-domestic revenue threshold within one year of transition, and four crossed the 25% level within 2 years.

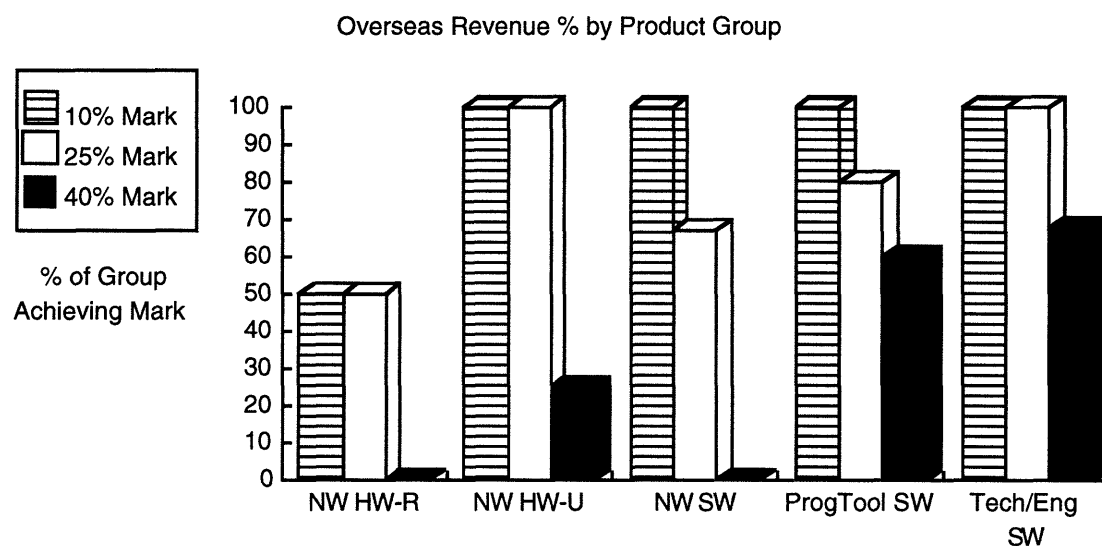
Only three companies failed to surpass 10% non-domestic revenues while operating in this mode. Two of them (#3, 10) supply networking hardware that is subject to country-by-country approval, and thus face the hurdle of expending engineering (product modification) resources as well as distribution management resources in order to support entry into new geographic turf. In addition, Company #10, because of product approval issues, did not even attempt to enter overseas markets during its first six years of extremely rapid domestic growth, and was already a \$50 million company before any substantial overseas revenues materialized. Despite the small percentages, however, both companies perceive their incremental revenues from overseas markets as profitable given the level of resources invested.

The third company (#6) that failed to surpass the 10% revenue threshold while operating in this mode had also been handicapped by its U.S.-based growth strategy, as it had initially begun its overseas activity by ceding responsibility to a third-party trading partner.

Integrating two sets of managerial factors, we divided the sample into two clusters: those companies in which the founders both had early intentions of globalization and who followed up aggressively by adopting the home-based manager entry mode (9 firms), and all others. All 9 companies with both global intent and active followup eventually achieved 25% or more global revenues versus only 7 out the other 10 companies. ( $p=0.07$ ) 5 of the 9 eventually reached 40% global revenues in contrast to two of the others. ( $p=0.11$ )

**Product Group Factors** Globalization performance was quite different for the different product categories, as shown in Figure 3. The networking-related products

Figure 3. Globalization Performance by Product Category.



on the whole show relatively lower success in global penetration. The current median non-domestic percentage for regulated networking hardware is only 15%, and two of these companies are the only sample respondents still under the 10% mark. The market-by-market approvals required of the regulated hardware were repeatedly cited as the major barrier to increasing non-domestic revenues in this group. In addition, this is the only category in which strong local competitors developed in overseas home markets, and in which low-priced product from Asian suppliers had an important major market impact.

Only one company (out of seven) in the two advanced networking categories (unregulated hardware or software) achieved more than 40% non-domestic revenues. Even the more globally aggressive among advanced networking product

suppliers were clustered between 20% and 40% non-domestic revenue, with advanced hardware suppliers able to achieve the 25%+ level fairly quickly (within 2 years) while those advanced software suppliers that did reach 25% did so more slowly (3-7 years). Three of the companies supplying relatively sophisticated networking or internetworking products report explicit internal company expectations of 28-35% non-domestic revenues as being an appropriate equilibrium state.

This lower degree of globalization by this group of companies seems consistent with a diffusion lag in the less-mature overseas markets alluded to by several respondents: the advanced networking hardware backbone is first installed for basic connectivity, and then more sophisticated software is required as consumers become more familiar with highly networked operations. U.S.-based customers with overseas subsidiaries, while not necessarily the initial source of globalization, were nevertheless mentioned several times as important in introducing these more advanced networking technologies into overseas markets.

The apparent lower degree of maturity in overseas markets did not, however, affect the global nature of the advanced networking product competition. All of these three companies (each serving different product segments) feel themselves to be in worldwide head-to-head competition with one or two other U.S.-based suppliers, and have quite good information on both their own worldwide marketshares and on their competitors' non-domestic revenue levels.

Two software product categories—Programming Tools and Technical/Engineering—show relatively high degrees of globalization, as 63% of the companies in the two groups combined achieved the 40% level, while 88% are above the 25% level. The median company in these two categories combined currently derives 35% of revenue from overseas markets, well above the 25% median for the entire sample.

With the exception of the specialized text database supplier (#4), all companies in these two categories feel that they are engaged in global competition with one or several other major players, each of which is present in most major markets. Interestingly, Technical/Engineering Software is the only category to report the strong major-market presence of products from non-U.S. (specifically French) suppliers.

***Distribution Business Model Factors*** Globalization seems related to how quickly and effectively a company is able to create an overseas distribution structure that approximates its domestic business mode. VAR-channel companies seem to globalize more quickly than the two direct groups ( $p=0.07$ ), reflecting the fact that a company structured to support domestic VAR channels is equally well-structured to

support the early overseas VAR channels with which they come into contact without expending too much incremental effort.

The Direct Field Sales model, in contrast, requires intimate contact between highly trained technical sales people and informed end-users, and the primary partner distributors initially engaged represent both a communications buffer and a reduction in net revenue. The Direct Field Sales companies required allocation of a larger proportion of internal resources in order to attack overseas markets effectively by replacing the buffer layer, and thus took longer to ramp up.

A compelling illustration of how important matching the business model was to globalization success is found in a comparison of two companies within the same distribution group:

- Company #15 sells highly complex and novel Technical Engineering Software via domestic Direct Field Sales. It hired its first international business development manager in advance of domestic product release. He was given the charter of building the overseas business base, initially via distributors, but also by personally visiting key overseas end users to facilitate going direct as soon as possible. This company achieved 20% non-domestic revenues within 1 year, 30+% in the second, 40+% in the third, and equilibrated at 35-40% non-domestic revenues (achieved through an ever-expanding investment in overseas field sales offices) while maintaining its overall explosive company growth.
- Company #6 sells highly complex Network System Software, also largely via a domestic Direct Field Sales force. It initially gave globalization responsibility to a third party trading house, and only dedicated an internal manager of global business development after five years of neglect. By that time, of course, growth in non-domestic revenues trailed domestic growth by a great margin, and it took three more years to build non-domestic revenues to 10% of the total. This company's only major rival (not in the sample), in contrast, established itself aggressively and effectively in overseas markets, and continues to enjoy both high overseas market share and a high non-domestic revenue percentage despite the fact that its product is substantially behind that of Company #6 in the U.S. market.

Similar contrasts were found within the other three distribution groups, with company globalization success being intimately linked to how effectively a company was able to approximate its domestic business model in key overseas markets.

## **Discussion and Conclusions**



The globalization performance of the companies in the sample suggests that small companies supplying desktop computing products both can and do globalize more rapidly and compete more effectively in global markets than is predicted by the traditional models of global expansion. 21% of the sample companies currently derive more than 40% of revenue from overseas markets. 47% are in the 25-40% band, while 21% are between 10-25% and only 11% have not yet achieved 10% non-domestic revenues.

### **Vernon's Product Cycle Model**

The sample companies represent five major product groups. With the exception of the regulated networking hardware products, U.S.-based companies dominate these product segments in every major global market, a state reminiscent of the post-war era for which Vernon's Product Cycle model provides an effective description of the transfer of U.S.-developed innovation to global markets. The globalization experiences of the advanced networking product suppliers, which indicate a definite time-lag between market acceptance in Europe and market acceptance in Japan, provide limited support for a product cycle explanation of overseas market development or technical product diffusion.

A core assumption of the product cycle model, however, largely not reflected in the behavior of sample companies, addresses the eventual transfer of *production* to overseas markets, and the subsequent importation of overseas-produced goods for domestic consumption. Only two of the sample companies (both networking hardware suppliers) have yet set up true overseas production facilities, from which they coordinate supply to all (not just U.S.) markets. The only software companies to enter into overseas production (in the form of republishing) did so specifically to tailor local language and features, and do not have any use for the foreign-produced product in domestic markets.

Most of the other companies, even those that produce language- or feature-localized products, do so from their U.S. base, and expect to continue doing so. One company indicates that it is considering establishing a European design staff to aid in developing pan-European products and to absorb specialized market knowledge on European usage of ISDN telecommunications technology. But its production of such European-specific products will still be centralized at the U.S. home base.

Thus "traces of the product cycle model" can in fact be seen in the globalization by the sample companies, as Vernon had expected. But the nature of the goods supplied by these companies, combined with the relatively low percentage of cost represented by transportation, seems to have greatly mitigated the impetus to transfer production activities, and thus much of the product cycle model's

explanatory power. Perhaps it is still too soon in the life cycles of most of the sample firms for overseas production to occur.

### **Rugman's Internationalization Process**

Each of the emerging firms selected for this study was organized specifically to create and appropriate technological and product advantage. Consequently they might well avoid the initial licensing step suggested by Rugman et al. (see Figure 1), but otherwise could reasonably be imagined to fit the Internationalization pattern. Yet the globalization behavior of the sample companies is also at odds with what would be expected under Rugman's model.

Where he suggests companies would proceed slowly into overseas markets, most companies in the sample were active within two years—many pulled by eager overseas partners. Where he suggests a cautious, incremental deepening of involvement based upon initially relying on outside experts and then slowly acquiring internal market familiarity, more than 50% of the sample companies began their global activities in what has been described as operating Mode C (dedicated home-based resources), and six of the companies were operating in Mode D (local overseas distribution staff) within four years of initial domestic product release.

In fact, the experiences of the sample companies clearly suggest that the more quickly and aggressively companies internalize their global distribution activities to a structure approximating their successful domestic models, the higher the rewards. At the same time, the global nature of the desktop computing environment means that too much caution might actually expose a company to an substantial late-mover opportunity cost risk in overseas markets.

The three companies that followed Rugman's cautious, incremental model by initially placing their overseas development activities in the hands of outside experts suffered poor global returns. All of the companies that either entered late or in a mode poorly matched to their domestic structure both lag their product-group counterparts in the sample, and know of more aggressive U.S.-based direct competitors that are consistently achieving a higher percentage of revenues from overseas markets even if their core products trail those of the sample companies in the U.S. market.

### **The Integrated Globalization Model**

The sections on Globalization Patterns and Globalization Performance communicated many external forces that molded the non-domestic revenue market opportunities. Most significant were the positive effects of the desktop computing platforms and the negative effects of regulatory factors in some markets. In

particular the existence of standardized global operating platforms has both accelerated the timing of overseas exposure and mitigated many of the risks Rugman emphasizes as associated with overseas market expansion.

*Accelerated Overseas Exposure* Nearly all of the sample companies report extremely early (within 2 years of product release) contact with overseas customers or distribution partners. While part of the early contact may be the result simply of the generally improved global communications infrastructure and reductions in transit and travel costs, the desktop computing industry trade shows and trade journals that concentrate on specific platform environments particularly facilitate the mutual discovery of early market opportunity. Thus, with the exception of regulated products, companies tend to be forced into making active sell/no-sell decisions quite early in their histories.

*Reduced Market Information Risks* At the same time, supplying products that operate within a standard platform seems to reduce the market information risk traditionally associated with small companies moving into overseas markets. A company supplying a Macintosh- or Sun-compatible product can think of its customers as platform-users first and overseas-"different"-users second. Companies (except for regulated hardware suppliers) successfully entered most overseas markets with domestic versions of their products, and only moved towards localized market tailoring to deepen market penetration and/or to raise the entry cost for new competitors. The knowledge of domestic-based third-party trading experts thus became inherently less valuable for platform-compatible goods, and, as an additional boundary layer between supplier and customer, third-party traders actually retarded globalization.

The fact that platforms exist, however, does not entirely eliminate market information risk, as can be seen in the experience of both the regulated hardware suppliers and the advanced networking system product suppliers. In the case of the regulated hardware group, market-by-market regulatory approvals require substantial investment in local information regarding both standards and approval processes, as well as product modification engineering expenses. In the case of advanced networking system product suppliers, knowledge about the specific development or maturity of individual overseas markets is needed in order to evaluate expansion potential. Because of the highly integrated nature of platform-specific products, and the fact that the platforms are predominantly supplied by U.S.-based companies, even suppliers of advanced networking products can acquire relevant overseas market information by contacting domestic industry (not trading) resources. Several of the respondents indicate that their expansion programs had been tailored specifically in response to feedback that they had solicited from the

U.S.-based platform suppliers (e.g. Apple, Sun, Novell) with which their products operate.

***Reduced Distribution Partner Investment Risks*** The development of standardized platforms also has encouraged the growth of technically competent overseas local distributors, and mitigated some of their own risk in investing in relatively high levels of sales and trained technical staff. The penetration of a platform into a local market is quickly followed by a host of software and peripheral products, so that even if the main platform suppliers had wholly-owned local channels, there is plenty of opportunity for independent distributors to collect a large portfolio of compatible products. By holding a portfolio of products that all rely on the same operating systems and connections, these distribution companies can justify investing in a more robust total staff than in the more classic trading company distribution situation in which each product in the company's portfolio requires a unique set of sales and support skills. At the same time, companies holding a portfolio of platform-related products can also afford to take on distribution for the new product offering of the small startup companies typically innovating in this market. Incremental staff investment is low, and thus the financial risks associated with supplier failure are small.

These well-staffed, specialized distributors in each major market typically became the initial "primary partner" for the sample companies. Because the primary partners could invest in a relatively robust staff, they were also able to provide additional marketing coordination and sales support for companies not yet ready to invest in overseas staff. Even small U.S.-based companies were able to contract for these services through the granting of additional discount levels, and thus exert a more direct influence over their overseas performance. As shown previously, however, the need to create an overseas business model approximating the domestic model dictates how long a company might rely upon arms-length regional coordination before internalizing these functions through overseas direct staff.

***Managerial Readiness and Assertiveness*** The statistical analyses demonstrate that the primary differences among companies in their globalization success were due to management factors. Founder international experiences and sensitivity provided critical underpinning for global programs. Senior management willingness to commit resources to non-domestic markets display significant consequences. More aggressive modes of foreign market entry pay off dramatically. Combining these managerial characteristics leads to eventual global market participation rates far in excess of companies with less integrated international intent and commitment.

## Summary

This study of 19 Massachusetts-based companies has shown that unique aspects of one emerging high-technology industry, desktop platform-based computer hardware and software products, result in a vastly accelerated globalization pattern—not deterministically leading towards overseas production activities—that is inconsistent with traditional expansion models. These unique features include: goods with extremely high value-to-transportation-costs; rapid supplier exposure to overseas markets; lowered market-familiarity information risk on the part of emerging suppliers; and the development of easy access to well-qualified distribution partners in major overseas markets. The authors' alternative integrated model, building upon both Vernon and Rugman, shows far better explanatory power than the traditional approaches.

The study was, of course, conducted on a small, non-random sample, and was primarily concerned with exploring globalization behavior in order to identify patterns and trends. Clearly there is opportunity to follow up by designing a more statistically robust sample—stratified by industry groupings and by geographic region—in order to conduct a more extensive and rigorous analysis of globalization in emerging high-technology industries.

In addition, only very gross measures of globalization were utilized here, and no attempt was made to link a company's rapid development of high percentages of non-domestic revenues with other measures of success, such as overall growth, overall profitability, or stock market performance.

The managerial implications for emerging companies are nevertheless compelling, however, as globalization behavior has clearly become an ever more important component of emerging company performance. Even tiny suppliers of platform-based products were able to globalize quickly and effectively, primarily by allocating a moderate level of highly-leveraged internal resources. Furthermore, companies that did not respond effectively to their initial exposure to overseas markets risked falling behind their more globally aggressive competitors. At the same time, each company determining its globalization strategy must consider, within the context of its own business model and product/market space, the ultimate level of resources dedicated to support overseas expansion, the level of internalization of global activity, and the expected equilibrium levels of overseas revenues.

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## Appendix: The Sample Companies

The sample companies were selected specifically to have been founded or reborn around products aimed at the workstation or personal computing markets. Table 1 lists the companies in order of the U.S. release date of the first core product (terms are defined in the sections that follow):

Table 1. Principal Characteristics of the Desktop Computing Sample.

<u>ID#</u>	<u>Date of Startup</u>	<u>USRel</u>	<u>Source of Funds</u>	<u>Hardware or Software</u>	<u>End-Use Product Category</u>	<u>Primary Comp. Platform</u>	<u>Prim. Domestic Dist. Channel</u>
1	1980	1982	VC	HW	Comm/NW(R)	PC	VAR
2	69	83	Consulting	SW	Programming Tool	WS	Direct FieldSls
3	84	84	Private	HW	Comm/NW(R)	PC	DirectTel(VAR)
4	84	84	Consulting	SW	ProgTool(Special)	PC	VAR
5	83	85	VC	HW	Comm/NW	IN	VAR(OEM)
6	83	85	VC	SW(HW)	Comm/NW	PC/IN	DirFS(VAR)
7	82	85	VC	SW	Programming Tool	WS	DirFS
8	84	85	Private	SW	Tech/Engineering	WS/PC/MAC	DirTelesales
9	86	86	Private	SW	Comm/NW	PC	DirFS
10	77	87	VC/Rebirth	HW	Comm/NW(R)	PC	Distrib(OEM)
11	85	87	Private	HW	Comm/NW(R)	MAC	Distributor
12	86	88	VC	HW	Comm/NW	IN	VAR
13	87	88	VC	HW	Comm/NW	MAC/IN	DirTel(Dist)
14	86	88	VC	SW	Programming Tool	WS	DirectFS
15	85	88	VC	SW	Tech/Engineering	WS	DirectFS
16	89	89	Private	HW	Comm/NW	WS(Sun)	VAR(Dist)
17	74	91	Priv/Rebirth	SW	Programming Tool	WS	DirectFS
18	82	92	Priv/Rebirth	SW	Comm/NW	PC(Novell)	VAR
19	91	92	Private	SW	Tech/Engineering	WS/PC	DirTel

**Funding Backgrounds.** Nine of the 19 companies received funding from professional venture capital (VC) firms prior to or concurrent with domestic product release, while the rest were funded by the founders and other private investors. Two of the companies developed and launched commercial products from a consulting business base. Three of the companies had been reborn around new core products after exiting prior product lines.

**Product Categories.** The eight hardware and 11 software products initially introduced by the sample companies fall broadly into three categories: Communications/Networking Products (11); Programming/Software Development Tools used by professional programmers (5); and Technical/Engineering Software Tools used by professional engineers (3).

The 11 products aimed at Communications/Networking applications may further be classified by the nature of their interface with the target country's

telecommunications infrastructure. Four of these hardware products directly plug into telephone lines (e.g. modems), and thus are subject to regulatory approval by federal communications authorities (tagged "R" in Table 1). The four other hardware products and the three primarily software products are not subject to any approvals.

Thus, from Table 1, the overall sample consists of five product groups:

<u>N</u>	<u>Product Category</u>	<u>Company ID #</u>
4	HW for Comm/NW-Regulated	1,3,10,11
4	HW for Comm/NW-Unregulated	5,12,13,16
3	SW for Comm/NW	6,9,18
5	SW for Programming/Development	2,4,7,14,17
3	SW for Technical/Engineering Applications	8,15,19

**Primary Computer Platforms.** Desktop computing encompasses a number of platforms or operating environments. Nine of the products operate on IBM-compatible personal computers (PC). Three products are for Macintosh computers (MAC). Nine products are aimed at workstations (WS). Four products were specifically designed to aid in interconnecting networks of various computers (IN). The categories overlap somewhat, as several of the products were released for multiple computing platforms.

**Domestic Distribution Channels.** As indicated in Table 1, the domestic distribution channels used represent a wide mix of distribution models.

**Direct Field Sales** Direct Field Sales describes a sales force, employed by the manufacturer, that routinely visits potential customers to make on-site presentations and meet with the various customer buying influencers. The sample companies that invested in developing a domestic Direct Field Sales force (#2, 6, 7, 9, 14, 15, 17) tended to be selling products that were rather expensive, that created new product categories or pioneering applications, and/or had high strategic importance or organizational impact for the end-user. Seven of the 11 software products were sold predominantly via a domestic Direct Field Sales force. No hardware product in this sample was sold via Direct Field Sales.

**Direct Telesales** In Direct Telephone Sales an employee of the manufacturer delivers his/her sales pitch via a phone call from the home office. It is a less onerous investment in wholly-owned sales resources, but nevertheless allows the manufacturer to retain complete control of both demand generation and customer contact. Domestic Direct Telesales (companies #3, 8, 13, 19) were generally employed for products with well-defined functional bounds—not requiring major



organizational or cross-functional coordination at the customer site—but which were sold on the basis of complex technical performance, and thus required deep product familiarity and expertise on the part of the salesperson. Two of the three Technical/Engineering software products relied domestically on Direct Telesales, as did two of the hardware products.

***The Value-Added Reseller Channel*** Value-added Resellers (VAR) are third-party companies that specialize in combining technical products from different manufacturers with their own product offerings and providing customers with an integrated turnkey solution. Utilization of the VAR channel thus means that the manufacturer has invested fewer resources in the sale and has ceded substantial ownership and control of the customer relationship to the VAR partner.

VAR channels were typically utilized by the sample companies when applications for their products were fragmented into many specialized niches that require specific expertise, particularly in configuration and installation. Two of the software companies in the sample depended primarily upon domestic VAR channels (#4, 18), while two other software companies supplemented their Direct Field Sales with application-specific or market-specific VAR partners. Four of the hardware suppliers concentrated on VAR channels (#1, 5, 12, 16).

***Distributors*** The large national distributors, which resell both to large end-users and to dealers and retail channels, represent an even larger separating layer between the manufacturer and the customer. Distributors were the primary domestic channels utilized by two hardware companies (#10, 11), each of which supplied well-defined, relatively lower-price products that were sold primarily on the basis of features and specifications.

***Original Equipment Manufacturer (OEM) Channels*** Supplying a large Original Equipment Manufacturer (OEM) partner with a product completely separates the manufacturer from the product-using market by replacing the manufacturer's brand with the partner's, and employing the partner's sales channels. Three of the hardware manufacturers in the sample had important domestic OEM partnering arrangements at various stages, but OEM revenue did not consistently represent more than 30% of any company's revenues.