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Models for Internationalization of Software

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by

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Abstract

This project reviews several business models for the internationalization process and conducts a study to see whether these models hold for the packaged software industry. The study involved collecting and analyzing data on the international activities of software firms. After comparing the results to the predictions of the models explanations were presented for the discrepancies.

1.0 Introduction

The software industry has gone through a number of dramatic changes. The separation of hardware vendors and software distributors took place in the 1970's creating the first independent software firms. The explosion of desktop computers in the 1980's made it possible for software companies to move away from custom software, into packaged software. Finally the establishment of the Internet enables sharing of resources, distributed development and a common means of communication across countries. Enabling faster sales, distribution and more efficient marketing.

The United States was the first country to experience the rapid growth in the packaged software market (Mowery 1992). The government provided generous funding to emerging hardware and software, and as a result jumpstarted development. Microsoft and IBM were able to establish widely accepted operating systems, what where later exported to other countries. This gave the US the "first-mover" advantage. Currently the United States is by far the largest exporter and consumer of packaged software. In 1992, it had about 87% of the world's software market.

Western Europe consumes about 41% of the world's packaged software, while producing only 16%. Their lack of software production can be traced back to a failure to produce successful hardware systems in the 1970's and 1980's. While American software companies benefited from close communication, backing and integration with hardware manufacturers, European firms were lacking these resources. They would often receive hardware specifications up to a year latter then US counterparts (Malerba,Torrisi 1992).

The Japanese software industry suffered from conflicting hardware standards, and as a result is dominated by custom software oriented firms (Cottrell 1992). The market for custom software in Japan is far greater than the market for packaged software, about 80% in 1990. This situation has limited the Japanese entrance into the international software market. It also cuts down on packaged software consumption in Japan. The majority of Japanese software is produced in house, and is industry, and often firm specific. Nevertheless, with the growing dominance of Windows and other standards, its packaged software market is growing fast. As of 1993, they accounted for 11 percent of the worldwide market for packaged software, while only contributing 4 percent to the market. This makes Japan the third largest market in the world.

It is plain to see that the current situation is strongly biased towards the exporting United States software firms. The United States has the advantage of overwhelming market dominance. The worldwide market for packaged software is equal to about double the current domestic demand and growing fast. Therefore if a software firm successfully enters international markets, it will greatly increase its revenue.

Understanding how a firm progresses from a domestic software supplier to an international competitor is important for a number of reasons. A country could better promote exports through government programs if it understands how firms enter foreign markets. Firms can identify key resources, and skills needed before embarking on international projects. Managers can focus on improving and speeding up the internationalization process, once it has been understood. Therefore it is worthwhile to explore the current theories on the foreign market entry of companies.

Chapter 2 defines the two most popular and accepted models of firm internationalization. Each model predicts, based upon its concepts and variables, a distribution of data. The implications of these predictions are also discussed. Critiques of both models and possible extensions are presented in chapter 3. The possible methods for applying the models are weighed, and a thorough description of the data collection process is given in chapter 4. The data is analyzed and explained using the models, and arguments are made for possible extensions to the model in chapter 5. Chapter 6 presents the final conclusions.

2.0 Models of Internationalization

Researchers have attempted to describe the process of internationalization of a firm using explanatory models. Two of the most prominent and accepted models are the Uppsala International Model (U-Model), and the Innovation-Related International Model (I-Model). Both models are genetic or historical explanations, because each particular state or condition is explained in terms of some prior sequence of states or conditions (Andersen 92). Each model takes a different approach.

Often the I-Model is characterized as a behavioral model, it focuses on the individual and his behavior in adopting the practices needed to enter a foreign market. The main concept of the U-Model is a dynamic feedback relationship between a firm's commitment to, and knowledge of, a foreign market. The following sections give a detailed description of the two models and their implications.

2.1 U-Model

Developed at the Uppsala University, Uppsala International Model was pioneered by (Johanson,Vahlne 1977), through empirical observation of Swedish manufacturing firms. Its main assertion is that internationalization is an incremental process. Total internationalization of a firm is the product of a series of incremental decisions, the model identifies elements shared in common by the successive decisions.

At a given point in time, a company is at a certain stage of internationalization, this is termed the state of the firm. The state is defined by two factors:

1. Resource commitment to the foreign market.
2. Knowledge about foreign markets and operations.

The current state and a number of variables determine the change from one state to the next. This creates a dynamic model, where the output of one cycle of events is the input of the next cycle of events. Equation 1 represents this relationship.

$\triangle I = f(I, \ldots)$ where I = state of internationalization.
Equation 1

Commitment of resources is defined as the amount of resources committed, and the degree of commitment, that is the, the difficulty of finding an alternative use for the resources and transferring them to it. An example of highly committed resources would be employees located in a foreign country specialized in the development of foreign markets. Local engineers in a central engineering group producing for a specific market is also a resource commitment, but to a lesser degree, because they can more easily be

shifted to another project. The commitment of resources to the foreign market is a good indicator of the firms perceived opportunities and risks in the market.

The knowledge of the foreign market can be broken down into three areas:

1. Present and future demand and supply
2. Competition and channels of distribution
3. Payment conditions and transferability of money

All three vary from country to country, and often over time. Such knowledge is often called experiential knowledge, because it is only through experience that it can be gained. Conversely, objective knowledge is knowledge that can be taught, and learned through other means such as marketing reports, and classes. Objective knowledge is of lesser importance. Experiential knowledge provides the framework for perceiving and formulating opportunities in foreign markets.

We can further break down experiential knowledge into two categories, general and market-specific knowledge. General knowledge consists of marketing methods, production processes and common characteristics of certain types of customers in an industry. Not local to any geographic location, general knowledge can often be transferred from market to market. Market specific knowledge is localized to a specific national market. Examples of market specific knowledge are cultural patterns, market structure, and characteristics of individual firms and their personnel. As we will see, market knowledge plays a major role in the internationalization process

The change from one state to the next is determined by the current state, and a number of change factors, the change aspects considered are:

1. Decisions to commit resources.
2. Performance of current business activities.

Often a lag exists between the commitment of resources and their results in performance of current business activities. For example, it may take months before the introduction of a product generates any useful feedback. As the lag time increases, so does the commitment of the firm. Current business activities are also the prime source of experiential knowledge. It is through active participation in a foreign market that a firm gains knowledge of the market, and its unique interaction with it.

There is a direct relation between market knowledge and the decision to commitment resources. Knowledge can be considered a resource, the more market knowledge gained the more valuable the resource, hence the greater the commitment. Furthermore commitment decisions are made in response to perceived risk and uncertainties of the market, see Equation 2.

CI =Existing market commitments
Ui = Existing market uncertainty
Ri = Existing market risk
RI = Maximum tolerable market risk

$Ri = Ui * Ci$
$\triangle Ri = Ui * \triangle CI > 0$
Equation 2.

A firm will typically increase commitments to a market in an incremental fashion until $R_i = R_I$. These decisions are termed scale-increasing decisions, because they increase the scale of operations in the foreign market. It is important to note that the uncertainty of the market is not effected directly by scale-increasing decisions. However a decline in uncertainty can be the result of an increase in market knowledge as a result of the

acquired market experience. An increase in market knowledge does not always translate to a decrease in uncertainty. An unstable market, where competition and political factors are constantly changing, may lead to a rise in uncertainty as market knowledge increases.

The maximum tolerable market risk (R_I) is a function of the firm's resources, and willingness to commit the resources to international endeavors. Changes to R_I or R_i, through scale increasing decisions for example, can lead to a situation where the current market risk is greater than the tolerable market risk ($R_i > R_I$). This is when an uncertainty reducing decision is made, see Equation 3.

$$\Delta Ri = \Delta U_i (C_i + \Delta C_i) + \Delta C_i * U_i < 0$$

Equation 3

This represents an increase interaction and integration with the market. Contrary to a scale-increasing decision, this has the effect of reducing the existing market risk. An example of such a decision would be increasing communications with customers or the take over of customers. The change in uncertainty is a result of the greater integration of the market and firm.

The above framework allows us to describe the basic mechanism of internationalization as a dynamic interaction of the state and change variables, this is illustrated in Figure 1.

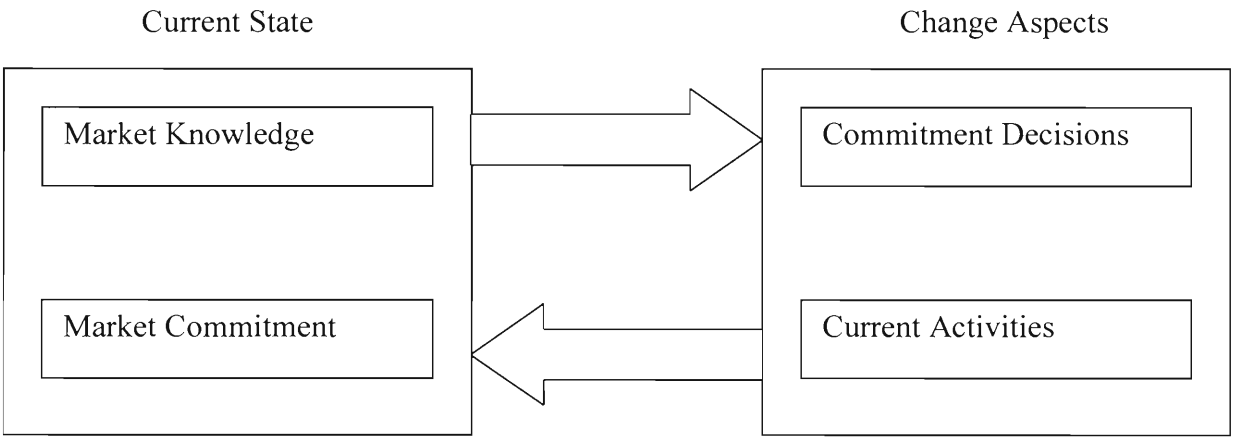


Figure 1.

Market knowledge plays a key role through its determination of the uncertainty, and hence the risk in the international market. The risk and current market commitments are the two factors driving the commitment decision as explained in equation 2 and 3.

The model also predicts an establishment chain, a rough definition of the typical stages a firm will go through in internationalizing its operations. The starting point is no exporting then the use of an independent representative in the foreign country, establishment of a sales subsidiary, and finally foreign production sites.

Stage 1: No regular export activities
Stage 2: Export via independent representatices, (agents)
Stage 3: Establishment of an overseas sales subsidiary.
Stage 4: Overseas Production.

A firm need not go through each stage incrementally for each market, because some knowledge of international operations can be transferred from market to market. Specifically general knowledge and objective knowledge are not market specific. This explains how large firms can expand quickly into multiple foreign markets at the same time.

2.1.1 Implications and Predictions of the U-Model

If we assume the U-Model to be an accurate explanation of the internationalization of a firm, then some predictions can be made. First, for a firm to be

international, it must be mature and experienced. It must evolve into a multinational corporation over time, by progressing through predefined stages. Only under special situations can a firm skip stages (see chapter 3.0), and these conditions do not apply to small startups. Therefore it follows that young startups with little experience will rarely enter foreign markets.

We can also summarize that small firms with little resources will internationalize slowly, if at all. This prediction is extrapolated from equations 2 and 3. The maximum tolerable market risk (R_I) is a function of the firm's resources. A firm with fewer resources will almost always have a lower R_I. Because commitment decisions can only be made when $Ri < R_I$, fewer commitment decisions will be made than by company with a larger R_I. Therefore the business activities in a foreign market are limited. Such business activities are the main source of market knowledge, hence less market specific knowledge is acquired. The end result is that a firm with more resources will internationalize faster than one with less.

2.2 I-Model

The Innovation-Related International Model or I-Model was pioneered by (Bilkey,Tesar 1977) and refined by (Cavusgul 1980),(Czinkota 1982),and (Reid 1981). It treats the internationalization process as an innovation of the firm. It is a behavior model in nature, in that it is an attempt at explaining the behavior and growth of a firm. At the core of the model is the learning sequence or the individual decision-maker in connection with adopting the innovation (Andersen'92).

The major focus of the model is on the decision-makers of the firm. The individual, who decides the firm's approach to the internationalization, is the center of the model. The main elements of the model are the individual's knowledge, export attitudes and how they effect the method of foreign entry, choice of country, and recognition of potential opportunities.

It is only applicable to the small to medium sized firm, as opposed to the U-Model, which is more applicable to larger firms. This is so because the individual manager has a greater effect in a small corporation. The larger firms have policies, procedures, and bureaucracy that get in the way of the individual decision-maker and his or her plan of adopting a foreign market strategy

The model describes the export expansion process as a five-stage hierarchy. The stages can be described as a learning sequence. The five stages are:

1.Export Awareness
2.Export Intention
3.Export Trial,
4.Export Evaluation
5.Export Adoption

Some external force, such as request for foreign orders, or an internal desire to expand operations brings about the first stage, export awareness. The latter stages are progressed in a sequential manner, and are fully described in Figure 2.

	Export Adoption Stages	Decision Maker Variables involves	Firm
Stage 1 Export Awareness	Problem or opportunity recognition, arousal of need	Past experience export related or not; type, level & amount of foreign information exposed to, and associated individual characteristics, unsolicited foreign orders.	Past firm performance, reputation, and visibility.
Stage 2 Export Intention	Motivation, attitude, beliefs and expectancy about export contribution	Expectations from entry into foreign market, foreign market orientation, export orientation, and underlying attitudes toward foreign involvement	Managerial goals and existing firm resources
Stage 3 Export Trial	Personal experience with limited exporting	Sought foreign orders through search of foreign markets	Unsolicited foreign orders existence of available managerial and financial resources
Stage 4 Export Evaluatio	Results from engaging in exporting	Profitability, sales stability	Results from engaging in export behavior
Stage 5 Export Adoption	Adoption of exporting/rejection of exporting	Export expansion activity shown by continued export growth as: (1) increased exports and percentage of sales; (2) continued entry into new markets; (3) continued absolute export growth; (4) continued introduction of new products into export markets.	

Figure 2.

A firm can be categorized into each stage using a set of criteria. The criteria are used to measure the foreign market orientation of the firm, and the current stage of internationalization. The criteria considered are:

1. Past export volume
2. Absolute export volume
3. Length of export experience
4. Type of countries exported to
5. Number of export customers
6. Number of export transactions
7. Manpower commited to exporting

The criteria are only used to classify the firm, no explanation is given, and no prediction can be made about the transition from one stage to the next (Anderson'92).

Like the U-Model, the I-model is a behavioral model. It is focused on the behavior of the decision-maker, and his adoption of the international process. Characteristics of the decision-maker that are considered include attitude, experience, motivation, and expectations. These characteristics determine the firm's engagement in foreign markets.

2.2.1 Implications and Predictions of the I-Model

The model stipulates that small firms are capable of entering foreign markets successfully, in fact its objective was to explain the empirical evidence generated from a sampling of small to mid-sized manufacturing firms. It found that of those exporting, the personal experience, and attitude of the corporate decision-makers, be they a board of directors, or a single manager is vital.

Experience has a much broader definition in the I-Model, than in the U-Model. Foreign experience is gained through living in, doing business in, and even studying in a foreign country. It has been shown that mangers who have such experience obtain foreign sales sooner, and progress through the stages faster (Reuber,Fischer 1997). We can deduce from this that a young small firm's capability to internationalize is determined by the experience of its decision-makers. There should be a direct relationship between small, young exporters, and decision-makers with foreign experience.

In addition, the firm will only enter the foreign market that the decision-maker is familiar with. It is unlikely for an individual to have extensive experience with more than one country. Therefore we can also make the assumption that such a firm will only export to a specific market. It is of course reasonable to assume international operations will expand into other markets, but this expansion takes time. Entry into additional markets is characterized in stage 5 of the model, which represents the complete adoption, or rejection, of the internationalization process. Adoption of the process takes time, a firm must progress through all the previous stages first. A young firm that is distributing to more than one market should be very rare.

3.0 Criticism of the Models

There exists some debate as to how applicable the two models are to the explanation and prediction of foreign market orientation. The I-Model claims to be only applicable to the medium to small firm (Bilkey, Tesar 1977). This is due to the use of only small and medium size manufacturing firms in its empirical sampling. U-Model

makes no statements about firms it is applicable to, yet it has focused its empirical evidence on large corporations (Leonidou , Katsikeas 1996).

It has been claimed that a rapidly changing international environment has left the two models obsolete (Sharma 1996). The current business environment has changed over the two decades since the models original inception. Such changes include:

1. Increased speed, quality and efficiency of international communications, and transport.
2. Homogenization of many markets in distant countries,
3. Business executives and entrepreneurs have been exposed to international business.
4. International financing opportunities are increasingly available
5. Human capital is more internationally mobile.

It is argued the above factors have made it possible for smaller firms to compete with larger firms. Resulting in firms that are able to disregard the incremental process of internationalization (Oviatt and McDougall 1994). Such firms would not fit into either U-Model, or I-Model, because both models are based around an incremental expansion into foreign markets.

The above criticism is particularly important to the software industry, and has been explored by the work of Reuber and Fischer (1994). They examined small and medium sized Canadian software firms that have shown to be international from the start, or have engaged in international sales early on.

The study concludes with a number of important results. Firms that have an internationally experienced management team often result in the earlier use of foreign partners, and a shorter delay in obtaining foreign sales. This result is in line with both models, which place a great deal of importance on international experience. Other results of the study do not fit in the models so easily. The most prominent is that firm size and

ages are not determinants of the firms' capacity for internationalization. Other researchers such as Bonaccorsi (1992) and Calof (1994) support this statement.

This poses a problem for the models because the models are incremental in nature. If a firm is able to internationalize early, or from startup, the firm has skipped the prescribed stages of development. Some conditions have been given in the U-Model to explain how firms can expand vigorously into foreign markets, and skip development stages (Johanson, Vahlne 1990)

1. Firms with large resources are expected to take large steps toward internalization
2. When foreign market conditions are stable and homogeneous, learning them is easier
3. When firms have considerable experience with markets that are similar to a newly targeted foreign market.

Yet none of these conditions are fulfilled by a small startup. They have constrained resources, no foreign market experience, and are often competing in unstable markets (Oviatt and McDougall 1994).

A number of advantages exist for a firm to go international early, while it is still small. They are likely to develop fewer routines and resources, which make it difficult for them to move out of domestic markets. Firms may become dependent on cultural attributes derived largely from their home countries. There may be non-transferable or hidden costs in new environments (Reuber,Fischer 1997).

Another explanation for the existence of small international firms is explored by Bonnaccorsi (1992), in his examination of small manufacturing firms in Italy. The study postulates that for the majority of firms, exporting is the easiest way to grow. Since most firms will take the path of least resistance, exporting becomes a viable option early in a firm's life.

Other possible paths for expansion include horizontal growth, product diversification, and regional expansion. Horizontal growth requires a commitment to obtain a larger market share. This often requires a long term marketing approach and large financial resources. Product diversification, especially in the software industry, requires financial backing and diverse skill sets that most small firms do not. The last option regional expansion might be difficult for a number of reasons.

1. Small firms may find difficulties in penetrating specific home market segments due to large retail chains.
2. Expansion in the domestic market may require the decision to invest in substantial advertising and promotion.
3. Terms of payment are sometimes more favorable abroad than in the domestic market
4. Credit discount is more favotable with foreign credit than with domestic credit
5. Liability of costomers mat be rather problematic in some regions in the domestic market.

Software firms have another vested interest in exporting rather than expanding in the domestic market. There are high capital costs of research and development. International sales can maximize the investment return of a large software product.

The next section details an attempt at applying the U-Model and I-Model to the United States software industry.

4.0 Methodology

This section describes the methods used to gather data, and apply the models. In many instances more than one method was possible, the reasons for choosing a particular method are presented where appropriate.

4.1 Application of Models

The application of both the U-Model and the I-Model to US software firms will serve two purposes. First, it will validate the applicability of the models across industries. Both U-Model and I-Model were derived from the sampling of manufacturing firms. While software firms are often described as "factories", differences between traditional manufacturing and software engineering are considerable. Second, it will allow us to explain data gathered using a traditional and trusted framework, hopefully adding to our understanding of the packaged software industry.

There are many approaches to applying the models to the software industry. Two possibilities were considered.

1. Measure the international experience and/or Knowledge of a sample of companies, and their foreign market orientation.
2. Determine the international offerings of a sample of companies, along with their size and age.

The main advantage of the first option is that it would allow one to apply the core of both models, the international experience and knowledge of a firm. If one could draw a direct and positive relationship between the international experience of a firm and their foreign market orientation, one would have come a long way to validating the two models for the software industry. The second advantage is that it would give a detailed view of each company and their international operations.

Problems with the first approach include the difficulty in measuring international experience and market knowledge. It is an intangible that could only be roughly gauged through an extensive personal interview or a written survey. It is not immediately clear

who, in a large corporation, should be surveyed. Often it is the task of a team of managers to decide the foreign market operations of a multinational enterprise.

Measuring foreign market orientation of firms also poses some problems. Foreign sales as a percentage of total sales (FSTS) is not considered a complete measure of the degree of internationalization of a firm (Reuber, Fischer 1997). It is recommended that a multiple item measure be used. Other items to consider include structural aspects of the firm, for example foreign assets as a percentage of total assets. Resources committed to foreign markets can also be used, such as the percentage of employees that spend over 50% of their time on international activities. Such measures are often hard to obtain in financial reports, and must be queried for specifically in written surveys or personal interviews.

The second option would give one the opportunity to evaluate the criticisms against both the U-Model and I-Model. If it can be determined that young small firms are offering a diverse product line to a variety of international markets, then it would appear that both the models do not apply to the software industry. On the other hand if the data determine that mostly well-established experienced firms are entering foreign markets, one can conclude that the models offer a good explanation of the data. Please see sections 2.11, and 2.21 for a discussion of the implications for each model, and what predictions they make.

We can easily obtain a clear picture of international products and services offered by a company. The size and age of a company is easily obtained through web pages and financial reports. Therefore this option represents a less time consuming, yet useful

method of data collection. It is also more likely to succeed, since it does not require cooperation of the sampled companies.

A disadvantage of the second option is that it does not offer us a clear picture of the international structure of the firm. It can not be determined from the data whether the firm is developing software at foreign sites, using third party distribution channels, or has sales offices in foreign countries. We can only determine whether a foreign version of the software product exists, not how it is delivered to, or supported in, the foreign location.

The second option was ultimatly chosen, mainly due to the ease of data collection, and the advantages discussed above. The next section explains the methods used to collect the data.

4.2 Data Collection

Three published lists were considered as possible sources for sampling, Software Magazine's (www.softwaremag.com) list of the top 500 Software Firms in the United States, Information Week's (www.informationweek.com) 500 top Technology innovators, and the Datamation (www.datamation.com) 100.

Information Week's list is described as a list of those companies that "demonstrate a pattern of technological, procedural and organizational innovation". The list is not limited to the software industry, and in fact the majority of firms are characterized as "Retail and Distribution". To compile the list third party contractors conducted a survey through phone, fax, and mail. No company with less than 1 billion in total revenue was considered. While it would have been possible to sample only those

firms characterized in the "information technology" industry, the fact that only large corporations were considered makes this list unacceptable.

Little information was published on how The Datamation 100 is compiled. It is global, considering firms outside of the United States and not limited to software firms. Focusing on the Information Technology industry. Hardware manufacturers and service providers are placed along with packaged software developers. This list was rejected based upon inclusion of firms outside the United States, as well as a lack of information regarding the methodologies used.

The firms sampled were derived from Software Magazine's list. The list is compiled according to applications filled out by each firm. Software Magazine selects 500 software firms from all applications submitted. Any software firm may submit an application. The questions on the application are very broad, dealing with revenue, product line of the firm, and product support. One question on the survey deals with an international subject. Part III Question 7 asks:

Is your primary software product(s) Euro compliant?

The possible answers are Yes, No and NA. It is unclear how Software Magazine weighs each question on the survey. The full survey is listed in Appendix B

Not all-500 firms were examined, only the first and second, 26th and 27th, 51st and 52nd, 76th and 77th, 101st and 102nd etc… were sampled. A total of 40 companies were represented. Care was taken in choosing the sampling pattern, because firm size and growth plays such an important role in the internationalization models. This sampling enabled us to get a broad rang of firm sizes, as well as ensuring that for a given size, two

firms where sampled. If each firm sampled was of a different size, it is possible for the data to be greatly effected by each data point.

For each company, the nature of the product line was determined. In the case of large companies, all products were not listed. An effort was made to incorporate all the major products of a firm, but it should not be considered a complete list of a firm's product lines. If a product had separate components or levels of functionality, only one product from the group was listed. Each product is categorized into one of 13 different types of software. The number of firms developing in each category is also listed. Some firms develop in more than one category, so the sum will be greater than 40.

Catagory	# of product lines	Category	# of product lines
1.Operating Systems	3	8.Project Management	7
2.Accounting/Finance	9	9. Graphics/Desktop Publishing	2
3 Communication	13	10.Word Processing	2
4.CAD/CAM	1	11.Utility	3
5.Database	5	12.Development Tools	8
6.Internet	9	13.Spreadsheets	2
7.Systems Management	5		

Software magazine list also categorized each firm into a field of the software industry such as information technology or applications. It was decided that this distinction was too broad, and each product line should be categorized into more specific product markets. The possible software categories were determined by the method software resellers categorize software within their catalogs, specifically Comp-Use (www.compusa.com), the largest reseller of computer software. It was then determined whether the product has a Japanese version and a European version. A European version

is considered to exist if the product has been localized for at least one European country, not including the United Kingdom. This will yield information as to whether there exists a correlation between international versions, and the product market. While it is not the aim of the paper to explore what type of software is internationalized, the results are interesting non-the less.

All of the companies on the list had corporate web pages. The page often contained information about their product lines, as well as the location of foreign sales offices, and the founding date of the company. In the majority of cases, examining this page generated the required information. In the rare case where required information was not present on their web page, a third party source was consulted, the large business directory Hoovers Online (www.hoovers.com) provided any missing information. The use of the Internet as the sole source of data collection greatly speeds up the process. It enabled more data to be collected in a sorter amount of time than more conventional means such as mail surveys and telephone interviews.

5.0 Data Analysis

The collected data is listed in Appendix A. Table 1 lists the companies name, total revenue from repackaged software, number of employees, number of years in business, and the products they offer. Table 2 lists the availability of a European version of each product. A 'Y' in a table entry indicates that such a version is available either through the company directly or through third party distributors. An 'N' indicates that no such version exists for the product line. In the event that not all products in a product line have

a suitable version, the products excluded are listed in parentheses after the "Y" in the table entry. The same strategy was used to indicate a Japanese version of a company's product line in Table 3.

5.1 Results

The U-Model predicts that large companies will have an advantage over smaller firms. We would expect this advantage to show up in the data as a shorter delay in adopting the internationalization process (See section 3.1.1). To determine the validity of this hypothesis, Figure 3 charts the firm age of each firm. The firms are ranked in order of software revenue, and color-coded. An orange bar indicated exporting of products to Japan and Europe, Green indicated just Europe, Blue indicates just Japan, and Black represents no entry into foreign markets at all.

The data does indeed indicate that firms with more resources internationalize earlier. After the 25'th ranked firm (Internet Security Systems), no other firm younger than 13 years entered international markets. Five firms older than 13 years, smaller than Internet Security Systems did enter foreign markets. Of these five, three of them remained in only one, and did not expand into other countries. Among those firms larger than Internet Security Systems, seven companies younger than 13 years entered international markets. All seven had versions of their products for both Europe and Japan. They were able to establish and expand their foreign market operations into newer markets earlier.

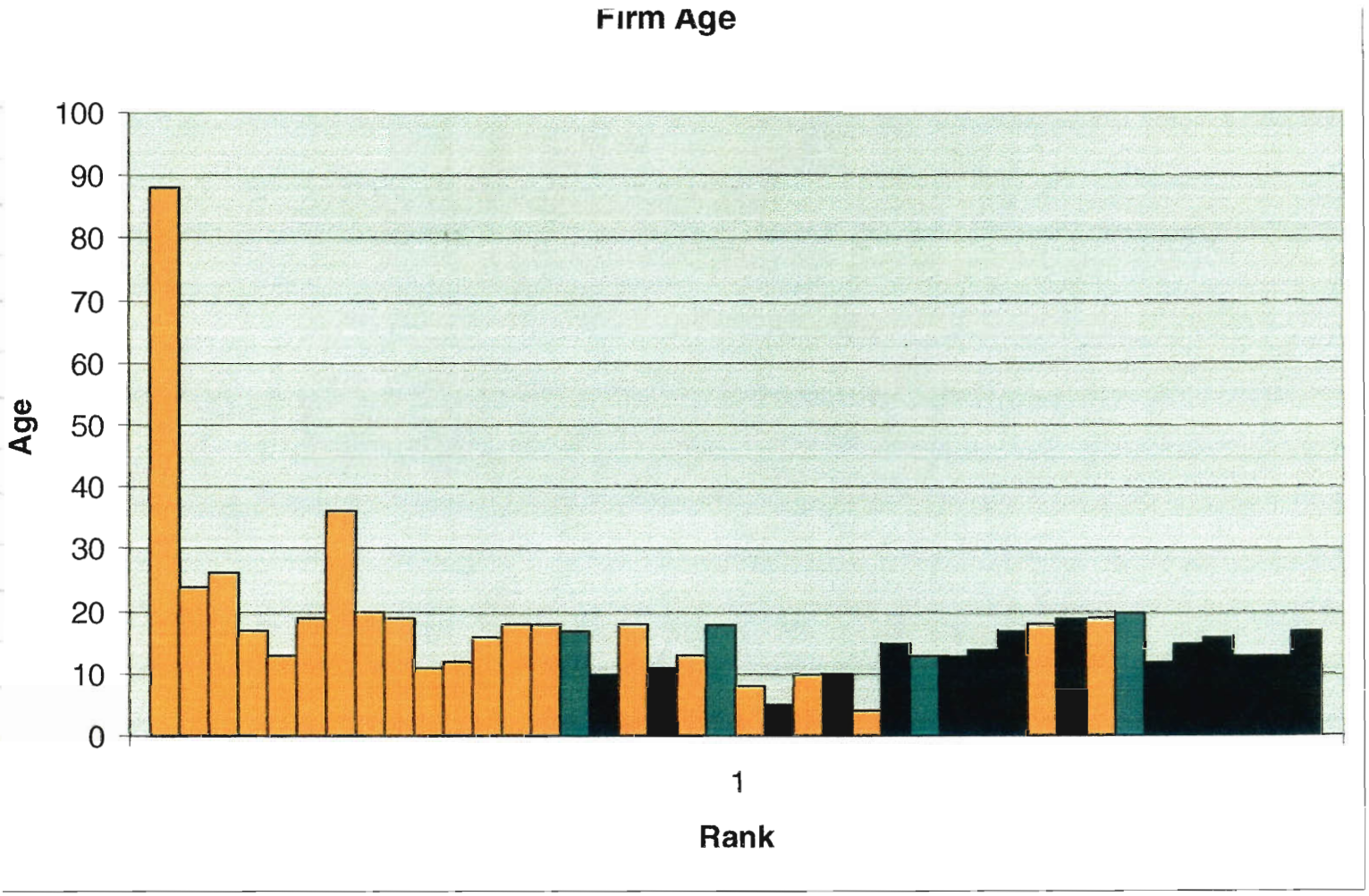


Figure 3

The second prediction made by the I-Model is a lack of young start-ups exporting to multiple markets. The data does not seem to support this prediction. While it is hard to quantify the term young to a specific number of years, each firm can be compared to its peers in terms of its age. As we can see from Figure 3 a number of shorter bars are colored orange. The majority is in the middle and towards the left half of the chart, this indicated that they have more revenue. While it could be argued that they have more revenue because they have expanded internationally, a better explanation would hold that more resources are needed in order to manage the risks involved in entering foreign markets.

Another prominent feature of the chart is that black bars dominate the right side of the chart and orange the left. This has two implications, the most obvious being that smaller firms do not enter international markets as often as larger firms do. This is exactly the distribution that the U-Model predicted (see sections 3.1.1, 4.0). The model sites a lack of resources and experienced personnel as the main contributors to the disparity.

Unfortunately our data collection methods did not enable us to measure the international experience of a firm's employees. Therefore finding data to support the predictions of the I-Model is far more difficult (see section 3.2.1). One strategy used is to measure the number of employees a firm has. Firms with more employees are more likely to have management and teams with international selling experience (Reuber,Fischer 1997). The reasoning behind this statement is evident: if firm hires more people, the chances of employing somebody with international experience are greater. The effectiveness of this approach rests on the assumption that a firm will attempt to utilize an employee's skill set, rather than putting a less experienced member in charge of internationalization. This is not unreasonable to assume. Figure 4 charts the number of employees for each firm. The same color scheme is used as Figure 3, and each firm is ranked in the same order of revenue from packaged software (the first three bars are cut short to fit within range).

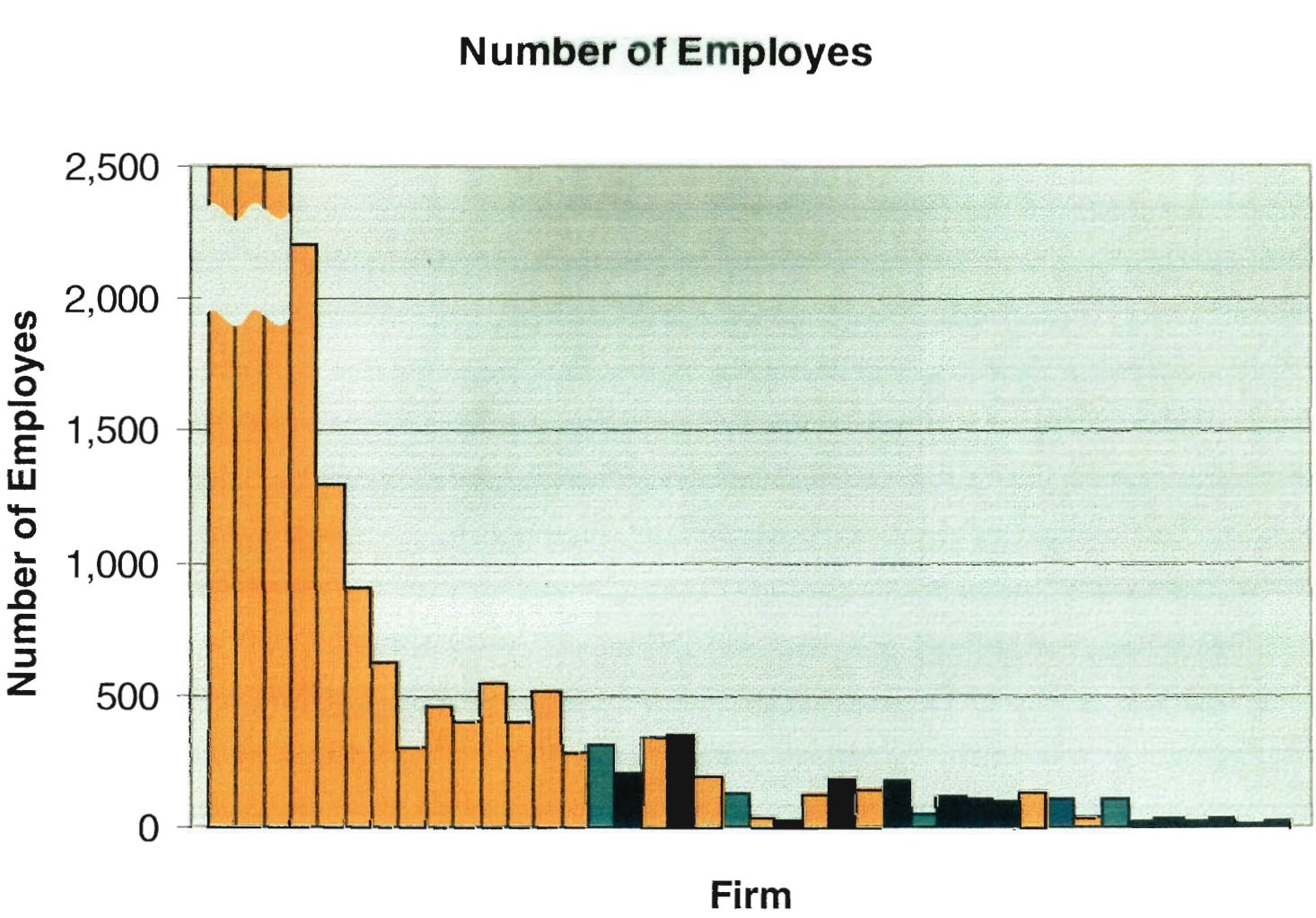
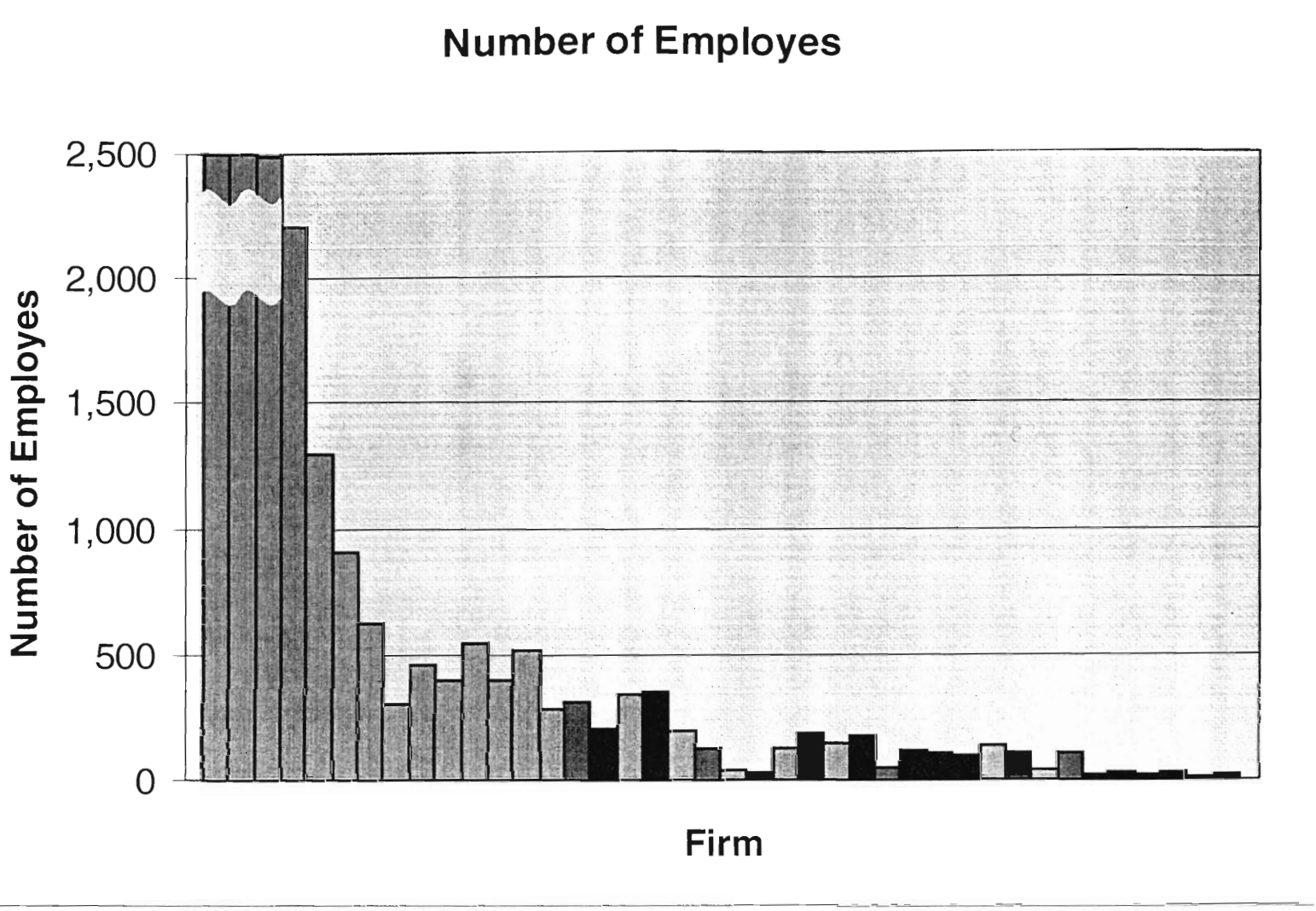


Figure 4

The most notable aspect of Figure 4 is that the cut-off point where firms are to small to export their products correlated exactly with a sharp drop in the number of employees. The cut off point is marked by the 35'th firm (NaperSoft). The fact that a cut-off point exists at all is important, and will be explored shortly. This seems to offer support for the I-Model, in that without experienced decision-makers it is hard for a firm to internationalize. Yet the rest of the data does not support this claim, no other correlation can be made between the number of employees and the propensity for a firm to internationalize. Firms with relatively few employees entered both European and



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Japanese markets (Brio Technologies, Optima Software, Puma Technologies, Internet Security Systems, VentureCom). Therefore it would appear that the I-Model does not offer a clear explanation for the data set. In fact, this conclusion concurs with other empirical studies. When firm size is measured by number of employees, no relationship was found with export behavior, but a relationship was found when firm size was measured by annual sales (Cavusgil 1984). This was also indicated by the data collected in this study, as illustrated in Figure 3.

The U-Model includes in its definition of committed resources (see section 3.1) employees working in or spending time developing foreign markets. Therefore the cut-off point could be explained as a general lack of resources, not international experience. The firms on the right side of the charts are smaller, have fewer resources, and can not tolerate the market risk that larger firms can. Therefore they perceive foreign expansion as uncertain, risky and unmanageable with their current tolerable market risk. These firms will choose to focus on the domestic market until they grow to a point where it becomes limiting. They are not interested in exporting, because they can continue to grow within their domestic market. It is commonly agreed that the size of the domestic market has an impact on the export potential of firms, such a relationship is often termed "economies of scale" (Bonaccorsi 1992),(Calof 1994),(Reuber,Fischer 1997). Since the United States has the largest appetite in the world for prepackaged software (see section 1.0), it makes sense that small firms will be reluctant to export.

5.2 Other Factors

Other factors that could explain a deviation from the models might be industry or even product specific. The demand for software varies across product areas and market domains, for example Japan's two largest software markets are in CAD and Industry-Specific applications (Mowery, 1996). This stems from Japan's large steel and banking industry. While the majority of software is in-house or custom manufactured, these are also the largest prepackaged software markets. Demand for operating systems is universal and because the same hardware is often used in many different countries, it is beneficial for firms producing operating systems to enter foreign markets. We can infer that the product area a firm is specialized in will have an effect on its propensity to export.

In order to examine this factor more closely, Figures 5 and 6 chart the percentage of firms internationalized to Europe and Japan, categorized by the thirteen different product categories they develop for.

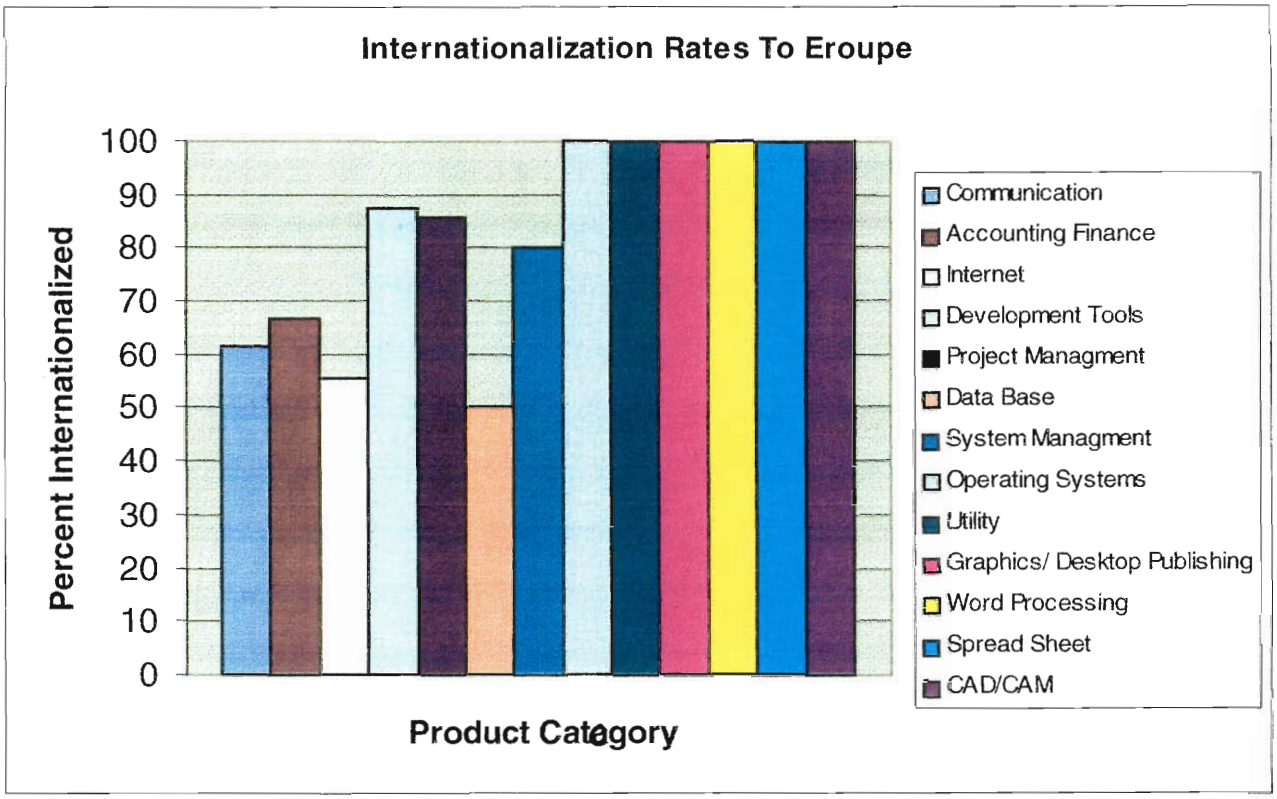

Figure 5

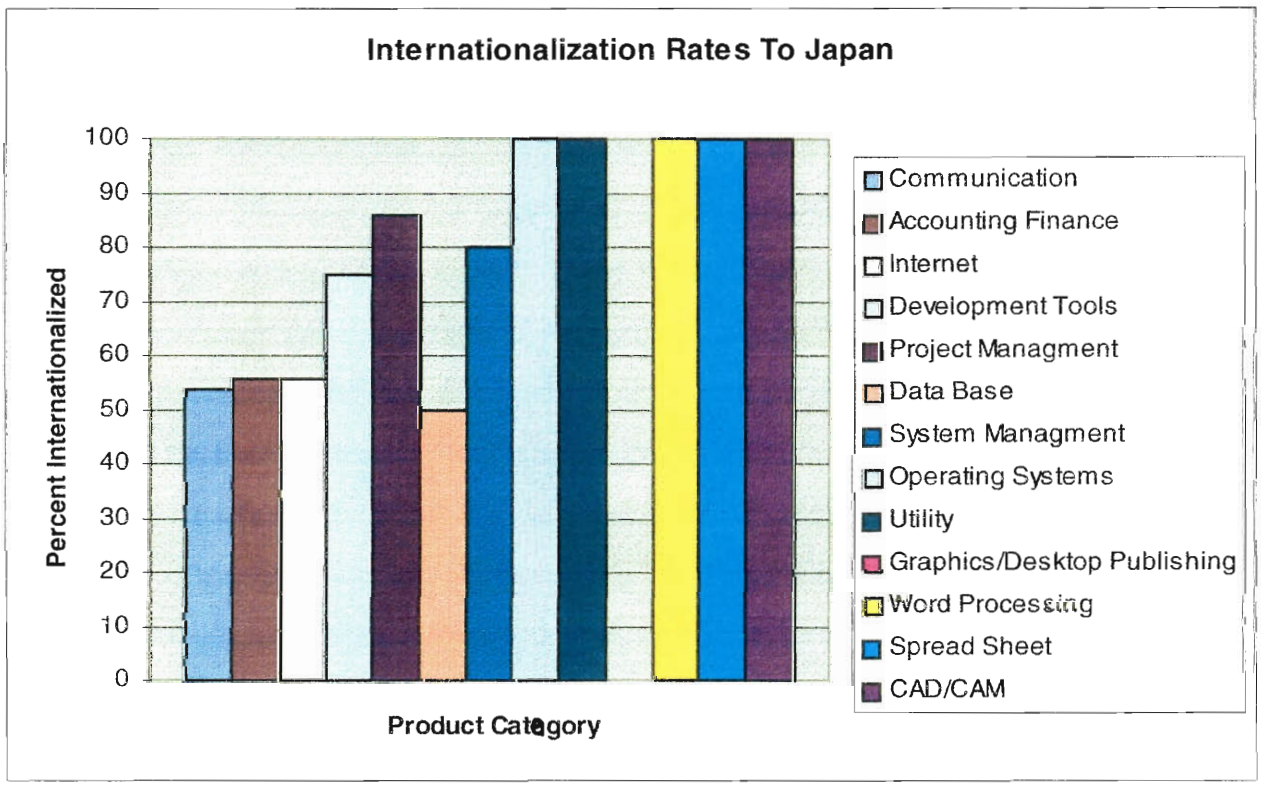

Figure 6

The categories are ordered from left to right by the number of firms developing products in the category (see section 4.2). The values on the right hand side of the charts of the charts are the result of a low number of firms in the category. If the one or two firms in the category enter an international market, then %100 percent of the firms in the category are internationalized. Likewise 0% percent internationalization is very easily achieved by the one or two firms in the category not entering foreign markets. This does not reduce the usefulness of the data, but should be considered when evaluating the charts. For example we can not conclude that firms developing spreadsheets or word processors are more likely to export, because only two such firms have been sampled. This is not a good data set to base a prediction on. Other categories containing more sampled firms lend themselves better to analysis.

There is a high internationalization rate for project management software, and a low rate for financial/accounting software. The number of firms developing project management software is comparable to those developing Accounting and financial software. At first glance it would appear that firms developing project management applications would be more likely to export than firms developing Accounting/Financial applications would. This observation does not take into account the full set of data.

The average software revenue of the firms developing for the two categories can explain the major difference in internationalization rates of the two categories. The average revenue of a firm developing project management software is 6438.5 million, while firms developing financial and accounting software have average revenues of 35.1

million. For reasons explained in section 5.1, software revenue is a great predictor of export potential.

Another category in figures 5 and 6 shows an unusually large rate of internationalization, system management software. System management software is development by relatively small firms with average software revenue of 280.6 million. They have a higher rate of internationalization than categories with much high average revenue, such as development tools with average revenue of 6419.0 or data base software with average revenue of 6427. System management tools consist of network monitoring agents, and remote administration and installations. Frequently little modification is needed in order to localize such software. It does not deal in any country or industry specific data. It is targeted for operating system or network architecture. Due to the proliferation of uniform operating systems such as windows, and major Unix variants (see section 1.0), it is possible to write such software and have it run on a broad installation base.

The same argument can be applied to the high rate of utility programs that are internationalized. Utilities consist of monitoring agents and virus scanners. They are targeted to specific platforms and software applications. While only three companies developing utilities where sampled, all had international versions, yet their average software revenue was 282.7 million. Due to the ease at which utilities and system management software can be internationalized, entering international markets is an easy way to generate revenue.

Graphical and desktop publishing applications are unique because they are the only type of software internationalized to Europe and not Japan. One possible

explanation is the extensive use of icons, and graphical representations in such applications make in more difficult and time consuming for firms difficulty to localize the software for a non-Latin character system, and cultural differences. In addition, the applications are frequently targeted to specific industries. A different country will have different demand, and needs even within the same industry.

Database software has an unusually low rate of internationalization. The average software revenue of firms in the category is among the highest at 12,844. Applications in this category include industry specific applications. Industries vary from country to country, and can explain a firm's reluctance to internationalize. Other possible reasons include a desire for more customer support and maintenance. Databases are complicated and often mission critical applications. If a problem occurs prompt response is needed. Firms based locally have an advantage due to their close proximity to the supported firms. Firms feel more secure being maintained by a neighbor than a foreign cooperation.

Conclusions

In this project, two traditional models of firm internationalization were presented. The implications of each model were examined and the distribution they predict on empirical data. Critiques of both models and possible extensions were discussed. The possible methods for applying the models were weighed, followed by a description of the data collection process. The data was analyzed and explained using the models, and arguments were made for any discrepancies between the predictions and actual results.

The U-Model explains the data better than the I-Model. Its predictions were satisfied by the data presented, while the I-Model suffered from inconsistencies. Possible reasons for the U-Model's better fit might be found in the differences in foreign markets.

While both the European and Japanese markets are converging on packaged software, they still rely on in-house development, and custom software services (see section 1.0). Hardware manufacturers are still the main distributors of software. Larger firms have the resources to enter these closed markets through establishing subsidiaries, or forming strategic partnerships with hardware companies (Field 1986).

An established name in the domestic market lends credibility to a company as it enters foreign markets (Bonazzorsi 1992). This enables older larger more dominant firms, through strategic partnerships, to extend into foreign markets easier. The foreign partner is willing to invest more, and will take the exporting firm seriously.

The type of product being developed is also a predictor of potential to internationalize. Software targeted at platforms or technologies, rather than industries or market specific areas are more likely to be internationalized. This is due to homogenous operating system environments and platforms that often span country borders. By internationalizing a product line, the potential clientele can be increased with little effort. Therefore entering international markets is the path of least resistance (see section 3.0) for the growth of small information technology firms that develop system management and utility applications.

The software industry will benefit from future studies in this area. Parties with particular interests are governments who wish to promote small software exporters and firms seeking to understand the processes of entering foreign markets. Funding for government programs will be better spent, and firms will be able to enter foreign markets with an understanding of the risks and growth potential.

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Appendix A. Data

	Software Revenue	Employes	Founded	Operating Systems	Accounting/Finance	Communication	CAD/CAM	Database	Internet	Systems Management	Project Manageme	Graphics/Desktop Publishing	Word Processing	utility	Development Tools	Spreadsheets
1. IBM	12,844	269,465	1911	OS2/WARP/AIX AIX PCDOS 2000		Lotus Domino		DB2	WebSphere		Lotus Domino		Lotus Suite			Lotus suite
2. Microsoft	12,836	25,000	1975	Windows 9x Windows NT Windows Terminal Server		Office/Outlook		SQL Server	IISI		MS Project		Word		Visual Studio	Excel
26. Compuware Corp	647	8,078	1973					File-Aid							EcoSCOPE QACenter Abend-AID XLS DevPartner XPEDITER	
27. Symantic	552	2,205	1982			ACT! WinFax				Norton HelpDesk Assistan pcAnywhere				Norton 2000 Anti Virus Clean Sweep	Visual Café JITspeed	
51. Hyperion	194	1,300			Hyperion Enterprise Hyperion's Spider-Man Hyperion Pillar											
52. Boole & Babbage	191.1	904	1980							Command/Post MainView Command MQ SpaceView						
76. MacNeal-Schwendler	125.2	627	1963				MSC/NASTRAN MSC/PATRAN MSC/DYTRAN									
77.Citrix	121.7	302	1989			Secure ICA				MetaFrame						
101. Legato	81.8	460	1988							Load/Install Management NetWorker5 Smart Media Bussniess Suite						
102. WonderWare	81.1	405	1987			Factory Suit InTouch		Insustrial SQL Serve	Scout		InBatch InControl SyteLine APS					
126. Symix	64.2	550	1979													
127. New Dimension	63.2	400	1983			ONTROL-D ONTROL-V					Control -M					
151. Coda Group	47.7	515	1980		BaanERP BaanE-Enterprise Baan-On-Board											
152. Mobius	47.2	282	1981		Renaissance CS											
176. Best Software	39.5	312	1982		FAS Win Imperativ	BIR										
177. News Edge	39.4	202	1988						Live Insight News Tools							
201. AbtC,orp	31.9	346	1981			ABT Connect ABT Publisher					ABT Resource Manager Team Workbench Project Workbench					
202.FirstLogic	31.8	350	1981			PostalSoft		IDCentric								
226. Brio Technologies	23.2	200							BrioQuery OnDemand Server							
227.Sqribe	23.2	125	1989									VisualSQRIBE Reportmart SQR Server				
251. Optima Software	20.5	40	1980											StarTool	Concurrent Development Facility Change Man SyncTrac	
252.Castelle Inc.	20.4	29	1987			FaxPress InfoPress LanPress Object-Fax										
276. Puma Technologies	17.7	124	1995			IntelliSync SatelliteForms										
277. UltraData	17.6	189	1981		ULTRAFIS Ultra-Sales											
301.Internet Security Systems	13.4	150	1994						Internet Scanner RealSecure					System Scanner Database Scanner		
302. Document Sciences	13.3	180	1991			CompuPrep CompuSeries										
326. BrandMark	11.2	45	1981					DBGeneral DBAudit								
327.White Pine	11.1	120	1984			CU-SeeMe ClassPoint			WebTerm WebTerm X							
351.AutoTester Inc	9.2	107	1986												AutoTester AutoAdviser	

352. SimWare	9.2	100	1982		A2B, Remote Connectivity		Salvo RexxWare		AutoController
376. Cygnus Solutions	7.4	136	1989	Cygnus eCos					Cygnus GNUPro(tm) Toolkit Cygnus Source-Navigator(tm)
377. Programmed Solutions	7.4	106	1986	Macola Flexo		WebLink			
401. Venturecom	5.4	43	1980						Real-time Extensions Component Manager
402. InfoData	5.2	105	1985					Inquire Re:Mark Compose Aerial	
426. NaperSoft	3.4	16	1986			Bridge&Trsade Merge&Trade			
427. Continental Computer	3.3	25	1984	The Accountant			Director Assistant Cemetary Manager		
451. Information systems Corp	2.6	23	1983		Cypress				
452. Red Wing	2.6	33	1979	AgCHEK Payroll Cow/Calf Commercial					
476. TYX Cop.	2.1	11	1982						PAWS/TRD PAWS/TPS
477. Travis Software	1.9	21	1986	TravisCobra TravisFlex Rbill					

Software internationalized to Japan

	Operating System	Accounting/Finance	Communication	CAD	Database	Internet	Systems Management	Project Management	Graphics/Desktop Publishing	Word Processing	utility	Developer	Spreadsheets
1. IBM	Y (not PCDOS)	Y			Y	Y		Y		Y			Y
2.Microsoft	Y	Y	Y		Y	Y		Y		Y		Y	Y
26. Compuware Corp					Y							Y	
27. Symantic			Y (no ACT!)				Y (no HelpDesk)				Y	Y	
51.Hyperion		Y											
52. Boole & Babbage							Y						
76. MacNeal-Schwendler				Y									
77.Citrix			Y				Y						
101. Legato							Y						
102. WonderWare			Y		Y	Y		Y					
126. Symix								Y					
127. New Dimension			Y					Y					
151. Coda Group		Y											
152. Mobius		Y											
176. Best Software		N	N										
177. News Edge						N							
201. AbtC,orp			Y					Y					
202. FirstLogic			N		N								
226. Brio Technologies						Y							
227.Sqribe									N				
251. Optima Software											Y	Y	
252.Castelle Inc.			N										
276. Puma Technologies			Y										
277. UltraData		N											
301.Internet Security Systems						Y					Y		
302.Document Sciences			N										
326. BrandMark					N								
327.White Pine			N			N							
351.AutoTester Inc												N	
352.SimWare			N				N						
376. Cygnus Solutions	Y											Y	
377.Programmed Solutions		N				N							
401. Venturecom												Y	
402. Infodata									N				
426. NaperSoft						N							
427. Continental Computer		N						N					
451.Information systems Corp			N										
452. Red Wing		N											
476.TYX Cop.												N	
477. Travis Software		N											

Software internationalized to Eroupe

	Operating Systems	Accounting/Finance	Communication	CAD	Database	Internet	Systems Mana	Project Managem	Graphics	Word Processing	utility	Developer	Spreadsheets
1.IBM	Y	Y			Y	Y		Y		Y			Y
2.Microsoft	Y	Y				Y		Y		Y		Y	
26. Compuware Corp					Y							Y	
27. Symantic			Y				Y				Y	Y	
51. Hyperion		Y											
52. Boole & Babbage							Y						
76. MacNeal-Schwendler				Y									
77.Citrix			Y				Y						
101. Legato							Y						
102. WonderWare			Y		Y	Y		Y					
126. Symix								Y					
127. New Dimension			Y					Y					
151. Coda Group		Y											
152. Mobius		Y											
176. Best Software		Y	Y										
177. News Edge						N							
201. AbtC,orp			Y					Y					
202.FirstLogic			N		N								
226. Brio Technologies						Y							
227.Sqribe									Y				
251. Optima Software											Y	Y	
252.Castelle Inc.			N										
276. Puma Technologies			Y										
277. UltraData		N											
301.Internet Security Systems						Y					Y		
302. Document Science			N										
326. BrandMark					Y								
327.White Pine			N			N							
351.AutoTester Inc												Y	
352.SimWare			N				N						
376. Cygnus Solutions	Y											Y	
377.Programmed Solutions		N				N							
401. Venturecom												Y	
402. InfoData									Y				
426. NaperSoft						N							
427. Continental Computer		N						N					
451.Information systems Corp			N										
452. Red Wing		N											
476.TYX Cop.												N	
477. Travis Software		N											

Appendix B. Software Magazine's 500 Software Firms.

	Company	Total Software Revenue Worldwide 1997 [$M]	Worldwide % Growth 1997 vs. 1996	% Prof. Software Rev.	Tot. Corp. Rev. [$M]	% Growth 1997 vs. 1996	Tot. Empl.	% Rev. on R&D	Business Sector
1	IBM Armonk, NY www.ibm.com	$12,844.0	-2%	NA	$78,508.0	3%	269,465	18%	OS/middleware
2	Microsoft Corp.[5] Redmond, WA www.microsoft.com	12,836.0	39	NA	13,098.0	39	25,000	19	Applications
26	Compuware Corp Farmington Hills, MI www.compuware.com	647.0	33	37	1,034.1	38	8,078	5	Application
27	Symantec Corp. Cupertino, CA www.symantec.com	552.0	21	NA	552.0	21	2,205	16	Applications
51	Hyperion Software Corp. Stamford, CT www.hyperion.com	194.0	31	22	254.0	31	1,300	15	Applications
52	Boole & Babbage Inc. San Jose, CA www.booie.com	191.1	7	3	200.3	7	904	14	Network/ Systems Mgmt.
76	MacNeal-Schwendler Corp. Los Angeles, CA www.macsch.com	125.5	1	7	134.9	1	627	19	CAE
77	Citrix Systems Inc. Ft. Lauderdale, FL www.citrix.com	121.7	179	2	123.9	178	302	9	Server Software
101	Legato Systems Inc. Palo Alto, CA www.legato.com	81.8	51	NA	81.8	51	460	18	Systems Mgmt.
102	Wonderware Corp. Irvine, CA www.wonderware.com	81.1	27	2	82.5	27	405	24	Applications
126	Symix Systems Inc. Columbus, OH www.symix.com	64.2	53	17	78.1	47	550	13	Applications
127	New Dimension Software Ltd. Irvine, CA www.ndsoft.com	63.2	47	3	65.0	49	400	14	Systems Mgmt.
151	The Coda Group Plc. Manchester, NH www.coda.com	47.7	23	31	68.8	25	515	17	Applications

152	Mobius Management Systems Inc. New Rochelle, NY www.mobius-inc.com	47.2	34	NA	47.2	34	282	14	Document Mgmt.
176	Best Software Inc. Reston, VA www.bestsoftware.com	39.5	22	10	46.7	26	312	17	Applications
177	News Edge Inc. Burlington, MA www.desktopdata.com	39.4	26	NA	42.2	25	202	12	News Delivery
201	ABT Corp. New York, NY www.abtcorp.com	31.9	23	37	50.7	28	346	10	Applications
202	Firstlogic Inc. La Crosse, WI www.firstlogic.com	31.8	31	6	34.1	35	350	NA	Applications
226	Brio Technology Inc. Palo Alto, CA www.brio.com	23.2	134	NA	23.2	134	200	NA	Data Warehousing
227	Sqribe Technologies35 Menlo Park, CA www.sqribe.com	23.2	43	6	25.0	52	125	17	Information Delivery
251	Optima Software Inc. Sacramento, CA www.optimasoft.com	20.5	59	15	24.1	66	40	NA	Change Mgmt.
252	Castelle Inc. Santa Clara, CA www.castelle.com	20.4	-24	NA	25.3	-14	29	12	Fax & Print Servers
276	Puma Technology Inc. San Jose, CA www.pumatech.com	17.7	121	NA	17.7	121	124	41	Connectivity
277	Ultradata Corp. Pleasanton, CA www.ultradata.com	17.6	-2	21	29.1	-28	189	16	Applications
301	Internet Security Systems Inc. (ISS) Atlanta, GA www.iss.net	13.4	198	1	13.5	200	150	25	Network Security
302	Document Sciences Corp. San Diego, CA www.docscience.com	13.3	22	17	19.7	29	180	17	Applications
326	Bradmark Technologies Inc. Houston, TX www.bradmark.com	11.2	7	NA	11.2	7	45	10	Databases
327	White Pine Software Inc. Nashua, NH www.wpine.com	11.1	-5	NA	11.1	-5	120	52	Applications
351	AutoTester Inc. Dallas, TX www.autotester.com	9.2	23	27	12.7	39	107	26	Applications
352	Simware Inc. Ottawa, ONT www.simware.com	9.2	-17	9	10.3	-17	100	33	Middleware

376	Cygnus Solutions Sunnyvale, CA www.cygnus.com	7.4	24	53	15.7	34	136	NA	Development Tools
377	Programmed Solutions Inc. Stamford, CT www.progsol.com	7.4	30	11	8.4	27	48	11	Applications
401	VenturCom Inc. Cambridge, MA www.vci.com	5.4	29	14	6.3	26	43	40	Development Tools
402	Infodata Systems Inc. Fairfax, VA www.infodata.com	5.2	52	51	10.6	11	105	23	Applications
426	Napersoft Inc. Naperville, IL www.napersoft.com	3.4	37	8	3.7	36	16	28	Applications
427	Continental Computer Corp. Jonesboro, AR www.continentalcomputers.com	3.3	6	NA	3.3	6	25	18	Applications
451	Information Systems Corp. Rochester Hills, MI www.cypressdelivers.com	2.6	8	3	2.9	3	23	27	Document Mgmt.
452	Red Wing Business Systems Inc. Red Wing, MN www.redwingsoftware.com	2.6	53	7	2.8	47	33	21	Applications
475	Travis Software Corp. Houston, TX www.travisoft.com	2.1	30	1	2.1	31	11	8	Applications
476	TYX Corp. Reston, VA www.tyx.com	1.9	-49	15	9.9	135	21	4	Applications

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IQP/MQP SCANNING PROJECT

Appendix C. Software Magazine's Survey

SOFTWARE™ MAGAZINE

17TH ANNUAL SOFTWARE 500 SURVEY

PLEASE RETURN SURVEY TO SOFTWARE MAGAZINE
BY MARCH 29, 1999

PART I. CORPORATE INFORMATION

1. Company _____
2. Address/ U.S. HQ _____
3. City _____ State _____ Zip _____
4. Web Address: Http:// _____
5. Telephone _____
6. Chairman _____
7. CEO _____
8. President _____
9. CFO _____

Contact Information for Survey:

10. Name _____
11. Title _____
12. Telephone _____
13. FAX _____
14. E-mail _____

15. Year company founded: _____
16. Is your company:
    - ❑ Privately held ❑ Public
    - a. If public, which exchange? _____
    - b. If private, will your company launch an IPO in 1999?
    - ❑ Yes ❑ No
17. How many permanent employees did your company have?
    a.12/31/98 _____ b. 12/31/97 _____
18. Did your company merge with or acquire another software company during the year?
    ❑ Yes ❑ No
19. If so, please list the companies, products, dates and value of the acquisitions: _____

PART II. FINANCIAL INFORMATION

Please complete this section carefully. This information will be used to compile the Software 500 ranking. To consider your company for the list, we must have ALL the requested revenue information. Include both calendar year and fiscal year revenue, if different. The ranking is based on worldwide software revenue, not total corporate revenue. For the purposes of this ranking, software revenue includes revenue from licenses as well as product maintenance and support.

A. Please itemize, as follows, CALENDAR YEAR REVENUE (in U.S. dollars) for your company:
If non-U.S. based, please list conversion rate: _____

	Calendar 1998 (in millions)	Calendar 1997
1. Total License Revenue:	$_____	$_____
2. Total Software Maintenance and Support Revenue:	$_____	$_____
3. TOTAL SOFTWARE REVENUE (= items 1+2):	$_____	$_____
4. Professional Services Revenue (custom programming, remote services, training, outsourcing, etc.):	$_____	$_____
5. Other Revenue (hardware, etc.):	$_____	$_____
6. TOTAL CORPORATE REVENUE (= items 3 through 5):	$_____	$_____
7. Net Income (loss):	$_____	$_____
8. R&D Spending as % of Total Corporate Revenue:	_____%	_____%

B. Please itemize, as follows, FISCAL YEAR REVENUE (in U.S. dollars) for your company if different from Calendar Year:
If non-U.S. based, please list conversion rate:_____

	FY Ended: / /98/99	FY Ended: / /97/98
1. Total Corporate Revenue:	$_____	$_____
2. Net Income (loss):	$_____	$_____
3. Total Software Revenue (= License Revenue + Software Maintenance and Support):	$_____	$_____

PART III. PRODUCT/STRATEGY INFORMATION

1. a. Please check ALL of the following categories that represent your lines of business:

- ❑ Operating Systems
- ❑ Development Tools/Languages
- ❑ Data Warehouses/Query Tools/OLAP
- ❑ Middleware/Connectivity/Application Servers
- ❑ Network/Systems Management
- ❑ Enterprise Application Integration (EAI)
- ❑ Internet/Electronic Commerce
- ❑ Databases
- *Application Software Packages:*
  - ❑ ERP/Enterprise Application Suites
  - ❑ Financial
  - ❑ Customer Information Management
  - ❑ Manufacturing/Supply Chain
  - ❑ Other (Please specify) _____
- ❑ Other (Please specify)_____

1. b. Please check the ONE category that represents your PRIMARY business (based on revenue):

- ❑ Operating Systems
- ❑ Development Tools/Languages
- ❑ Data Warehouses/Query Tools/OLAP
- ❑ Middleware/Connectivity/Application Servers
- ❑ Network/Systems Management
- ❑ Enterprise Application Integration (EAI)
- ❑ Internet/Electronic Commerce
- ❑ Databases
- *Application Software Packages:*
  - ❑ ERP/Enterprise Application Suites
  - ❑ Financial
  - ❑ Customer Information Management
  - ❑ Manufacturing/Supply Chain
  - ❑ Other (Please specify) _____
- ❑ Other (Please specify)_____

2. a. Please check ALL of the channels used to sell your software products:

- ❑ Direct sales
- ❑ VARs
- ❑ Systems integrators
- ❑ Electronic distribution
- ❑ Retail
- ❑ Other (Please specify)_____

2. b. Please check the PRIMARY channel used to sell your software products:

- ❑ Direct sales
- ❑ VARs
- ❑ Systems integrators
- ❑ Electronic distribution
- ❑ Retail
- ❑ Other (Please specify)_____

3. Which of the following software pricing policies/options has your company implemented? Please check ALL that apply:

- ❑ Mips based
- ❑ Site license
- ❑ Enterprise license
- ❑ Per node
- ❑ Per concurrent user
- ❑ Per session
- ❑ Per server class
- ❑ Leasing
- ❑ Metered usage
- ❑ Other (Please specify)_____

4. How does your company provide software product support? Please check ALL that apply:

- ❑ Telephone
- ❑ Fax
- ❑ E-mail
- ❑ Web page
- ❑ On-site technician
- ❑ CD-ROM
- ❑ BBS (bulletin board service)

5. How does your company charge for software product support? Please check ALL that apply:

- ❑ Free
- ❑ Free for a limited time after purchase
- ❑ Per phone call
- ❑ Flat rate
- ❑ Cafeteria style options
- ❑ Other (Please specify)_____

6. Is your primary software product(s) Y2K complaint? ❑ Yes ❑ No

If no, will it be by 12/31/99? ❑ Yes ❑ No

7. Is your primary software product(s) Euro compliant? ❑ Yes ❑ No ❑ N/A

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