

The effect of service intangibility on revenue from foreign markets

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Abstract

Drawing on the Eclectic Theory, this empirical study reports a test of the influence of intangibility on the receipt of revenues from foreign markets, and the moderating influence of management international experience. To insure sufficient variance in service intangibility while also controlling for extraneous sectoral and national variables, this study obtained extensive cross-sectional data from U.S.-based manufacturing and services firms in the environmental control industry. For this sample, the findings indicate that tangibility is positively related to the receipt of foreign revenues and to the use of higher control entry mode, supporting the view that intangibility is an important variable for understanding internationalization and value creation.

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1. Executive summary

As the value of international services increases, the need to understand the effect of service characteristics, notably intangibility, on value creation becomes increasingly important. This study reports a test of the influence of intangibility on the receipt of revenues from foreign markets, and the moderating influence of management international experience. The results extend the Eclectic Theory to include intangibility as a necessary variable associated with ownership and internalization advantages, two of the three advantages central to the creation of value in international production. To insure sufficient variance in service intangibility, while also controlling for extraneous sectoral and national variables, this study obtained extensive cross-sectional data from U.S.-based manufactur-

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ing and services firms in the environmental control industry. For this sample, the findings indicate that tangibility is positively related to the receipt of foreign revenues and to the use of a higher control entry mode, supporting the view that intangibility is an important variable for understanding internationalization value creation, and suggesting that service characteristics, such as intangibility, are influential variables in determining the success, as well as the patterns, of internationalization.

Today, the value of service exceeds the value of manufactured, tangible outputs. Service accounts for more than half of the gross domestic product in all developed countries and in most developing economies (Clark and Rajaratnam, 1999; U.N., 1994b). In the United States, the service sector now employs approximately 82% of the overall work force (Hilsenrath, 2002). As the barriers to trade in services have continued to decrease (Campbell and Verbeke, 1994; Dunning, 1993; U.N., 1994b), the value of international services has also begun to surpass that for manufactured goods (Dunning, 1993; U.N., 1994b). This trend is expected to continue. Freer global trade in services is central to current EU and U.S. trade policies (King, 2003). The delivery of services and products is also increasingly linked. Even when trade is permitted, firms may choose to link, or embody, services with goods to export the services through the merchandise flow, where barriers tend to be lower (Dahringer, 1991). To compete in today's global market, manufacturers often find that they must combine more services with their goods (Ansberry, 2003). Services, such as banking, also rely heavily on physical products, such as automatic teller machines, in that the service is embedded in the product. In fact, there are few pure goods or services (Dunning, 1989; Hirsch, 1993; Shostack, 1977).

Interestingly, the research examining the internationalization of services remains notably sparse (Boddeyn et al., 1986; Clark and Rajaratnam, 1999; Coviello and Martin, 1999; Dunning, 1993; Organization for Economic Co-operation and Development, 1997; Westhead et al., 2001). Research has labored under the traditional assumption that services are best suited for domestic markets. Despite phenomenally successful international growth in services, like fast food, service have been treated blithely (Palmer, 1985). The relative neglect in the literature regarding the role of services in creating value abroad is surprising because the growth in international services speaks of the importance of services from a managerial perspective. In addition, from a theoretical perspective, services have long been acknowledged to differ from purely manufactured goods (Dunning, 1989; Hirsch, 1993; U.N., 1994b). Pure services are typically modeled as exhibiting four key characteristics: (1) intangibility, because services outputs are not objects; they cannot be seen, touched, tasted, lifted, or dropped, (2) perishability, because service outputs cannot be inventoried, (3) inseparability, because service outputs are produced as they are consumed with the customer participating in the production of the service rather than merely receiving the service, and (4) heterogeneity, because service outputs vary widely (Aharoni, 1993). Because of these differences, by 1980, for instance, the field of marketing recognized the need to develop a body of knowledge related to services (Upah et al., 1983). Similarly, the need to examine how strategy differed for services was acknowledged (Dan, 1978). Of particular interest to researchers has been the greater intangibility of services compared with manufactured goods (Aharoni, 1993; Arvidsson, 1997). For example, in a series of articles, Parasuraman et al. (1988) refine tangibility as a component of service quality.

Yet, a decade later, the internationalization of services and the influence of service characteristics on internationalization remained largely unstudied. With the exceptions of banking and financial services, few sectors had been closely examined (Dunning, 1993). Today, our understanding of services, and its internationalization, continues to lag. Services involved in the production of physical goods are not well understood either, although, in the United States today, they constitute approximately 48% of the jobs in the highly globalized manufacturing sector (Ansberry, 2003). In addition, few studies have examined the role that the actual characteristics of services, such as intangibility, play in value creation and the generation of revenues (Cloninger, 2000).

This study seeks to help address this omission in the literature. The primary objective of this study is to examine the influence of service intangibility on internationalization and the creation of value. Drawing on the Eclectic Paradigm, this research examines traditional and emerging views regarding the influence of service intangibility on ownership and internalization advantages, two of the three advantages central to the creation of value in international production, and finds that the implications of traditional and emerging views conflict. Although both the traditional and the emerging views suggest that intangibility influences the extent and pattern of internationalization and the resulting revenues earned, the traditional views suggest that increasing tangibility of products and service will increase the ability of firms to create value and, hence, foreign revenues. In contrast, the emerging view suggests that increasing intangibility will increase their ability to create value and, hence, foreign revenues, subject to the moderating influence of management's international experience, a variable that is also examined.

This research has important implications for both business theory and practice. First, it extends the Eclectic Paradigm by exploring traditional and emerging views related to the influence of intangibility on internationalization, and the associations of intangibility on the paradigm's ownership and internalization advantages that are central to value creation. Second, it develops and tests theoretical arguments that explain the influence of intangibility on the creation of value as measured by the receipt of revenues from foreign markets. Third, it sheds light on the influence of management experience on revenues when internationalizing intangible products and services. Fourth, unlike many studies that use nonrandom case studies to examine the internationalization of service firms and smaller firms, this study provides empirical evidence based upon a large sample drawn from a comprehensive sampling frame. Finally, it discusses some reasons why the empirical findings for this sample may be more supportive of the traditional view of the influence of intangibility on internationalization.

This paper is organized in four sections. In the first section, the theoretical model is developed. Services and intangibility are defined, key studies on the characteristics and internationalization of services are reviewed, theory that associates intangibility with the ownership and internalization advantages of the Eclectic Paradigm as sources of value creation is developed, and hypotheses are presented. In the second section, the sample, data, measures, and the validity of the study are discussed. In developing operational measures, a scale for measuring service characteristics is introduced. In the third section, the analysis of the data and the results are presented. The final section of the paper discusses the findings and the implications of the findings for theory and practices in the

context of the study sample. It also states the limitations of the study and lists issues to be explored in future studies.

2. Theory and hypotheses

2.1. Service intangibility

Consistent with the work of Berry (1980), Campbell and Verbeke (1994), Clark et al. (1996), and Dunning (1989), services are defined in this research as deeds, performances, and efforts that provide benefits to customers. Thus, services are intangible. Pure service outputs cannot be seen, touched, tasted, lifted, or dropped like tangible objects. Yet, many scholars suggest that separating services and goods may be too simplistic (Arvidsson, 1997) or a false distinction (Dunning, 1989). What a firm often sells is a combination of a service and a good (Shams and Hales, 1989; Shostack, 1982). Many manufactured goods, for example, are accompanied by services such as customer service, design, distribution, and marketing (OECD, 1997). To compete successfully today, manufacturers often find that they must combine more services with their goods to remain relevant to their customers (Ansberry, 2003). Similarly, many services are accompanied by, or embedded in, physical goods such as cash withdrawals from automatic teller machines. Thus, there are actually few pure goods or services (Dunning, 1989; Hirsch, 1993), and the theoretical segregation of services from products may have long been dysfunctional (Wyckham et al., 1975).

The distinctions between goods and services are more a matter of degree. Empirical research measuring intangibility, or tangibles, supports this view (Cloninger, 2000; Hartman and Lindgren's, 1993; Parasuraman et al., 1988). Therefore, this research does not separate goods and services but, to avoid the numerous connotations commonly associated with these terms, focuses on the combined firm output and measures the service intangibility of the output. In this conceptualization, service intangibility is viewed as a continuum in which a firm's output, whether a good, a service, or, more commonly, a combination of good and service, can be ranked from *highly intangible* to *highly tangible*. In other words, a firm's output is not classified as a good or service per se, but rather as an output with some measure of service intangibility, which can vary from very low (i.e., *tangible*) to very high service intangibility.

2.2. Service intangibility and internationalization

The Eclectic Paradigm contends that three advantages—ownership, location, and internalization (OLI)—explain international investment. Each of these three advantages plays a role in the creation of value in international production and, ultimately, in the receipt of revenues from foreign markets. Although OLI was developed to explain the foreign production of manufactured goods (Dunning, 1988), evidence suggests that OLI is also applicable to service firms (Agarwal and Ramaswami, 1992; Arvidsson, 1997; Cloninger, 2000; Dunning and Kundu, 1995; Enderwick, 1989; Terpstra and Yu, 1988). Service characteristics influence the ownership, internalization, and location advantages on

which the paradigm is based. This study examines the influence of service intangibility on two of these advantages, ownership and internalization, and the resulting conflicting implications of the traditional and emerging views of service intangibility on the creation of value in international production.

2.2.1. Intangibility and ownership advantage

The traditional view holds that firms with more tangible outputs, or a low degree of service intangibility, are more likely to internationalize because they allow firms to generate revenues more easily overseas. More tangible outputs are easier for customers to evaluate (Hartman and Lindgren, 1993; Nayyar, 1992, 1993). Less communication with the customer is required (Aharoni, 1993). More tangible outputs are also easier for producers to deliver (Hartman and Lindgren, 1993). Unlike many intangible outputs that need to be produced physically close to the client (Arvidsson, 1997), tangible outputs can be produced at a location convenient to the producer.

Increasingly, an emerging view suggests the opposite, however, that more intangible outputs either allow firms to generate more revenues internationally (Markusen, 1989; Sharma and Johanson, 1987) or help push firms to seek revenues internationally (OECD, 1997; Oviatt and McDougall, 1995). This emerging view is based on several arguments. First, many firms whose outputs are highly intangible are often highly knowledge based, and evidence suggests that firms can leverage knowledge-based outputs to earn relatively higher revenues from overseas. To begin with many such knowledge-based assets are easy to transfer (Markusen, 1989). Unlike more tangible, physical assets, such as equipment, where the use at one location prevents the concomitant use at another, a more intangible asset, such as a trademark or blueprint, can be used in several markets at the same time (Markusen, 1989). Similarly, many skills can be easily moved to another market (Sharma and Johanson, 1987). One engineer or manager can visit many different locations at a relatively low cost (Markusen, 1989). Thus, with relative ease, firms can enter new markets. Entering new markets may offer opportunities to achieve economies of scale or scope (Nayyar, 1992) and additional opportunities to learn about new clients (Hitt et al., 1997). Some evidence supports this view. Many services currently traded extensively internationally, such as consulting and finance, appear to be highly knowledge intensive (Markusen, 1989). Manufacturing firms might also be more likely to provide intangible services, such as training overseas, than more tangible services, such as regular maintenance and repairs, because many services, especially knowledge-based services like consulting, also appear to have the potential to generate relatively greater revenues. Evidence suggests, for example, that purchasers of professional services do not appear to be very price sensitive (Mitchell, 1998). Similarly, firms offering services, whose quality cannot be determined until after their purchase due to information asymmetries between the buyer and seller, have been found to earn relatively higher revenues (Nayyar, 1993).

Another argument made is that the ease of transfer associated with many knowledge-based assets is also likely to decrease the risk of internationalization. In one of the few empirical studies, for example, Sharma and Johanson (1987) found that the majority of Swedish technical consulting firms surveyed entered developing countries first. They surmised that risk was not an issue because the skills or the professional technical

consultants can easily be moved to other markets. This suggests that firms whose ownership advantages are based on outputs that are characterized by greater intangibility, such as those based on knowledge or skill, can be transferred to foreign markets both more easily and at less risk than firms whose advantages are based on more tangible advantages.

Yet, another argument suggests that firms may be pushed to internationalize. Globalization has eliminated many previously protected niches (Oviatt and McDougall, 1995). Firms may feel compelled to internationalize and create a value stream internationally. This may be especially true for firms whose service outputs are characterized by a high degree of intangibility. Many intangibles cannot be legally protected. Firms may need to internationalize to avoid theft or appropriation of a service concept (OECD, 1997; U.N., 1993b). As trade negotiations continue to lower barriers to services, more markets are open to services (King, 2003). Internationalization may allow a firm with more intangible outputs to establish themselves in a market and develop a loyal customer base before their service concept can be copied and marketed by competitors. Evidence suggests, for example, that the capability to reduce franchisee opportunism is a predictor of overseas expansion for large U.S. franchisers across a variety of industries (Shane, 1996). Service firms may internationalize to lead, rather than follow, their clients overseas (Li, 1994). Failure to internationalize would open the door for imitators to serve their clients. Thus, multiple locations can also serve as a barrier to entry (Dan, 1978).

In addition, because customers find intangible outputs more difficult to evaluate, they tend to favor their current service providers (Nayyar, 1992). Evidence suggests that customers perceive intangibility as a characteristic of a riskier purchase (Mitchell, 1998). In other words, as the intangibility of a firm's outputs increases (i.e., becomes more akin to a pure service), potential customers are faced with making a purchase for an output that they are largely unable to see, touch, taste, or lift prior to the purchase. This is likely to make a more intangible output more difficult to evaluate (Nayyar, 1992), to make the perception of the purchase to be riskier (Mitchell, 1998), and to favor the current provider, whose output quality is known, if the current provider is satisfactory. They may be more hesitant to switch providers if they are satisfied already, further increasing the importance of multiple locations as a barrier to entry if clients internationalize.

Therefore, the literature suggests two viable and contrasting views regarding the influence of intangibility on international value creation. The traditional view suggests that an output characterized by a higher degree of service intangibility is more difficult to internationalize and, hence, less likely to produce foreign revenues, while the emerging view suggests that service intangibility potentially offers a number of hitherto unrecognized ownership advantages, which increase the likelihood of producing foreign revenues. Considering the paucity of empirical research supporting either view, this research proposes to test both views. However, given the new environment of declining trade barriers and increasing global competition, and the growing theoretical support for the emerging view, this study proposes that the emerging view is more likely to be supported. In other words, firms whose service outputs are more intangible are more likely to create value internationally and to generate proportion of their revenues from overseas, either from entering more countries or via a greater commitment in the country or countries they do enter.

Therefore,

Hypothesis 1. Firms whose outputs are more intangible will receive higher revenues from foreign markets than the firms whose outputs are less tangible.

The alternative hypothesis is the traditional view,

Hypothesis 1A. Firms whose outputs are more tangible will receive higher revenues from foreign markets than the than firms whose outputs are less tangible.

2.2.2. Intangibility and internalization advantage

By definition, internalization advantages stem from the ability of firms to add additional value by maintaining control internally (Dunning, 1989). The degree of service intangibility is also likely to influence the ability of firms to maintain control and, hence, the entry mode that firms choose when internationalizing. For example, increasing intangibility is likely to increase the need to produce service outputs physically near to the client (Arvidsson, 1997). Management and engineering consulting firms, for instance, may have internalization advantages due to their ability to control quality. For these firms, the degree to which their outputs are based on relatively intangible managerial skills might lead them to franchise. In the fast food industry, for instance, the same managerial skills and approaches can be used worldwide to create value, even if the product must be changed to suit local tastes (Palmer, 1985).

Similarly, management and engineering consulting firms may have internalization advantages due to their knowledge of confidential, idiosyncratic, or tacit information. For these firms, the degree to which their outputs are based on highly intangible information might lead them to choose FDI to maintain full control of these delicate potential sources of value creation. Internalization of key services may help firms to control costs and protect quality (Kotabe et al., 1998). Campbell and Verbeke (1994), for instance, argue that outputs that are more intangible increase the importance of firm reputation. A high control mode, such as FDI, allows a firm to protect its reputation. In addition, advantages based on highly intangible outputs may be difficult to protect legally through patents and copyrights, etc. Internalization may also help to protect such key assets (Kotabe et al., 1998; Enderwick, 1989). In contrast, manufacturing firms may have internalization advantages based more on economies of scale. Manufacturing firms are more likely than service firms to find it advantageous to arbitrage operations, spread exchange, and political and other risks (Dunning, 1993). These firms might create value by more efficiently serving foreign markets via exports, licensing, or joint venture agreements. Therefore,

Hypothesis 2. Firms whose outputs are more intangible will choose higher control entry modes than the firms whose outputs are less intangible.

2.2.3. Management experience and internationalization

Management characteristics are yet another important firm-specific difference that may influence internationalization and the creation of value. Some understanding of the “nuts and bolts” of doing business in another country appears to be crucial (Oviatt and

McDougall, 1995). However, the management's international experience, per se, is likely to be especially important when the outputs are more intangible. A firm's knowledge of the market becomes more important when the service content increases (Eriksson and Johanson, 1997). A high degree of intangibility, in particular, might imply a high need for personal contacts with other firms that are important in the industry (Arvidsson, 1997). Actual international experience is more likely to provide the keen knowledge of country tastes and culture that is necessary for delivering more intangible products or services. Thus, the management's international experience seems likely to interact with tangibility to influence the creation of value internationally. Therefore,

Hypothesis 3. The management's international experience and intangibility interact, such that firms with more experienced managers will receive higher revenues from foreign markets as intangibility increases.

2.2.4. *Control variables*

Scholars have suggested that several factors may influence internationalization. Therefore, this study collected data for three categories of control variables related to the organization (firm size), the top management (gender, nationality, credentials, motivations for internationalizing), and the host countries (cultural distance, transaction costs, size of the economy, and regulatory barriers). The data, however, do not permit all of the control variables to be retained in the analyses. Therefore, only important controls were used in the regressions. One measure of the importance of a predictor is its correlation to the criterion variable (Nunnally and Bernstein, 1994). A rule of thumb is that a predictor variable should be more closely correlated to the dependent variable than to the best predictor variable (Hair et al., 1992). Therefore, for the regressions, all control variables that are more closely correlated with the dependent variable (P value $<.05$) than they are with any other control variable were retained and regressed. For the logistic regressions, all control variables that are, individually, a significant predictor of the dependent variable, as measured by a chi-square improvement over the initial likelihood function significant at the .05 level, were retained and regressed. This also serves to minimize the potential effects of collinearity among the controls.

3. Methods

3.1. *Study design and sample*

The sample for this study had to insure sufficient variance in service intangibility, while, at the same time, controlling for extraneous sectoral and national variables. Therefore, this study examined three types of young, U.S.-based firms—manufacturing, engineering and technical services, and management and business services firms—founded between 1989 and 1996 in the environmental control industry. First, these three sectors should have distinctly different service characteristics. Although manufacturing firms increasingly produce service outputs (Dunning, 1993; U.N., 1990, 1996), firms providing services like consulting are more likely than manufacturing firms to exhibit the

classic service characteristics such as intangibility (Clark et al., 1996). However, firms offering technical services, such as engineering consulting, may be deliverable via methods such as video (Clark et al., 1996) and, thus, be more tangible than management consulting services.

Second, the three sectors in this industry were expected to yield a high number of international firms for study. Demand has grown worldwide for businesses to adopt environmentally sensitive products and processes (Klassen and Whybark, 1999; Millstone and Watts, 1992; Porter and van der Linde, 1995a,b), and engineering and consulting are both covered by GATS (Mabile, 1995).

Third, focusing on relatively new U.S.-based firms in the environmental control industry controls the variance of many extraneous variables and reduces the likelihood of random errors, without decreasing the variance in the variables of interest. The United States is also highly prominent internationally in the environment control industry (Engineer, 1996; U.S. Industry and Trade Outlook, 1998) and is the largest exporter of environmental goods and services (U.S. Industry and Trade Outlook, 1998).

Finally, focusing on firms founded between 1989 and 1996 maximizes the number of firms included in the sample (many newer firms, especially small, private ventures are not immediately included in many published lists), while minimizing the influence of extraneous variables due to organizational inertia as a result of sunk costs and organizational routines. Organizational inertia can inhibit the internationalization of established firms (McDougall et al., 1994). Evidence also suggests that, at least for manufacturing firms, newer firms are more likely than old firms to internationalize because of the characteristics of, and demand for, the product (Brush, 1995).

A comprehensive sampling frame, consisting of 5710 firms, was developed by searching and downloading several paper and on-line directories, and by contacting several environmental associations and state-level authorities that maintain directories and contact lists of environmental firms. A total of 14 state and national listings was used in this research. The national directories include the *Consultants and consulting organizations directory* of Gale Research (1997a,b), *The Green Pages* of the U.S. Department of Commerce (1997), *The Directory of Service Companies* of Dun and Bradstreet (1998a,b), and an on-line national directory, *Enviro-net*. Two national directories are used to check additional secondary data, which, when available, further minimize bias. These directories are *Register of Corporations* by Standard and Poor (1998) and *Directory of Service Companies* of Dun and Bradstreet (1998a,b).

Of the 5710 firms in the sampling frame, 1933 were sampled. Every fifth firm was sampled, unless the directory provided additional information, such as a firm's founding date, in which case, all firms seeming to meet the criteria of the study were sampled. Of the 1933 sampled, 20.33% were undeliverable. Following the survey method recommended by Dillman (1978), 426 of the 1540 delivered questionnaires were returned, for a response rate of 27.66%. This response rate, while lower than the claims of Dillman (1978), is fairly typical for studies targeting new or small ventures. For example, McDougall (1987) reported an 11% response rate in her study of new ventures, and Brush (1995) reported a 13% response rate in her comprehensive study of small firms. Of the 426 questionnaires returned, 190 were used in the study. To be used in the study, questionnaires had to be complete (or be completed over the

telephone), come from firms founded between 1989 and 1996, and operate in one of the three sectors selected for the study. Since many of the directories used to develop the sampling frame do not list founding dates or other information about the firm, many of questionnaires returned could not be used because they were from firms founded before 1989 or from firms which were not in manufacturing, engineering and technical services, or business and management services.

The final usable sample consisted of firms (a) located in each of the eight geographic regions designated by the U.S. Census, (b) doing business in each of the three sectors, and (c) founded each year between 1989 and 1996 (except for the manufacturing sector that did not have any firms in the sample that were founded in 1992). International firms in the sample have entered countries in all regions in the world, with Canada and Mexico being the most popular destination, closely followed by Europe and the Caribbean, Central and South America regions. The majority of the firms were in the engineering and technical services sector, 68.4%, of which 20% were international, followed by the business and management services sector, 23.2%, of which 18% were international, and the manufacturing sector, 8.4%, of which 50% were international. Although the number of manufacturing firms in the final usable sample was somewhat smaller than expected, it is believed to be highly representative of the industry, given the great efforts made to develop a comprehensive sampling frame. In addition, to the extent possible, nonresponse bias was assessed by comparing data available in the various directories, such as staff size, product description, geographic areas served, and revenues, of the responding and nonresponding firms. Attempts were also made to contact some nonrespondents for more in-depth comparisons.

3.2. *Data*

Many newer ventures, especially service ventures, are small, private firms for which little public information is available. Knowledge about the nature of service characteristics of goods and services is also limited. Therefore, the primary data source is a self-administered survey questionnaire of the firms in the sample. Such cross-sectional data are suitable for the research questions (Babbie, 1992; Cooper and Emory, 1995).

All data used in the analyses are standardized so the regression coefficients are beta coefficients that allow direct comparisons of the relative effects of each independent variable on the dependent variable (Hair et al., 1992). Standardization also eliminates one source of heteroscedasticity, unequal variances, in the predictor variables (Hair et al., 1992). Normal probability plots of the residuals are used to check the normality of error distributions. Residual plots against the fitted values are used to insure that the regression functions are linear. In a linear model, the residuals should tend to fall within a horizontal band centered around zero (Neter et al., 1990).

3.3. *Validity and reliability*

To insure validity, multiple efforts were made to develop a valid instrument for measuring the service characteristics. Service intangibility (as well as the other three characteristics, perishability, simultaneity, and heterogeneity) was assumed to be indepen-

dent and continuous.¹ Consistent with the recommendations in the literature (Hinkin, 1995; Nunnally and Bernstein, 1994; Schriesheim et al., 1993), multiple items based on the theoretical definitions were iteratively refined by using panels of experts consisting of business professors to assess the theoretical correspondence of the items to the construct's content domain, and to insure that the items provide adequate theoretical coverage of the subject. The final panel was able to successfully identify the service characteristics being tapped by the items, with 91.89% accuracy.² The understandability of the items and the questionnaire to the business public was also iteratively tested and improved, first, via verbal feedback from several business owners who were administered the questionnaire by telephone, and then by students in several evening business courses, many of whom had full-time jobs.

To minimize common method bias, the firms were asked for copies of any brochures or available information about their services and their company. When available, a firm's home page on the Internet was also used to try to verify information. Finally, over 30% of the firms were called to complete, clarify, and verify information.

The consistency of individual items was assessed using Cronbach's alpha. Stability was assessed by asking a small number of respondents to resupply their answers at a later time, via telephone.

3.4. Measures

The dependent variable is the receipt of foreign revenues (revenues earned outside the United States) and entry mode. The receipt of foreign revenues is measured two ways, by foreign sales growth and by international sales intensity. Foreign sales growth is defined as the mean growth of the firm's foreign sales since the firm began to receive revenues from foreign markets. International sales intensity is defined as the ratio of foreign sales from all foreign markets to total sales. It is operationalized as foreign sales in 1998 to the total sales revenue from all foreign markets and the U.S. market in 1998. Primary data obtained with the questionnaire were used to determine the receipt of foreign revenues.

International entry mode is defined as LOW and HIGH control modes, where LOW control modes are the modes absence of ownership, such as exports, licensing, and franchising, and HIGH control modes are sales offices, joint ventures, and subsidiaries, which involve ownership.³ LOW control was coded as 0 and HIGH as 1.

The independent variables are service intangibility and management's international experience. Since service intangibility is conceptualized as a continuum from highly intangible to highly tangible, service intangibility is operationalized as the net degree to

¹ Factor analysis, as discussed in Footnote 5, found that service intangibility (and each of the other service characteristics) constituted independent dimensions.

² This figure applies to the entire instrument, which was designed to measure service separability, heterogeneity, and perishability as well as intangibility.

³ If a firm indicated they entered a country using two or more modes, such as exports and joint venture, the entry mode was listed as HIGH control if any mode listed involved ownership (sales offices, joint ventures, or subsidiaries).

which an output consists of intangible outputs. Thus, the measure includes items for highly intangible, or the nonmaterial aspects of a service, including atmosphere, ideas, performance, attitude, etc. (Clark et al., 1996), that “cannot be seen felt, tasted, or touched” (Zeithaml et al., 1985, p. 33), and items for highly tangible objects that are more easily identified (Clark et al., 1996).⁴ To measure service intangibility, respondents were asked to rate how well six items (three related to tangibility and three to intangibility) describe their company’s primary products or services, those products or services that generate the bulk of their sales to external customers. A six-point scale is used where one means the item is a very weak description, five means it is very strong description, and N/A means the item is not descriptive at all. This portion of the questionnaire is shown below:

N/A	1	2	3	4	5
Not descriptive at all	Very weak description				Very strong description
Your firm’s products or services consist of:					
Manufactured products or assembled goods	N/A	1	2	3	4 5
Specialized skills, tasks, efforts, or performances	N/A	1	2	3	4 5
Mechanical skills, installation, repairs, or maintenance	N/A	1	2	3	4 5
Professional skills, know-how, or design tasks	N/A	1	2	3	4 5
Reports, audits, manuals, or documents	N/A	1	2	3	4 5
Videos, software, or technical or industrial films	N/A	1	2	3	4 5

The factor analysis was used to provide additional evidence of content and construct validity (Nunnally and Bernstein, 1994). Principal components extraction were used with the latent root criteria (eigenvalues greater than one) and varimax rotation.⁵ Standardized variables were used in all analyses because standard scores are easier to interpret, and they prevent scores with higher variance from having a heavier weighting in composite measures (Nunnally and Bernstein, 1994). Two items were retained: “professional skills, know-how, or design task” and “reports, audits, manuals, or documents”.⁶ Communalities were 0.78225, and 0.86583, respectively. Alpha was .6344, which is reasonable, given that it is a very short scale and that the communalities are relatively high.

The management’s international experience was operationalized as the total number of years that top management team members (President, CEO, COO, and Vice-Presidents) have worked overseas.

⁴ This requires the use of reverse coding. Although reverse coding has been questioned, Hinkin (1995, p. 972) finds that “an examination of those studies that used negatively worded items did not reveal any discernible pattern of problems in subsequent analysis”.

⁵ Factor analysis was applied to the entire 16-item instrument designed to measure service separability (simultaneity), heterogeneity, and perishability, as well as intangibility. The final factor analysis yielded a four-factor solution, with nine reliable items that explained 73.5% of the variance. Communalities were all fairly large, ranging between 0.64109 and 0.86879, indicating that the factor solution extracted a large amount of variance.

⁶ Manufactured products or assembled goods loaded moderately highly on intangibility (0.40397), but loaded much more highly on perishability (0.65261). Since it also made theoretical sense, this item was retained as a perishability item. The other three items were dropped.

4. Analyses and results

4.1. Hypotheses 1 and 3

Hypotheses 1 and 3 were tested by a series of hierarchical regression analyses. As the focus of this study is the influence of service intangibility on internationalization, intangibility is entered after the control variables have been entered. In this way, any change in R^2 will be due to the addition of the service characteristic. Any interaction terms are entered last to insure that any change in R^2 will be due to the proposed interaction. Only important control variables were used in the calculations, where importance was defined as being more closely correlated with the dependent variable ($P < .05$) than with any other control variable, in keeping with the literature (Hair et al., 1992; Nunnally and Bernstein, 1994). A preliminary one-way analysis of variance found ($P < .05$) that the outputs of international firms are more tangible.

4.1.1. Foreign sales growth

Normal probability plots of foreign sales growth (and of the residuals computed using it) showed some deviations from normality. Since the regression model implies that the dependent variable is a normal variable (Neter et al., 1990), the logarithmic transformation of the variable, which is substantially normal, was used in the regressions. Table 1 shows the results of the hierarchical regressions on the dependent variable foreign sales growth. Model 1 presents the base equation after the correlations were examined to determine the control variables. Two variables, transaction costs and marketing experience, are included.

Table 1
Regression models

Dependent variable	Foreign sales growth ^a			
	Model 1	Model 2	Model 3	Model 4
Control variables				
Transaction costs	0.486042***	0.519043***	0.479549***	0.480278***
Marketing experience	0.380273***	0.346106**	0.269541*	0.257894**
Independent variables				
Intangibility		-0.259843*	-0.250368*	-0.191803
Moderating variables				
Management's international experience (main effect)			0.229877	0.595191*
Management's international experience (interaction)				-0.407554
<i>F</i> value	8.80717***	7.58954***	6.69857***	5.97945***
R^2	.32252	.38743	.43360	.46790
Adjusted R^2	.28590	.33638	.36887	.38965

^a Logarithmic transformation.

* $P < .10$.

** $P < .05$.

*** $P < .01$.

The equation is significant at the .01 level and explains 28.6% of the variance in foreign sales growth.

Hypothesis 1 predicts intangibility positively influences the receipt of foreign revenues. Model 2 presents the results of the regression. The regression is significant at the .01 level and explains 33.6% of the variance, a 5% increase over the base equation. The increase in R^2 in the model is a statistically significant increase, in comparison with the base equation. The sign of the beta for intangibility is negative, indicating support for the traditional view of the influence of intangibility expressed in Hypothesis 1A, and a lack of support for Hypothesis 1. In Model 3, the variables, intangibility, and management's international experience are entered. The equation is significant at the .01 level. The equation explains 36.9% of the variance, a 3.2% increase. The increase in R^2 is not statistically significant, although the variable approaches significance at a .1 level (P value=.1001). The next step is to enter the interaction term between intangibility and management's international experience. If the interaction is significant, the management's international experience is a pure moderator, as predicted. Model 4 presents the results. The equation is significant, but the interaction term is not. Therefore, Hypothesis 3 is not supported.⁷

4.1.2. International sales intensity

Again, the logarithmic transformation of the international sales intensity shows less deviation from normality, and the transformed variable is used in the regressions. The large sample size will diminish detrimental effects due to nonnormality (Hair et al., 1992).⁸

Table 2 shows the results of the hierarchical regressions on the dependent variable, international sales intensity. Model 1 presents the base equation after the correlations were examined to determine the control variables. Two variables, motivations for internationalizing and technical experience, are included.⁹ The equation is significant at the .05 level and explains 15.8% of the variance in international sales intensity. As shown in Model 2, entering the intangibility variable in the second block yield a significant solution that explains 22.8% of the variance, a 7% increase over the base equation. The sign of the beta for intangibility is negative. This, again, indicates support for the traditional view of the influence of intangibility expressed in Hypothesis 1A and a lack of support for Hypothesis 1. In Model 3, the variables, intangibility, and management's international experience, are entered. The equation is significant and explains 23.3% of the variance, a 7.6% increase, but the management's international experience is not statistically significant. The next step is to enter the interaction term between intangibility and management's international experience. If the interaction is significant, the management's international experience is a pure moderator, as predicted. Model 4 presents the results. The equation is significant, but the interaction term is not. Therefore, Hypothesis 3 is not supported.

⁷ Collinearity effects also become noticeable in this solution.

⁸ Normal probability plots of the regressions verified that the residuals were substantially normal.

⁹ Technical experience was actually more highly correlated with management credentials; but it was included because, of all the control variables, it was the most highly correlated with international sales intensity.

Table 2
Regression models

Dependent variable	International sales intensity ^a			
	Model 1	Model 2	Model 3	Model 4
Control variables				
Motivations	0.258588*	0.231312	0.228148	0.223523
Technical experience	−0.346384**	−0.291688*	−0.279406*	−0.278201*
Independent variables				
Intangibility		−0.299694*	−0.312938**	−0.303506**
Moderating variables				
Management's international experience (main effect)			−0.159336	−0.098414
Management's international experience (interaction)				−0.068846
F value	4.57830**	4.73268***	3.88535**	3.03031**
R ²	.20277	.28859	.31371	.31466
Adjusted R ²	.15848	.22761	.23296	.21083

^a Logarithmic transformation.

* $P < .10$.

** $P < .05$.

*** $P < .01$.

4.2. Hypothesis 2

Hypothesis 2 is tested with logistic regressions because the dependent variable is dichotomous rather than metric. The coefficients in the logistic regression are measures of the changes in the odds ratio, the ratio of the probability of the event, indicated by the dependent variable divided by the probability of no event. Equations can be compared by examining the difference between the $-2LL$, which is the change in the predictive fit from one equation to another, and by the chi-square statistic indicating the improvement relative to the base model. Classification tables compare the predicted values versus the observed values, and report the percentages correctly predicted. Table 3 shows the results.

The first step in the hierarchical logistic regression is to determine the control variables to use to construct the base equation. After the base equation is determined, the independent variables are added and compared with the base equation. The important controls, defined as any control that is, individually, a significant predictor of the criterion variable, as measured by a chi-square improvement over the initial likelihood function significant at the .05 level, are firm size, management nationality, and management's experience with new ventures. Model 1 presents the base equation. The equation is significant at the .01 level and over 90% of the predicted values are correct.

In Model 2, the intangibility variable is entered in the second block. Intangibility is predicted to positively influence the selection of a high control entry mode. Model 2 presents the results. The model's chi-square improvement is significant at the .1 level. However, the sign of the intangibility coefficient is negative. Therefore, although intangibility is a significant predictor, Hypothesis 2 is not supported. Lower intangi-

Table 3
Logistic regression models

Dependent variable	Entry mode	
	Model 1	Model 2
Control variables		
Size	2.6865	2.4099
Nationality	0.3669	0.4589*
New ventures experience	0.5948*	0.7039**
Independent variables		
Intangibility		−0.4361*
−2 Log likelihood	61.582	58.732
Chi-square improvement ^a	30.655***	2.850*
Percent correct	90.53	90.53

^a Improvement relative to Model 1.

* $P < .10$.

** $P < .05$.

*** $P < .01$.

bility (greater tangibility) positively influences the selection of a high control entry mode.

5. Discussion

This research presents what is believed to be the most advanced measure of intangibility available today. More importantly, the results of the regression analyses in this sample lend support for the premise of this research: that service intangibility is an important variable in understanding value creation internationally. The degree of intangibility influences both the revenues earned and the entry modes used. Tangibility (rather than intangibility) was found to be positively related to the receipt of foreign revenues for both of the measures used, foreign sales growth and international sales intensity. These findings tend to support the traditional view about the difficulty of internationalizing services, and suggest that despite the lessening barriers to trade in services, creating value internationally continues to be easier with tangible outputs.

However, it may also be possible that one or more of the arguments relating to the emerging view do not hold, or do not hold for the firms in this sample. For example, few of the firms in this sample indicated that their outputs were significantly more innovative than those of their competitors. Thus, the argument that firms with intangible outputs might be pushed to internationalize to avoid appropriation seems less applicable to this sample, or it may be that the intangible assets, in general, are more ambiguous and difficult to copy, decreasing the risk of appropriation. Similarly, this research relied on a sample of young firms because organizational inertia can inhibit the internationalization of established firms (McDougall et al., 1994), and some evidence suggests that newer firms are more likely than old firms to internationalize because of the characteristics of, and demand for, the product (Brush, 1995). Yet, younger firms might lack sufficient resources to adequately support internationalization efforts. One possible alternative for future research

would be to examine independent young divisions or groups within larger corporations that have ample resources.

Regarding entry mode, intangibility, as predicted, was a significant predictor of entry mode. However, the sign was opposite to that predicted. In other words, firms whose products and services are more tangible (like traditional manufactured goods) are more likely to use a higher control mode. The opposite had been hypothesized because it seemed that firms with intangible products and services would require a higher control mode to maintain quality, reputation, confidential, idiosyncratic, or tacit information, etc., to create value internationally. One interpretation of this finding suggests that firms may be able to maintain control of their intangible products and services without using what are traditionally considered high control entry modes. Most international firms in the sample conduct most of their work “at home”. Few firms had employees living abroad or travelling frequently. Another interpretation of this finding, however, is that firms fail to understand the need for a higher control mode when firm outputs are more intangible. In this sample, firms whose products and services are more intangible receive significantly less foreign revenues. This seems to support this view, as it implies that firms may not be very successful in exerting control and, as a result, fail to create as much value overseas as firms with more tangible outputs do. However, the lack of adequate resources may be a factor in this finding as well. Perhaps, managers understood the need for control but lacked the resources to maintain personnel or facilities overseas. Supporting expatriate in positions abroad may be too expensive of a proposition for many young firms. Future research should examine these possibilities.

In addition, in light of the findings that service intangibility has an important influence on internationalization, the other service characteristics, heterogeneity, perishability, and simultaneity, merit further examination as well. Each may potentially impact internationalization, revenues earned, and the selection of entry mode in some way. For example, heterogeneity among service providers may have a strong influence on exerting control over the service output and, hence, on creating value overseas. Another possibility for future research relates to theoretically and empirically examining and comparing alternative characterizations of service content such as “soft” and “hard”, or by their transportability. For example, one study of the banking industry ranked the transportability of each possible banking output, such as credits cards, prepayment cards, and financial loans, as very good, fair, and good, etc. (U.N., 1994a). In addition, although this research presents what is believed to be the most advanced measure of intangibility available today, future research should also seek to replicate the findings regarding the influence of intangibility on internationalization, and the finding that service intangibility is an independent dimension (from the other service characteristics).

Yet, another possibility for future research relates to the continued existence of trade barriers and legal differences. It is possible that it is simply more economically viable to ship manufacturing overseas and to keep higher skilled, intangible service jobs at home (Ansberry, 2003). This may be partly due to the trade barriers that continue to exist in services. Tradability might be more important in sectors with lingering trade barriers. For example, until recently, in the insurance industry, only 7 out of 133 countries allowed foreign companies to operate freely, 35 countries excluded foreign companies altogether,

and the other countries imposed various degrees of control (U.N., 1993a). In addition, the legal qualifications and standards for professionals like doctors, lawyers, and accountants continue to vary from country to country (Snape, 1993). For example, in the United States, some states have residency and citizenship requirements for practicing law, and accountants must use U.S. accounting standards rather than international standards that are used in Europe (King, 2003). Similar restrictions might influence the strategic decisions of the engineering and technical services and of the management and business services firms in this sample. Thus, all in all, despite the care taken in designing the research reported here, the emerging view of the influence of intangibility on internationalization can certainly not be ruled out and merits further study.

In addition, future research should consider examining service characteristics in terms of different theoretical frameworks and methodologies. This research supports the idea that the Eclectic Paradigm may need to systematically incorporate additional variables, as suggested by Dunning (1995, 1988). In addition, the internationalization literature has traditionally emphasized the activities of large manufacturing firms. Findings for smaller firms and firms involved in the production of services might be inherently different (Coviello and Martin, 1999). For one thing, managers in smaller firms may lack the experience or the resources to follow a rational decision-making process regarding entry mode (Kumar and Sabramaniam, 1997). In addition, the internationalization concept itself may be too broad a concept to be examined within a single theoretical framework (Coviello and Martin, 1999).

For managers, there are several important implications. First, managers, like many researchers, need to broaden their strategic thinking. Internationalization and the creation of value must not be limited by thinking in rather outdated product- or service-oriented terms. The language of practicing managers must begin to be more inclusive and recognize that service intangibility applies to most firm outputs today. Second, managers need to heighten their awareness of the implication that service intangibility has on the issue of managerial control and of the potential impact of service intangibility on firm profitability. The service intangibility of their firm outputs is an important variable. Third, managers need to begin explicitly incorporating the service intangibility of their firm outputs into their decision making. Evidence suggests that service intangibility should be considered when deciding to internationalize and when making entry mode decisions.

Finally, the findings related to the control variables suggest that the internationalization of newer ventures may be different from old ventures. Foreign nationals in top management, managers with marketing and new ventures experience, differences in travel undertaken, etc., appear to be influential variables in determining the success in creating value internationally, as well as in determining the patterns of internationalization. This is yet another interesting area for future research.

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