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# International Diversification, Performance and Offshoring: the Case of the Computer Services Industry

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## *Abstract*

*This article deals with the internationalization process in the computer services industry. It discusses two aspects of internationalization: the relationship between international diversification and firm performances and the new process of offshoring part of the business to low-cost countries. Analysis is based on a proprietary database covering data for the industry's 45 largest companies for the past nine years (1998-2006). It shows that product internationalization has not generated substantial profits for firms that have given priority to international growth. Non sequitur, though precise data is lacking, it seems that it has become common practice over the last five years to outsource parts of the business to subsidiaries in low-cost countries. We do not find any relation between offshoring and profitability or internationalization. The internationalization of process and product seems to be disconnected.*

## **1. Introduction**

The relationship between corporate multinationality and performance remains an important research topic, constantly renewed. The aim here is to question the justification for the "be global" imperative in corporate practice. There are already many empirical studies, but there is still room for further questioning. The vast majority of studies on this topic draw on samples consisting exclusively or very largely of industrial firms. In addition many studies only focus on a single country (mainly the United States). Lastly there are few sector-specific studies. It is this aspect that the present article aims to explore, with a consideration of the internationalization process in the computer services industry. This approach allows the use of a sample consisting, half and half, of US and other firms.

Recent work has highlighted the non-linear nature of the relation between internationalization and corporate performance. The results of empirical studies are split between U-shaped, inverted U-shaped and sigmoid (S-shaped) relations. One of the problems with existing studies is that they do not take account of the respective profi-

<sup>1</sup> Gérard Grégoire (Professor, UPMF) implemented the algorithm of the FGLS procedure.

tability of national and international business, because they use databases that do not contain this information. This makes it difficult to interpret the empirical results. The present work is original in that it draws on a proprietary database into which we have entered these data, whenever publicly available (annual reports and form 10-Ks).

Another point concerning the computer services industry is the trend towards offshoring and outsourcing in low-wage countries. We need to know more about this new international division of labour. Though much has been written on the subject, very little empirical work has been produced. Our database includes a measurement of offshoring employment, enabling a preliminary evaluation of this phenomenon.

This paper raises two issues:

- What are the links between internationalization and profitability?
- What are the links between offshoring, internationalization and profitability?

The first section outlines the results of recent work on multinationalization of companies and more specifically service companies. The second section presents the methodology used and the results. The third and last section is more exploratory, presenting an initial inquiry into offshoring of computer services firms.

## **2. Internationalization and profitability**

### **2.1. The general arguments**

The arguments in favour of the benefits of international diversification draw largely on the notion of internalization: taking advantage of economies of scale, for instance by spreading fixed costs over several countries, and of economies of scope and learning. In addition, in keeping with the resource-based theory of the firm, companies may deploy their competencies and intangible assets abroad. Advocates of international diversification also point out that international firms are often large corporations that can take advantage of (and sometimes create) imperfections in the marketplace, for instance the possibility of arbitrating between the costs of factors (capital and labour) in various national spaces in which they are active (Lu; Beamish, 2004).

Alongside these benefits, internationalization also involves costs, due to the novelty and foreignness of this kind of operation. Geographical remoteness and cultural differences give rise to organizational and transactional costs.

Overall the relation between profitability and international diversification is supposed positive and initial studies have tested a linear relation. But more systematic application of the time factor to analysis of the internationalization process prompts the following remarks.

At the outset internationalization enables performance gains because it almost always concerns countries that are geographically and culturally close. Firms consequently reap the benefits of economies of scale, familiarity with the market, and their in-house competencies. Firms may even make better use of their management resources. The costs associated with early internationalization are lower than the cor-

responding profits (Ruigrok; Wagner, 2003). But further internationalization gradually distances firms from their geographical and cultural roots, and demands the setting up of specific management tools for international activities, increasing in turn the cost of coordination and auditing (Hitt; Hoskisson; Kim, 1997, Gomes; Ramaswamy, 1999).

Contrary views have been proposed. Internationalization is always costly from the start because it is necessary to invest in new markets, promote a brand or corporate image, learn about new markets, adapt products or services, and so on. These efforts are summarized in the literature under the term "liability of foreignness" (Contractor; Kundu; Hsu, 2003). Companies subsequently benefit from international activities as fixed costs are more widely spread and the advantages of internationalization are achieved. In addition, thanks to organizational learning, firms come to know how to manage operations in various countries (Katrishen; Scordis, 1998). This improves their knowledge base because host countries hold specific resources and locations (Lu; Beamish, 2004). Lastly the same conclusion regarding the limitations on internationalization generally prevails: companies tend to over-invest abroad and internationalization becomes costly again because investments are increasingly distant, with a corresponding rise in the complexity of their management, each new country demanding increasingly specific treatment.

Some authors have thrown doubt on this conclusion, advancing the hypothesis of radical organizational learning. It follows that profitability does not necessarily drop as the rate of internationalization increases (Ruigrok; Wagner, 2003). For example, Ruigrok & alii (2007) have found there is no drop in the profit margin of Swiss multinationals with extreme degrees of multinationalization (more than 90% of their activity located abroad). The authors suggest that it is intermediate internationalization that is expensive whereas a high degree of internationalization is beneficial.

Depending on whether one favours trends or counter-trends, these positions may be summarized as follows:

Early internationalization is or is not costly;  
Medium internationalization is generally beneficial;  
A high-degree of internationalization is or is not expensive.

Second order arguments may prove very operative. For instance there is a strong likelihood early internationalization of small and medium-sized enterprises will be costly because these firms usually lack organizational expertise (Lu; Beamish, 2001). Similarly a small country like Switzerland, surrounded by large countries of which it shares languages, has no difficulty doing business abroad.

## **2.2. Internationalization of services**

Services are experience rather than inspection goods, so reputation and brand image can allow transfrontier advantages. In knowledge-based service sectors competencies, which are always a mix of formal and tacit knowledge, become a distinctive asset.

In the same way privileged access to certain markets can be a competitive advantage. This is true of service companies that follow the multinationalization of their national customers (Dunning, 1989). Lastly new communications tools can enable small

teams in foreign subsidiaries to be managed cheaply, while benefiting from the knowledge resources of the parent company.

Applying the counter-trends to the service sector yields the following arguments: markets for services are much more local than markets for goods. Economies of scale are consequently more difficult to achieve or completely non-existent. Moreover services must be adapted to local conditions and almost always produced on the spot (linked to the simultaneity of production and consumption).

Other authors (Brock; Yaffe; Dembrovsky, 2006) think that even early internationalization can show a profit for US service companies already accustomed to working with multiple divisions and sites. They can keep track of overseas customers at no additional cost because no change in organization is involved, which would not be the case for firms in other countries.

Even if the vast majority of empirical studies devoted to the relation between profitability and internationalization has not focussed on services (Bryson, 2001; Contractor; Kundu; Hsu, 2003), there are now several studies along these lines and it is perhaps useful to detail the most recent (table 1).

Table 1: Relations between internationalization and profitability in service sectors

Authors	Sample	Results
Katrishen; Scordis (1998)	93 insurers over 8 years (1985-1992)	No relation Negative for high ratios
Capar; Kotabe (2003)	81 German firms from 4 services (average over 3 years: 1997-1999)	Positive U form with a threshold of 18% for FSTS
Contractor; Kundu; Hsu (2003)	101 firms from 11 services over 6 years (1983-1988)	Positive S form (negative slope first)
Brock; Yaffe; Dembrovski (2006)	73 US and 13 UK law firms (2003)	Positive U form for UK Inverted U form for US
Hitt; Hoskisson; Kim (2006)	72 US law firms over 8 years (1992-1999)	Positive Inverted U form
Contractor; Kumar; Kundu (2007)	127 Indian firms over 5 years (1997-2001) from 4 services	Positive Linear form

There seems to be no clear-cut pattern regarding the financial advantages or disadvantages of internationalization in the service sector.

If we apply the arguments cited above to the computer services industry we may note the limited economies of scale in this sector but on the other hand the possible scope

for brand leverage. Under these circumstances we may posit that there is no relation between internationalization and the profitability of firms.

### **3. Empirical analysis of international diversification**

#### **3.1. Method and data**

This work is based on a proprietary database of the top 45 computer services companies including mainly independent service vendors. The database contains data for nine years from 1998 to 2006. We extracted a panel of 34 companies that were present for all nine years. The panel contains 18 US firms and 16 non-US firms but no Indian firms.

The database contains the usual variables. When available we included international earning before income taxes (IEBIT) and its corresponding national earning before taxes (NEBIT). It is much more difficult to evaluate the size of the offshore workforce. First, this information is not always available in annual reports or Form 10Ks (or other official data). Second, when available, it is not standardized: subsidiaries in low and medium-income countries may themselves resort to offshore production while maintaining some activity in the local market. We have tried to verify this detail carefully by checking against changes in the total turnover to total employment ratio, which drops as a company steps up its offshoring operations, all other things being equal.

As dependent variables, we use the operating result on sales (ROS) ratio. The independent variable is the foreign sales to total sales (FSTS) ratio. Many internationalization indices have been proposed (Sullivan, 1994, UNCTAD, 2005). Most work uses multi-industries data and one of the problems is due to the difficulty of identifying an index that makes sense for each industry involved. In the present case the fact that we are only studying a single industry makes the choice of index less problematic as firms follow the same pattern of managerial practice to a far greater extent.

We included two control variables, one for the size of companies, the other for the origin of the firm, a dummy taking the value of one if it is an American firm. For size we used the natural logarithm of total assets (the natural logarithm of total employment gives the same results).

Bergh (1995) and Bergh; Holbein (1997) show that panel data or other repeated database measurements violate the assumptions of the usual OLS (non-autocorrelation and homoscedasticity) or the ones of some simple GLS models. Bergh (1995), for instance, evaluated the relationship between diversification and performance, demonstrating that the use of classical methods –which violate the assumptions – induces erroneous conclusions, in his case the existence of a relation between the two variables.

Our model is a panel model without correlation between firms at fixed time, but with timewise autocorrelation allowed for each firm: the disturbance covariance matrix is constituted with blocks of diagonal matrices.

The methodology involves a refinement of the often used Kmenta (1986) model. Thus we implemented an iterated FGLS (Feasible Generalised Least Square) pro-

cedure (Greene, 1993). In our setting, this provides a maximum likelihood estimate (Oberhofer; Kmenta, 1974). Firstly OLS method is applied and provides a first estimate of the error covariance matrix. Then GLS model is fitted using the estimated covariance matrix. A new estimate of the error covariance matrix is obtained and the process is iterated until convergence of the model coefficients. This algorithm was implemented in SAS-IML language.

### 3.2. Results

We shall consider the question from two angles: first by looking at the relation between overall corporate profitability and the extent of internationalization; secondly by trying to evaluate the profitability of international activities themselves. For this purpose, and continuing use of the data pooling method, we shall compare international profitability to national profitability.

#### Profitability and internationalization

We specify the following three models:

$$\text{ROS} = a_1 + a_2 \text{LnTa} + a_3 \text{USA} + a_4 \text{FSTS} + e;$$

$$\text{ROS} = a_1 + a_2 \text{LnTa} + a_3 \text{USA} + a_4 \text{FSTS} + a_5 (\text{FSTS})^2 + e;$$

$$\text{ROS} = a_1 + a_2 \text{LnTa} + a_3 \text{USA} + a_4 B + a_5 C + a_6 D + e.$$

The variables B, C, D are dummy which have value 1 if  $0.06 \leq \text{FSTS} < 0.17$  for B,  $0.17 \leq \text{FSTS} < 0.4$  for C and  $\text{FSTS} > 0.4$  for D. We can test the non linearity of the function by implementing these variables. The model test for a difference with the non included variable A which has value 1 if  $\text{FSTS} < 0.06$ . Intervals are chosen in such a way that observations are fairly distributed. This model allows us to evade the possible correlation between the variable and its square (table 2).

The fit of the models is very low and no coefficient is statistically significant even at the 10% level, except the intercept. The three models give the same results. There seems to be no relation between internationalization and performance. The two control variables are themselves not significant. One possible interpretation is that in a new industry like this one, patterns are not yet settled down and so there are not definite trends.

Table 2: Effect of internationalization on firm performance (ROS)

MLE	Model 1	Model 2	Model 3
Intercept	0.101 (0.000)	0.103 (0.000)	0.096 (0.002)
LnTa	- 0,000 (0.905)	-0.000 (0.953)	- 0.000 (0.980)
USA	0.020 (0.124)	- 0,020 (0.139)	0.019 (0.127)
FSTS	- 0.031 (0.119)	- 0.072 (0.178)	
(FSTS) <sup>2</sup>		0.051 (0.406)	
B			0.003 (0.720)
C			-0.006 (0.506)
D			-0.016 (0.134)

(p-value tra brakets)

#### Profitability of international activities

We are able to evaluate the profitability of international activities and correspondingly the profitability of the national activities for a relatively large subset of our database (table 3).

Table 3: Comparison between national and international profit rate

	Foreign EBIT/Foreign Sa- les	National EBIT/National Sa- les
Unweighted average	5.5 %	9.8 %
Weighted average	4.7 %	10.5 %

Number of replies: 223.

The international activities are less profitables than the national ones'.

## **4. Offshoring and the computer services industry**

Despite the large number of publications on offshoring many of them either have no empirical content at all or use Nasscom statistics which provide a very general pic-

ture of trends in India's computer services industry. An interesting paper from Arora; Forman (2007) examines empirically the decision to outsource in about 100,000 US organizations. The authors conclude that not all information technology services can be outsourced, specifically programming and design. Another paper, from Gefen; Carmell (2008), shows that when outsourcing projects through an online programming marketplace, offshoring is not an automatic choice, all other things being equal. Our position is intermediate, seeking to evaluate offshoring trends in the computer services industry for customers in industrialized countries.

Little is known about the factors determining offshoring. We may posit that the findings of Arora; Forman (2007) regarding US organizations can be transposed to their IT subcontractors. It thus seems plausible that offshoring depends on the sub-segment in which a firm is operating. If this is the case, offshoring is not linked to a firm's performance nor to its degree of internationalization. We should however emphasize the exploratory nature of this work on the determinants of offshoring.

The data used is a subset of our database for 2006. It contains 42 firms, 24 of which are American. We will also use a subset excluding three US firms – First Data, Lockheed Martin and Northrop Grumman – which are not independent service vendors, the computer services activity not being their main activity. The R&D rate of firms in this sector provides an initial indication of the sub-sectors in which they are positioned. It will serve as a control variable, much as the size of the company measured by the natural logarithm of sales. The dependant variable is the ratio offshore employment / total employment. The independant variables are the ratio Operating Income / total assets and Foreign Sales/ Total Sales.

We propose the following models:

$$\text{Rate of offshoring} = a + b \text{ FinancialPerformance} + c \text{ R\&D rate} + d \text{ FirmSize} + e$$

$$\text{Rate of offshoring} = a + b \text{ FSTS} + c \text{ R\&D rate} + d \text{ FirmSize} + e$$

The results of the OLS regressions are as follows (table 4 and 5):

Table 4: Offshoring and profitability (OLS)

N	42	42	39	39
Intercept	- 0.045 (0.754)	- 0.016 (0.913)	- 0.059 (0.689)	- 0.027 (0.857)
LnTS	0.019 (0.294)	0.017 (0.350)	0.021 (0.260)	0.0193 (0.311)
OI/TA	- 0.360 (0.326)	- 0.397 (0.284)	- 0.345 (0.398)	- 0.381 (0.352)
R&D		- 0.006 (0.372)		- 0.007 (0.309)
F-statistic	0.943	0.898	0.899	0.956
R2	0.046	0.066	0.048	0.076

(p-value tra brakets)

Table 5: Offshoring and internationalization (OLS)

N	42	42	39	39
Intercept	- 0.059 (0.675)	- 0.033 (0.822)	- 0.070 (0.635)	- 0.040 (0.790)
LnTS	0.015 (0.413)	0.013 (0.500)	0.018 (0.360)	0.015 (0.438)
FSTS	0.0006 (0.433)	0.0007 (0.373)	0.0004 (0.615)	0.0005 (0.552)
R&D		- 0.006 (0.377)		- 0.006 (0.324)
F-statistic	0.759	0.769	0.655	0.770
R2	0.037	0.057	0.035	0.062

(p-value tra brakets)

The results of empirical analysis show that there is no linear relation between the rate of offshoring and the profitability of companies in the computer services sector nor with their degree of internationalization. Neither size nor differentiation (measured by rate of R&D) display a relation with the dependent variable.

## 5. Discussion and conclusion

Empirical analysis shows that international activity is generally not very profitable for firms in the computer services industry. As internationalized firms are just as profitable as their non-internationalized counterparts, we are led to conclude that firms with excess profits from their home market tend to waste them on foreign markets. A possible interpretation of this phenomenon is that internationalization is a growth strategy holding the promise of long-term benefits derived from a monopoly position.

The development of internationalization is generally based on a mixture of economies of scale and/or variety and/or innovation on the supply side and not very specific (or perhaps local) demand. In the case of professional services internationalization may be motivated by the advantages of (brand) differentiation and method standardization (industrialization of such services). But in fact computer services have still not been "industrialized" fifty years after the start of the industry. Japanese attempts to set up software factories did not work out and the current wave of "relocations" to India are rooted in just this lack of industrialization in computer services.

This work has produced the following main findings:

- Internationalization is expensive for companies.
- Offshoring does not concern all activities nor all sub-sectors. Offshoring is not liked to internationalization.

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