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STRATEGIC CORRELATES OF INFORMATION TECHNOLOGY ADOPTION IN THE FINANCIAL SERVICES INDUSTRY OF PORTUGAL

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The increased internationalization of business has brought about a need for firms to understand the relationships among global competition, information technology, and sustaining their competitive advantage. This paper reviews the relevant concepts and previous research in technology adoption strategy, environment, and competitive advantage, and develops and tests a model of the relationship between the competitive global environment and technology adoption. Support was found for the contention that technology adoption was related to competitive aspects of the firm's business level strategy.

The rapid internationalization of many industries in recent years has increased the level of competition which many firms face. This new exposure to global competition has created a need for technology adoption which allows firms to process and evaluate the increased amount of information provided by the global competitive environment. This internationalization has, in turn, brought about a need for firms to understand the relationships among global competition, information technology, and sustaining their competitive advantage. While some past research has explored the periphery of this issue, a need clearly exists for work which can both better account for the process or interpretation utilized in strategic issue diagnosis (Dutton and Dukerich, 1991), and examine the issue dimensions more broadly (Ginsberg and Venkatraman, 1992). This paper will attempt to do this first by reviewing relevant concepts and previous research in technology adoption strategy, environment, and competitive advantage, then by developing and testing a model of the relationship between the competitive global environment and technology adoption.

Strategy

Corporate-level strategy involves defining the businesses in which the firm will compete, and obtaining and allocating the resources necessary for individual business units to compete (Wheelen and Hunger, 1995; Hofer and Schendel, 1978). International corporate-level strategies vary on the basis of either a centralized/ standardized or a decentralized/ international focus. This variance in focus has been broken into five classifications in the literature. The accepted classifications of international strategy are: volume enhancing, resource acquisition, multidomestic, global, and transnational (Bartlett and Ghoshal, 1989; Porter, 1986).

The first two international strategies are primarily "inward-focused" to domestic markets. A volume enhancing strategy seeks to increase sales of domestic products through export sales to international markets. Resource acquisition looks to originate or acquire low-cost foreign sources of material or production to service its domestic market. Like volume enhancing, resource acquisition is primarily focused on its home market and strategy decisions which support the competitive priorities necessary to serve this market.

The three remaining international corporate-level strategies may be considered "outward-focused." A global strategy seeks to treat the entire world as one market by standardizing products. Firms often pursue this strategy by centralizing decision making. A multidomestic strategy utilizes a decentralized approach to focus individually on each market in which a firm operates. The emphasis with this strategy is on national flexibility and market responsiveness. A transnational strategy attempts to integrate the approaches of both the global and multidomestic strategies in the hopes of gaining the benefits of each without incurring too many of their weaknesses. The choice of international corporate strategy a firm pursues will influence its downstream business- and functional-level strategies.

Business-level strategy is concerned with the scope of operations and the basis by which the firm will obtain and sustain competitive advantage within its industry (Wheelen and Hunger, 1995; Hofer and Schendel, 1978). A firm derives its business strategy from what is occurring in the environment. Strategies at the business level are commonly classified along the elements of cost, differentiation, and focus (Porter, 1980).

Environment

Firms affect and are affected by their environments. Despite even the best efforts to buffer a core technology or to plan for possible future contingencies, the firm is subject to the effects of its environment. In global operations this issue is exacerbated. A firm not only is subject to the effects of the environment in its home market, but to the environmental effects in every location from which it obtains resources, manufactures its products, and every market it sells in to.

Previous research on strategy, business environment, and firm performance identified several environmental factors Ward, Duray, Leong, and Sum, 1995; Dess and Beard, 1984. The first factor utilized the concept of environmental munificence - support of organizational growth, which may be observed on a reverse scale as environmental hostility (Mintzberg, 1979, Child, 1972). This aspect is composed of the elements of: 1) business costs; 2) labor availability; and 3) competitive hostility. A second aspect is environmental dynamism which refers to the nature and amount of unpredictable change within an environment (Ward, et al., 1995; Smart and Vertinsky, 1984)

Technology

In a study on the diffusion of technology in the banking industry Pennings and Harianto (1992) found that prior experience in information technology, along with a variety of interfirm linkages, influences the adoption of new technology. This is supported by prior work which found that the adoption of innovation emanated from an organization's collective technical, strategic, and administrative skills (Nelson and Winter, 1982). The intrafirm linkages between these skills facilitated a firm's accessibility to "technological spillover" from competitors and extra-industry sources as well (Pennings et al., 1992).

Research indicates that early adopters of new technology acquire valuable advantages over laggards (Lieberman and Montgomery, 1988). This is evidenced in the banking industry where information technology were found to enhance internal operations and the delivery of financial services (Pennings et al., 1992).

Technology and Strategy

Technological change tends to be viewed as valuable in and of itself. Competitive success of foreign firms utilizing technological innovation has served as a force motivating companies to make investments in similar technologies. However, the adoption of high technology does not guarantee profitability. Profitability from technology is achieved by its proper position and usage within a firm's value chain. Technology's role within the value chain can create abilities which allow a firm to achieve low cost or differentiation through value activities.

If technology's role in the value chain is significant in facilitating a relative cost or differentiation position it will directly affect a firm's competitive advantage. According to Porter (1985), this relationship between technology and competitive advantage occurs in several ways which should be examined before a firm implements new technology. These relationships between technology and competitive advantage are listed in Table 1.

Table 1: Porter's Technology-Competitive Advantage Relationships

1. Technology itself lowers cost or enhances differentiation and provides a sustainable technological lead.
2. Technology shifts cost or uniqueness drivers in favor of a firm.
3. Pioneering new technology results in first-mover advantages in addition to those inherently provided by the technology itself.
4. Technology improves the overall structure of the industry.

When a firm attempts to choose among technologies, it must make acquisition or research and development decisions based upon the role of each technology or function within the firm's value chain. The age of a technology is of far less importance than its ability to contribute to the creation of value. Acquisition or development of "breakthrough" technology may not provide the firm with benefits obtainable from modest cumulative upgrades or improvements to key technologies within their value chain. Such "cumulative breakthroughs" also provide the advantages of being less noticeable to competitors, less easily duplicated, and inherently more sustainable. When attempting decide between breakthrough or cumulative technologies a firm should be aware of the advantages and disadvantages that can result from being a first-mover into breakthrough technology. Porter's (1985) typology of first-mover advantages and disadvantages is listed in Table 2.

Table 2: Porter's First-Mover Advantages And Disadvantages

Advantages
• **Reputation**
• **Preempting a Position**
• **Switching Costs**
• **Channel Selection**
• **Proprietary Learning Curve**
• **Favorable Access to Facilities, Inputs, or Other Scarce Resources**
• **Definition of Standards**
• **Institutional Barriers**
• **Early Profits**
Disadvantages
• **Pioneering Costs**
• **Demand Uncertainty**
• **Changes in Buyer Needs**
• **Specificity of Investments to Early Generations or Cost Factors**
• **Technological Discontinuities**
• **Low-cost Imitation**

Technological evolution of an industry results from the interaction of various forces which are displayed through the observable effects from scale change, learning, uncertainty reduction, imitation, technological diffusion, and diminishing returns from technological innovation in value activities (Porter, 1985). Since a firm affects and is affected by the evolution of its industry, it should develop a technology strategy to direct and benefit from these evolutionary forces. A key purpose of such a strategy is to correctly identify and utilize technologies which create a sustainable competitive advantage, shift cost or uniqueness drivers in favor of the firm, lead to first-mover advantages, and improve overall industry structure (Porter, 1985). To formulate technology strategies which can accomplish these objectives, Porter (1985) devised seven steps which are listed in Table 3.

Table 3: Porter's Steps for Technology Strategy Implementation

1. **Identify all distinct technologies within the value chain.**
2. **Identify potentially relevant technologies in other industries or under development.**
3. **Determine the likely path of change for key technologies.**
4. **Determine which technologies and potential changes are most significant for competitive advantage and industry structure.**
5. **Assess a firm's relative capabilities in important technologies and the costs of cumulative enhancements.**
6. **Select a technology strategy, utilizing all important technologies, that reinforces a firm's competitive advantage.**
7. **Reinforce business unit technology strategies at the corporate level.**

Interaction Between Strategy and Technology

A recent study revealed the dynamic nature of the interaction between strategy and technology (Itami and Numagami, 1992). Three distinct relationships were pointed out by this work. First being the effect of current technology on current strategy; Second being the effect of current strategy on future technology; and third the effect of current technology on future strategy (Itami and Numagami, 1992). The premise of these relationships is that strategy capitalizes on and cultivates technology, and technology in turn drives the cognition of strategy (Itami and Numagami, 1992). Itami and Numagami (1992) argue effectively that technology can impact strategy in three ways: The first as tools which may be utilized by the firm; The second as constraints to which the firm must adapt; and third as threats which the firm must secure themselves against. This prior work points to the importance of the relationship between technology and strategy, and the need for further research in this area. Our paper will attempt to advance the understanding of these dynamic relationships between technology and strategy.

Relationship Between Competitive Posture and I.T. Investment

Research in the early 1990's identified the element of competitive posture and its role in new information technology investment (Ginsberg and Venkatraman, 1992). The premise of this study was that competitive posture, measured as a firm's efficiency and quality orientation, influenced the adoption new information technology both directly and indirectly through issue interpretation (Ginsberg and Venkatraman, 1992). The findings suggested that competitive posture, in effect, establishes institutional rules which influence investments in new technology. This is explained through a managerial view of technological innovation and acquisition as a strategic issue. With such a view, investments in new technology result from evaluating and interpreting strategic issues, and firms' competitive postures play a role in influencing managers' diagnoses of strategic issues (Ginsberg and Venkatraman, 1992).

HYPOTHESES

Based upon our review of previous research, it may be hypothesized that a firm's information technology adoption decision results from a combination of pressures generated by the external business environment and the firm's specific strategy within this environment.

H1: The adoption of information technology is influenced by a firm's international strategy emphasis and its business environment.

From the general relationship in hypothesis 1, it may be possible to discern more specific relationships between types of international strategy and information technology adoption. It is hypothesized that significant differences will exist between strategy emphases and technology adoption.

H2: Firms which pursue international-corporate level strategies emphasizing strategic alliances and global growth will be more likely to adopt advanced information technology than firms not emphasizing such international corporate-level strategies.

H3: Firms primarily focusing on international business-level strategies and their functional level support elements will be more likely to adopt advanced information technology than firms without this focus.

Finally, it may be hypothesized that the level of competitiveness in a firm's environment, may in and of itself, influence the adoption of information technology.

H4: Firms operating in business environments which are highly competitive will be more likely to adopt information technology than firms in less competitive environments.

METHODS

The approach utilized to test our four hypotheses was that of designing, testing, and administering a survey to collect primary data on the relationship between technology and strategy within the financial services industry. Previous research argues for the significance of the financial services industry as a place to conduct studies because of the numerous technological transformations which have taken place (Pennings et al., 1992).

The dynamic growth of the economy of Portugal following that country's admission to the European Union in 1986 brought on a period of unprecedented expansion of the Portuguese financial services industry. The attendant opportunity, for firms in that industry, to adopt new information technology during this growth period offered a unique occasion for researchers to assess the process of technology adoption. The relatively small size of the Portuguese financial services industry also held the benefit of being able to survey the practices of the entire industry, rather than a subset or sample of an industry.

The Dependent Variable: Technology Adoption (TA)

A panel of three experts in the field of information systems was asked to develop a list of technological innovations which would represent the full range of information technology available to firms in the financial services industry in 1995. The expert panel consisted of university professors who were active consultants in the field of information management, two from the United States and one from Portugal. A thirty-one item questionnaire was developed which included five categories of information technologies:

I. Information exchange technologies (IE): Examples: videoconferencing, electronic mail, local and wide area networking, and wireless communications. This subset contained eleven items.

II. Decision support and decision making technologies (DS): Examples: group decision support systems, executive information systems, and expert systems. Five different technologies were listed in this subset.

III. Multimedia technologies (MM): Examples: business presentation multimedia, computer assisted instruction for training, and document storage using images and sound. Four multimedia technologies were included.

IV. End-user support (EU): Examples: end-user database access tools, analytic tools, presentation graphics, and on-line end-user assessment technologies. Six technologies were included in this subset.

V. System design and implementation (SD): Examples: join application development, application prototyping, and computer-aided software engineering. Five technologies were included.

Respondents were asked to indicate whether their companies used thirty-one different information technologies, how long they had used them, or whether the company had plans to adopt the technology. Responses were arrayed on five-point Likert scales. A summary variable, "Technology Adoption" (TA) was constructed by averaging each respondent's scores across all thirty-one items [TA = (IE + DS + MM + EU + DS) / Number of answered questions].

Independent Variables

Corporate strategy (CS). The two types of corporate strategy that were hypothesized to affect information technology adoption - strategic alliances and geographic strategies - were measured by asking respondents to assess how important various manifestations of these two basic approaches had been to their companies over the past five years. Items in this section of the questionnaire were developed by two university professors of strategic management, one Portuguese and the other American. Responses to the thirteen items were arrayed on Likert-type scales from 1=not important to 5=very important.

Strategic alliances (SA): Eight items measured the respondent company's use of strategic alliances of all types. Strategies ranging from controlling interest arrangements and joint ventures to joint marketing and joint research arrangements were listed.

Geographic strategies (GS): Five items assessed the importance to the company of geographic strategies. The strategies listed ranged from domestic expansion to various international strategies.

The summary variable "competitive strategy" (CS) was constructed by averaging each respondent's scores across all thirteen items [CS = (SA + GS) / Number of answered questions].

Business competitive aspects (CA). Sixteen questions assessing the respondent company's use of various aspects of business level strategy were included in the questionnaire. These items were also designed by the two strategic management professors mentioned above. Responses to the these sixteen items were also arrayed on Likert-type scales from 1=not important to 5=very important. Aspects measured covered a wide range of possible strategies: cost containment, customer service, product range, market segment coverage, etc. The summary

variable "business competitive aspects" (CA) was constructed by averaging each respondent's scores across all sixteen items.

Business environment (BE). Ten questions, also designed by the two strategic management professors previously mentioned, measured the respondent assessment of the importance of various competitive elements in the company's environment. Responses to the these ten items were also arrayed on Likert-type scales from 1 = not important to 5 = very important. The elements ranged from number of firms competing, barriers to entry, and degree of concentration through the relative power of various industry players. The summary variable "business environment" (BE) was constructed by averaging each respondent's scores across all ten items.

Respondents

Questionnaires were mailed to the presidents of every financial services company in Portugal, a total of 104 in all. Firms included in the study were the all of the country's banking institutions, plus all of its insurance companies, its investment firms, and its diversified financial services companies. Instructions included with the survey asked that the company's leading information services officer answer the first part, which contained the five technology adoption (TA) subscales, and that the remainder of the survey be completed by either the CEO or a member of the strategic planning team of the company. Thirty-two useable responses were received, for a response rate of 30.8%.

Following data collection, multiple linear regression analysis of the data was performed utilizing SPSS to calculate Pearson product moment correlations, regression models, and independent variable reduction via the stepwise procedure. The data analysis went through a three phase process which began at a macro level and then sought to look at more specific relationships between variables to test our hypotheses.

RESULTS

Composite average scores for each of the major variables of the study – technology adoption (TA), corporate strategy (CS), business competitive aspects (CA), and business environment (BE) – were correlated using SPSS. The resulting Pearson correlation coefficients indicated possible relationships between TA and CA, TA and CS (Appendix 1). A multiple linear regression model was run on SPSS to test the relationship among CS, CA, and BE, on TA. The resulting model achieved an F-value of 6.68551, significant at alpha = 0.005, an R-square of 0.42622 and an adjusted R-square of 0.36247. As expected from the correlation matrix results, the significant independent variables in the model were CA and CS (Appendix 2).

Findings from this first tier analysis were used to reduce our independent variables to refine the regression model. The SPSS procedure was repeated on the model TA= f(CA + CS). This resulted in a increased F-value of 8.3336 from 6.68551 which remained significant up to alpha = 0.005. R-square decreased from 0.42622 to 0.37314, but the revised model was able to explain almost as much as the original version using only significant independent variables (Appendix 3).

In the hopes of teasing out more specific results to support our hypotheses, the individual elements of CA and CS where run against TA in a correlation matrix. The results of these analyses where that large volume of business (CA_2), market share (CA_3), wide range of products/ services (CA_8), investment in new product development (CA_10), geographic coverage (CA_13), market segment coverage (CA_14), and investment leverage (CA_15) were the significant elements of business competitive aspects (Appendix 4).

We could also identify expansion of business in other Portuguese-speaking countries (CS_10), expansion of business in Spain (CS_11), and expansion of business in other European countries (CS_12) as the significant elements of business competitive strategies (Appendix 5).

These results were confirmed by a two-stage regression model explaining TA through CA and CS using market share, investment leverage, investment in new product development, geographical coverage, market segment coverage, large volume of business, wide range of products/ services, expansion of business in other Portuguese-speaking countries, expansion of business in Spain, and expansion of business in other European countries as instrumental variables. This model achieved an R-square of 0.46589, and an adjusted R-square of 0.42138, showing the relevance of the instrumental variables selected (Appendix 6).

Acknowledging the correlation between some of these instrumental variables, we computed two-stage regressions with subsets of the instrumental variable original set. In this procedure, we reduced the instrumental variable list to market share, investment leverage, market segment coverage, wide range of products/ services, and expansion of business in other Portuguese-speaking countries. This lighter regression provides an R-square of 0.46031 and an adjusted R-square of 0.41880 together with an improvement of the F-statistic from 10.467 (Appendix 6) to 11.087 (Appendix 7).

DISCUSSION

Results of the study failed to support the first hypothesis (H1), namely that technology adoption was a function of a combination of a firm's international strategy, its business level strategy and its competitive environment. The three predictors were investigated separately under Hypotheses 2, 3 and 4. Support was found only for Hypothesis 3, the contention that technology adoption was related to competitive aspects of the firm's business level strategy.

Firms which reported emphasis on a greater number of competitive aspects also reported a higher level of information technology adoption, as measured by the adoption, or plans to adopt, a greater number of the thirty-one technologies included in the study. This finding suggests that, within the financial services industry in Portugal, firms view information technology as an important competitive weapon and attempt to use technology to compete.

The aspects of strategy that were most closely associated to technology adoption were market share, wide range of products/ services, market segment coverage, and investment leverage strategies. The finding that these strategic variables were related to technology adoption supports previous findings that point to the use of technology as a means for increasing contact with customers, and with keeping up with market developments. The first set of technologies in the study, which were labeled "information exchange" ones, are especially well suited to the implementation of market share development strategies. In the rapidly changing markets of the information service industry, it is essential that competitors stay on top of the latest changes, and have effective ways of reaching a diverse and rapidly expanding customer base. Technologies such as videoconferencing, e-mail, and wide area networking greatly enhance the ability of a competitor to respond quickly in a dynamic environment.

Investment leverage strategies have become increasingly important for firm survival, especially in the investments and insurance segments of the financial services industry. The association of this aspect of business strategy is therefore not surprising. Highly leveraged firms must utilize a wide range of tools for getting the most out of their limited capital resources, and must closely monitor capital markets. Information technologies allow firms to do each of these things more effectively.

CONCLUSION

As an initial effort to attempt an understanding of the dynamics of technology adoption within the financial services industry, the present study represents a start. Although the study did shed some light on the aspects of a firm's strategic environment which fosters the adoption of information technology, further study is required in order to better understand these relationships.

Several limitations need to be addressed by future research. Perhaps the most important of these is a methodological one. The present study used summary measures to operationalize each of the three independent variables. This, quite possibly, had the effect of underrepresenting certain strategic stances among the respondent companies. For example, in the case of a company which emphasized a single business level competitive strategy, the average score for CA would have been quite small. Although such a strategy might very well be the most appropriate one for that company's particular segment of the industry, the method of measurement would have resulted in that company having a reported strategy that is "less competitive" than others in the industry. Conversely, a firm whose strategy was "stuck in the middle" might, quite possibly, have reported that all of the sixteen competitive aspects were important in its strategy. This particular firm would have been measured as the most competitive, when in reality it might simply have been the most confused. Similar complications arise from using our summary measures to assess the other two independent variables as well.

The effects of the independent variables were investigated on an item-by-item basis. Given the limitation explained above, this approach seemed to be a more valid one on its face. The limitation of that approach, however, is that it produces a multitude of separate relationships that are very hard to place into a meaningful

predictive model of the decision in question - i.e., the adoption of information technologies within the financial services industry.

The lack of comparison samples is also a significant limitation of the present study. Portugal is a small country, with a unique recent history. The rapidity with which all sectors of its economy, and its financial services industry, have grown in the past decade makes it a fertile example for investigating technology adoption. The uniqueness of this experience, however, reduces the generalizabilty of the present study's results. There may be predictive value in the findings, however, for the rapidly developing economies of Central and Eastern Europe.

Despite these limitations of the present study, the investigation of the strategic factors leading to the adoption of innovative information technology should be continued. It is an important area of concern not only for the financial service industry, but for anyone interested in the relationship between strategy and technology.

APPENDIX 1

CORRELATION COEFFICIENTS

	TA	CS	CA	BE
TA	1,0000	,4284	,4994	,2377
	(32)	(32)	(31)	(32)
	P= ,	P= ,014	P= ,004	P= ,190
CS	,4284	1,0000	,1628	,0267
	(32)	(32)	(31)	(32)
	P= ,014	P= ,	P= ,381	P= ,885
CA	,4994	,1628	1,0000	-,0047
	(31)	(31)	(31)	(31)
	P= ,004	P= ,381	P= ,	P= ,980
BE	,2377	,0267	-,0047	1,0000
	(32)	(32)	(31)	(32)
	P= ,190	P= ,885	P= ,980	P= ,

(Coefficient / (Cases) / 2-tailed Significance)

" , " is printed if a coefficient cannot be computed

APPENDIX 2

Model #1: TA = F[CS + CA + BE]

* * * * M U L T I P L E R E G R E S S I O N * * * *

Pairwise Deletion of Missing Data

Equation Number 1 Dependent Variable.. TA

Block Number 1. Method: Enter CS CA BE

Variable(s) Entered on Step Number
1.. BE BE
2.. CA CA
3.. CS

Multiple R ,65286
R Square ,42622
Adjusted R Square ,36247
Standard Error ,64163

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	3	8,25695	2,75232
Residual	27	11,11547	,41168

F = 6,68551 Signif F = ,0016

---------- Variables in the Equation ----------

Variable	B	SE B	Beta	T	Sig T
CS	,395106	,166833	,350047	2,368	,0253
CA	,733879	,244513	,443474	3,001	,0057
BE	,313933	,198639	,230481	1,580	,1257
(Constant)	-2,944912	1,116433		-2,638	,0137

End Block Number 1 All requested variables entered.

APPENDIX 3

Model #1: TA = F[CS + CA]

```
          * * * *  M U L T I P L E   R E G R E S S I O N  * * * *

Pairwise Deletion of Missing Data

Equation Number 1    Dependent Variable..   TA

Block Number  1.  Method:  Enter      CA      CS


Variable(s) Entered on Step Number
   1..     CS
   2..     CA       CA


Multiple R            ,61085
R Square              ,37314
Adjusted R Square     ,32837
Standard Error        ,65856

Analysis of Variance
                    DF        Sum of Squares      Mean Square
Regression           2              7,22868          3,61434
Residual            28             12,14375           ,43371

F =       8,33363       Signif F =  ,0014


------------------ Variables in the Equation ------------------

Variable              B         SE B        Beta          T  Sig T

CA              ,730327      ,250956     ,441327      2,910  ,0070
CS              ,402442      ,171171     ,356546      2,351  ,0260
(Constant)    -1,898452      ,922611                 -2,058  ,0490


End Block Number   1   All requested variables entered.
```

APPENDIX 4

CORRELATION COEFFICIENTS FOR DETAILS OF CA VS. TA

- - Correlation Coefficients - -

	TA	CA_1	CA_10	CA_11	CA_12	CA_13
TA	1,0000	-,1507	,4464	,3083	,2250	,3932
	(32)	(31)	(31)	(31)	(30)	(31)
	P= ,	P= ,418	P= ,012	P= ,091	P= ,232	P= ,029

	CA_14	CA_15	CA_16	CA_2	CA_3	CA_4
TA	,3594	,4000	,	,4482	,5275	,1042
	(31)	(31)	(3)	(31)	(31)	(31)
	P= ,047	P= ,026	P= ,	P= ,011	P= ,002	P= ,577

	CA_5	CA_6	CA_7	CA_8	CA_9
TA	,2045	-,2451	-,0963	,5272	,1679
	(31)	(31)	(31)	(30)	(30)
	P= ,270	P= ,184	P= ,606	P= ,003	P= ,375

(Coefficient / (Cases) / 2-tailed Significance)

" , " is printed if a coefficient cannot be computed

APPENDIX 5

CORRELATION COEFFICIENTS FOR DETAILS OF CS VS. TA

	CS_1	CS_10	CS_11	CS_12	CS_13	CS_2
TA	,2947	,5541	,5820	,3898	,4117	-,1754
	(32)	(31)	(29)	(31)	(16)	(32)
	P= ,102	P= ,001	P= ,001	P= ,030	P= ,113	P= ,337

	CS_3	CS_4	CS_5	CS_6	CS_7	CS_8
TA	,1870	,1375	,2688	,1149	,0716	-,2667
	(32)	(32)	(29)	(31)	(31)	(6)
	P= ,305	P= ,453	P= ,159	P= ,538	P= ,702	P= ,609

	CS_9	TA
TA	,2257	1,0000
	(31)	(32)
	P= ,222	P= ,

(Coefficient / (Cases) / 2-tailed Significance)

" , " is printed if a coefficient cannot be computed

APPENDIX 6

Two-Stage Regression Model #1: TA = F[CS + CA]

Instrumental Variables:

- **Market Share**
- **Investment Leverage**
- **Investment in New Product Development**
- **Geographical Coverage**
- **Market Segment Coverage**
- **Large Volume of Business**
- **Wide Range of Products/ Services**
- **Expansion of Business in other Portuguese-Speaking Countries**
- **Expansion of Business in Spain**
- **Expansion of Business in other European Countries**

Dependent variable.. TA

Listwise Deletion of Missing Data

Multiple R	,68256
R Square	,46589
Adjusted R Square	,42138
Standard Error	,65437

Analysis of Variance:

	DF	Sum of Squares	Mean Square
Regression	2	8,964367	4,4821837
Residuals	24	10,276881	,4282034

F = 10,46742 Signif F = ,0005

---------- Variables in the Equation ----------

Variable	B	SE B	Beta	T	Sig T
CS	,603550	,211274	,534032	2,857	,0087
CA	1,034052	,407705	,449513	2,536	,0181
(Constant)	-3,627190	1,490836		-2,433	,0228

Correlation Matrix of Parameter Estimates

	CS	CA
CS	1,0000000	-,3040513
CA	-,3040513	1,0000000

APPENDIX 7

Two-Stage Regression Model #2: TA = F[CS + CA]

Instrumental Variables:

- **Market Share**
- **Investment Leverage**
- **Market Segment Coverage**
- **Wide Range of Products/ Services**
- **Expansion of Business in other Portuguese-Speaking Countries**

Dependent variable.. TA

Listwise Deletion of Missing Data

Multiple R	,67846
R Square	,46031
Adjusted R Square	,41880
Standard Error	,73448

Analysis of Variance:

	DF	Sum of Squares	Mean Square
Regression	2	11,963088	5,9815438
Residuals	26	14,026010	,5394619

F = 11,08798 Signif F = ,0003

---------- Variables in the Equation ----------

Variable	B	SE B	Beta	T	Sig T
CA	,915591	,385997	,496701	2,372	,0254
CS	,777383	,255628	,682454	3,041	,0053
(Constant)	-3,344927	1,313862		-2,546	,0172

Correlation Matrix of Parameter Estimates

	CA	CS
CA	1,0000000	-,3343063
CS	-,3343063	1,0000000

REFERENCES

Bartlett, C.A. and Ghoshal, S. (1989). "Managing Across Borders: The Transnational Solution." Boston: Harvard Business School Press.

Child, J. (1972), "Organizational Structure, Environment and Performance: The Role of Strategic Choice", Sociology (1), 1-22.

Dess, G., and Beard, D. (1984), "Dimensions of Organizational Tasks Environments", Administrative Science Quarterly (29), 52-73.

Dutton, J.E., and Dukerich, J.M., (1991). "Keeping an Eye on the Mirror: The Role of Image and Identity in Organizational Adaptation," Academy of Management Journal, (34), 517-554.

Ginsberg, A., and Venkatraman, N. (1992). "Investing on New Information Technology: The Role of Competitive Posture and Issue Diagnosis." Strategic Management Journal, (13), 37-53.

Hayes, R.H., and Wheelwright, S.C., (1979). "Link Manufacturing Process and Product Life Cycles," Harvard Business Review (January-February, 79107), 15-22.

Hofer, C.W., and Schendel, D. (1978), Strategy Formulation: Analytical Concepts, St. Paul: West Publishing.

Itami, H., and Numagami, T. (1992). "Dynamic Interaction Between Strategy and Technology," Strategic Management Journal, (13), 119-135.

Lieberman, M.B., and Montgomery, D.B. (1988). "First Mover Advantage," Strategic Management Journal, (9), 41-58.

Mintzberg, H., (1979). The Structuring of Organizations, New Jersey: Prentice-Hall, Inc.

Nelson, R.R., and Winter, S.G. (1982). "An Evolutionary Theory of Economic Change," Cambridge, MA: Belknap Press and Harvard University Press.

Pennings, J., and Harianto, F. (1992). "The Diffusion of Technological Innovation in the Commercial Banking Industry," Strategic Management Journal, (13), 29-46.

Porter, M.E., (1980). Competitive Strategy: Techniques for Analyzing Industries and Competitors, New York: The Free Press.

Porter, M.E., (1985). Competitive Advantage, Boston: The Free Press.

Porter, M.E., (1986). Competition in Global Industries. Boston: Harvard Business School Press.

Smart, C., and Vertinsky, I. (1984), "Strategy and Environment: A Study of Corporate Responses to Crises", Strategic Management Journal, (5), 199-213.

Ward, P.T., Duray, R., Leong, G.K., and Sum, C. (1995). "Business environment, operations strategy and performance: An empirical study of Singapore manufacturers," Journal of Operations Management, (13), 99-115.

Wheelen, T.L., and Hunger, J.D. (1995), Strategic Management and Business Policy, Reading, MA: Addison-Wesley Publishing