

THE USE OF GRAVITATIONAL MODELS FOR INTERNATIONAL MARKETING STRATEGIES ADAPTATION

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ABSTRACT

This paper presents a conceptual model for the degree of prediction adaptation of business strategies at the international level to a new offer in foreign markets. The model was developed considering concepts proposed by retail gravity models, cultural distance and global brand. The model tested predicts values observed in 15 different cases, being three different products in five different countries. The main variables are the size of the company and the country, which predict the necessity of adaptation. The cultural distance is relevant in strategy formulation. The model proves to be robust for the cases analyzed.

Keywords: *Business strategies. Gravity models*

1. INTRODUCTION

In recent decades, with the growth of internationalization of companies and their products and services, even in a time of economic crisis in many countries around the world (UNCTAD, 2012), several studies in the field of international marketing seek to analyze and identify the correct balance between standardization or adaptation deals in international markets.

Several studies from the 1960s (Roostal, 1963; Elinder, 1965) to the 2000s (Zou and Cavusgil, 2002; Katsikeas, Samiee and Theodosiou, 2006), including the seminal decade of 1980/1990 (Levitt, 1983; Cavusgil and Zou, 1994; Jain, 1989) sustained by many theoretical concepts ranging from communication (Alden, Steenkamp and Batra, 1999; Callow and Schiffman, 2004) to economic theories as institutional (Bianchi and Ostale, 2006 and Shoham et al, 2008) aim to find a line that supports their hypothesis and / or propositions, as well as its conclusions in order to explain or even recommend the correct degree of adaptation or standardization of business deals on international markets.

Most of these studies deal with strategic decisions regarding the degree of adaptation / standardization as a company management function and consider markets as discriminating variables and not as dependent variables in determining the degree of standardization. Thus this work is directed to meet the need for the development of the theories of international marketing for adaptation/standardization of offerings (Birnik and Bowman, 2007; Ryans et al, 2003 and Theodosiou and Leonidou, 2003).

Therefore, this paper aims to present a conceptual prediction model of degree of adaptation of international marketing strategies necessary for a new offer in a foreign market. The model was developed considering concepts proposed by retail gravity models, cultural distance and global brand. Also, the model is supported on gravity models (Reilly, 1931 and Converse, 1949) and especially in the Market Area Attraction Model (Huff, 1964).

This research contributes to the theories of international marketing to fill the gap for decision making adaptation / standardization of orders and at the same time provides theoretical basis with verifiable variables for predicting the degree of adaptation / standardization indicated for a specific marketing situation related to the country for the International entry that can be used for empirical research of International Business.

2. LITERATURE REVIEW

To develop this conceptual model (theoretical framework) it was necessary to understand three major themes and thus the review of the literature concerning them:

2.1 Gravity models

Gravity models are so called because they are loosely based on Newton's law of gravitation and the assumption that the probability that a given customer will buy in a store or market becomes larger as the size of the store or market increases and the distance or travel time to the store decreases.

There are basically three types of trade area analysis models: Analog, regression and gravitational (Anderson, Volker and Phillips, 2010): (a) The gravity models include the Retail Gravitational Law (Reilly, 1931), the (b) Breaking-point model (Converse, 1949) and (c) Attraction Model Trade Area (Huff, 1964; Anderson, Volker and Phillips, 2010).

The trade area is defined by Bennett (1995) as: "the geographical area that contains consumers of a particular company or group of companies for product or specific services" (a) The gravity models are based on the assumption that a particular group of customers within driving distance are attracted to the stores in a particular area, based on variables such as the distance to the market, distance between markets, relative market population and store image (Anderson, Volker and Phillips, 2010) etc.

The Retail Gravitational Law (Reilly, 1931) defines the relative ability of two cities to attract customers and thus trade for them from a third area (middle). This capability is directly proportional to the populations of the two cities and inversely proportional to the square of the distance from these two cities to the intermediate town. This relationship is expressed as follows:

$$\left(\frac{Ba}{Bb}\right) = \left(\frac{Pa}{Pb}\right) \left(\frac{Da}{Db}\right)^2 \text{ where:}$$

Ba = Proportion of Commerce of intermediate city attracted by the city a

Bb = Proportion of Commerce of intermediate city attracted by the city b

Pa = Population of city a

Pb = Population of City b

Da = The distance between the center of the intermediate city to city a

Db = The distance between the center of the intermediate city to city b

The review of the Retail Gravitational Law made by Converse (1949) and also known as (b) Breaking-point model seeks to determine the extent (distance) in which the probability of a given consumer to buy products and / or services in the city 'a' or city 'b' is exactly 50%, that is, the consumer is not "attracted" by any of the cities. Thus, the consumer attractiveness between these two cities is directly proportional to the square root of the population of the two cities and inversely proportional to the distance between the cities. This relationship is expressed as follows:

$$Da \rightarrow b = \frac{d}{1 + \sqrt{\frac{Pb}{Pa}}} \text{ Where:}$$

Da → b = The limit (breaking-point) of the city 'a' measured in miles to city 'b'

d = distance (time or miles) from city 'a' to city 'b'

Pa = City 'a' Population

Pb = City 'b' Population

(c) Both Huff's Model (1964) and Wagner's Model (1974) of Attraction of the Trade Area are used to determine the probability of a given consumer in a city or area to buy in a store. To forecast, for example, sales resulting

from a particular area, you can multiply the population of that area by estimating the average ticket of these consumers and finally multiply that result by the probability defined by the following equation:

$$P_{ij} = \frac{S_j \div T_{ij}^b}{\sum_{j=1}^n S_j \div T_{ij}^b} \text{ where:}$$

P_{ij} = Probability of a consumer 'i' at a given point of origin to travel to Purchase Place 'j'

S_j = Size of Purchase Location 'j' in square feet

T_{ij} = travel time or distance from the consumer's 'i' point of origin to Purchase Location 'j'

b = the exponent of T_{ij} reflects the effect of distance on different types of shopping trips.

It is important to note that the higher the value of 'b', the greater the effect of travel time or distance on the likelihood of a customer shopping at a given Place of Purchase. According to the author, a larger value of 'b' to a shopping center that offers convenience goods than a shopping center that offers specialty goods must be assigned. Thus, the Huff model (1964) is highly related to the product and produces different sales forecasts based on different product categories. When a product is of great value to a customer, all sites become attractive.

Reflecting on these models under international marketing, it may be inferred that the influence of a given company on a particular market is marked by the size of this market, the influence of the company through the value of its brand and by the size of the company and on a certain distance (physical or psychological) which could be understood as an effort of purchase involved in the process (Wagner, 1974; Parente and Kato, 2001).

2.2 Cultural Distance and Cultural Familiarity

From the work originally developed by Hofstede (1983) in which one proposed four cultural dimensions to evaluate countries and the formula developed by Kogut and Singh (1988) to measure cultural distance between countries, several authors tested the influence of this distance on the performance of companies in international business (Colakoglu and Caligiuri, 2008; Slangen, Beugelsdijk and Hennart, 2012) as moderating variables, or as dependent variables.

The theory of Cultural Familiarity proposes that companies are less likely to invest in more culturally distant countries and, when they do, end up showing worse performance (Lee, Shenkar and Li, 2012). Kogut and Singh (1988) and Kim and Hwang (1992) realized that in fact, low control modes were often selected in situations characterized by high cultural distance. That is, large cultural distance implying insufficient knowledge of the target market discourages large foreign investments. In this sense, as in gravity models, the distance, which in this case is cultural, also has a strong correlation with the decisions involving the internationalization of companies (Erramilli, 1990; Erramilli and Rao, 1993).

2.3 Global Brand

Mooij (2005, p.14) defines global brand as that which is available in many countries, sharing the same strategic principles, positioning and marketing in multiple markets, although the marketing mix can vary and to Steenkamp; Batra and Alden (2003) global brands give an image of prestige to their products.

According to the literature on standardization in global marketing, the main reason that companies would have to develop / use a global brand would be to take advantage of large economies of scale. In this sense, a standardized brand could generate large economies of scale and obtain cost advantages in marketing, Research and development, supply and production (Levitt, 1983; Buzzel, 1968; and Douglas Craig, 2000).

Some studies have examined how the impact of Brand Globalization is perceived in the attitude and the likelihood of purchase (Batra et al., 2000; Steenkamp, Batra, and Alden 2003). The main rationale is that when a brand is perceived as Global, it generates the consumer's brand awareness and a perception of brand superiority and thereby the preference for global brand, even though the quality and value are not objectively superior (Keller, 1998; Shocker, Srivastava and Ruekert 1994).

In this sense, the literature review dictates that the brand has great influence both in the likelihood of purchase, as a dependent variable, as in how a product choice is made in the form of a moderating variable.

2.4 The Proposal

Considering the literature review, and in the view of the impact of company size, the target market size, the cultural distance between the home country and the destination country and brand globalization in the consumer choice process and its influence on marketing strategy adopted by international companies, an hypothetical formula was

developed showing the relationship between the possible strategies represented by an index and other variables presented, based on retail gravity models, particularly in the Huff's model (1964).

$$I = \frac{P_e \cdot P_m}{b \sqrt{d}} \text{ where}$$

I = Adaptation index

Pe = Ratio (base 100) size in overall sales (value) company.

Pm = Proportion (base 100) of the size of the industrial production of the destination country.

d = cultural distance between the country of origin of the company and the country destination.

b = Brand globalization based on the proportion of brand value.

Based on the above are proposed the following hypotheses:

The size of the company to be perceived as an element to positively influence consumer implies less risk for the smaller company in expanding their business to the target market (Koufaris, Hampton-Sosa, 2004).

H1: The size of the company positively influences the degree of market adaptation.

The destination country's size, due to its complexity in terms of distribution channels, political and legal complexity can exert influence on product adaptation (Gomez and Valenzuela, 2006).

H2: The destination country's size, measured by its industrial production negatively influences the degree of adaptation.

Greater cultural distance implies, for large companies, risks that exert influence on product adaptation (Evans, Mavondo and Bridson, 2008).

H3: The cultural distance negatively influences the degree of market adaptation.

Most valued brands due to be better known and commented and by creating brand communities imply smaller cultural distance (Schau, Muñiz and Arnould, 2009).

H4: Brand value minimizes the influence of cultural distance.

3. METHODOLOGY

To check the validity of the proposed model, Gross Domestic Product data were collected (GDP), adjusted for purchasing parity (IMF, 2012), Brand Value in US Dollars (Interbrand, 2011), Sales Volume by Brand, 2011 (Euromonitor, 2012) and calculated the Cultural Distance from the formula proposed by Kogut and Singh (1988) from the values of each cultural dimension (Hofstede, 1983) available on the author's own website (www.geert-hofstede.com, 2012).

These data were then entered into the model proposed for obtaining the index value indicating the degree of adaptation of international marketing strategies that would be required for operation in a particular country.

To validate the results obtained from the model, they should be confronted with the results of an ex post evaluation of the degree of adaptation used by companies - and their products - observed in this study.

In order to perform this comparison of degrees of adaptation it was necessary to use observable variables that could serve as a measure of degree of adaptation. Therefore, it was decided to use the STRATADAPT scale (Lages, Abrantes and Lages, 2008) because this scale offers observable variables and their significance values and validation of statistical treatment (-t test).

Since the research was conducted remotely (from Brazil) with data collected from secondary sources, it was decided to use the most representative variable of each dimension of STRATADAPT model (product, price, promotion and distribution). The following variables were chosen because they could be observed and that represented the most significant in the model with the largest value of the test -t while the lowest individual error shown in Figure 1 and Figure 2.

For the study were chosen three different products, a smartphone, an operating system and an ultrabook, all companies based in the United States of America, whose brands are in the report Best Global Brands - 2011 (Interbrand, 2011). The choice of these products is due to the characteristic that all are high technology products and therefore require little adaptation to the markets (Porter, 1986).

The brand values were converted to an index on base 10 in order to be used in the proposed model as shown in Figure 3.

Similarly, countries were chosen as they are covered in the International Monetary Fund Database (IMF) in relation to GDP adjusted for purchasing parity and to present the values of Cultural Dimensions on Hofstede's website. Also, were chosen by judgment the following countries: Great Britain (UK), India (IN), Spain (ES), France (FR) and Brazil (BR). The basis of judgment regarding different cultures considered the factors Distance to power, Individualism, Masculinity, Risk aversion, Pragmatism and indulgence (www.geert-hofstede.com, 2012).

The data used for observation of the model variables STRATADAPT were taken from the locals websites, the manufacturers themselves or websites mentioned by manufacturers for evaluation of advertisements, such as the website youtube.com or vimeo.com. All checks occurred in December 2012. The relevant information for the experiment resulting from websites in foreign languages were translated into Portuguese by 10 individuals natives of the countries that speak Portuguese fluently or Brazilian fluently proven in the foreign language, shown in Figure 4.

For the observed values as Retail Price, always have the same models been considered, or in the absence of exact same model, the "entry" models were considered in all countries observed, always in the local online store manufacturer. The values have been converted from the original currency to US Dollars by day quotation observation, provided by the Central Bank of Brazil (BC, 2012).

4. PRACTICAL APPLICATION

After entering the collected data in the proposed model, it could be observed various aspects and different views presented by findings. According to the values obtained for the observation made with the smartphone, as it is one of the most valuable global brands, it was expected that the Adaptation Index offered by the model was low, as indeed it is. Figure 5, reflects the rate adaptation of the model, [see p. 7](#), adapted from Huff (1964).

Figure 5 shows that the rate of adaptation considers the factors retail price, product line, message theme and distribution channels (Lages, Abrantes and Lages, 2008). This figure reveals that Brazil is the country with the lowest adaptation rate of the three products and Spain has the highest adaptation. Further, in this same figure it is observed that in India (IN) there are adaptation for price and distribution channels for smartphone; and, the same goes for Spain (E).

For Operational System, Brazil (BR) adapts price, India (IN) adapts price and message theme and Spain (ES) adapts product line and message subject. For the Ultrabook product, Brazil (BR) adapts message theme, India (IND) product line and message subject and Spain (ES) adapts price, product line and message theme.

For all 3 products analyzed, the country of origin was held the same (USA), and also the observed countries were the same and considering the results from the observed index with the same product and among product hypothesis H1 and H4 were confirmed since the indices obtained for the same country, but for different products vary positively according to the variation in the size of the company and negatively according to its brand value, confirming the influence of these factors in the decision of international marketing strategy (Colakoglu and Caligiuri, 2008).

Also, hypotheses H2 and H3 were confirmed, as the values of adaptation rates for the same product in different countries positively vary according to the country size but negatively depending on the cultural distance (Lee, Shenkar and Li 2012).

5. CONCLUSIONS AND DISCUSSIONS

From the results obtained in the experiments, it is clear that there is evidence that there is a relationship that can be expressed in mathematically from an adaptation of the principles laid down in the gravitational retail models (Reilly, 1931 Comverse, 1949 and Huff, 1964) to aid strategic decision making about adaptation or standardization of international strategies (Katsikeas, Samoee and Theodosiou, 2006).

This model fills a conceptual gap as it provides a prediction model of degree of adaptation for entry into new markets (Erramilli, 1990; Erramilli and Rao, 1993); to researchers at the International area, it fills a theoretical gap, insofar as it provides a model based on the principles of retail gravitation, especially in Huff's model (1964) as well as to managers of multinational and global companies providing a tool that can assist in decision making regarding which market and when to seek products/services internationalization.

Some limitations arise in this model, to the extent that only three products were tested in the same sector of the economy in only five countries. Thus we suggest future studies to expand the scope of this research to other sectors and other countries.

Other studies on the potential use of this model proposed herein are directed, but not limited to verify the variation over time of the attractiveness of countries for global brands by longitudinal studies or even based on ex post data trying checking economic, cultural and even distances marks value over a certain historical period. Such studies as well as increase knowledge in this line of research, serve to provide robustness to the model, to expand its analytical capacity or develop new models that can contribute to the theoretical development of the area.

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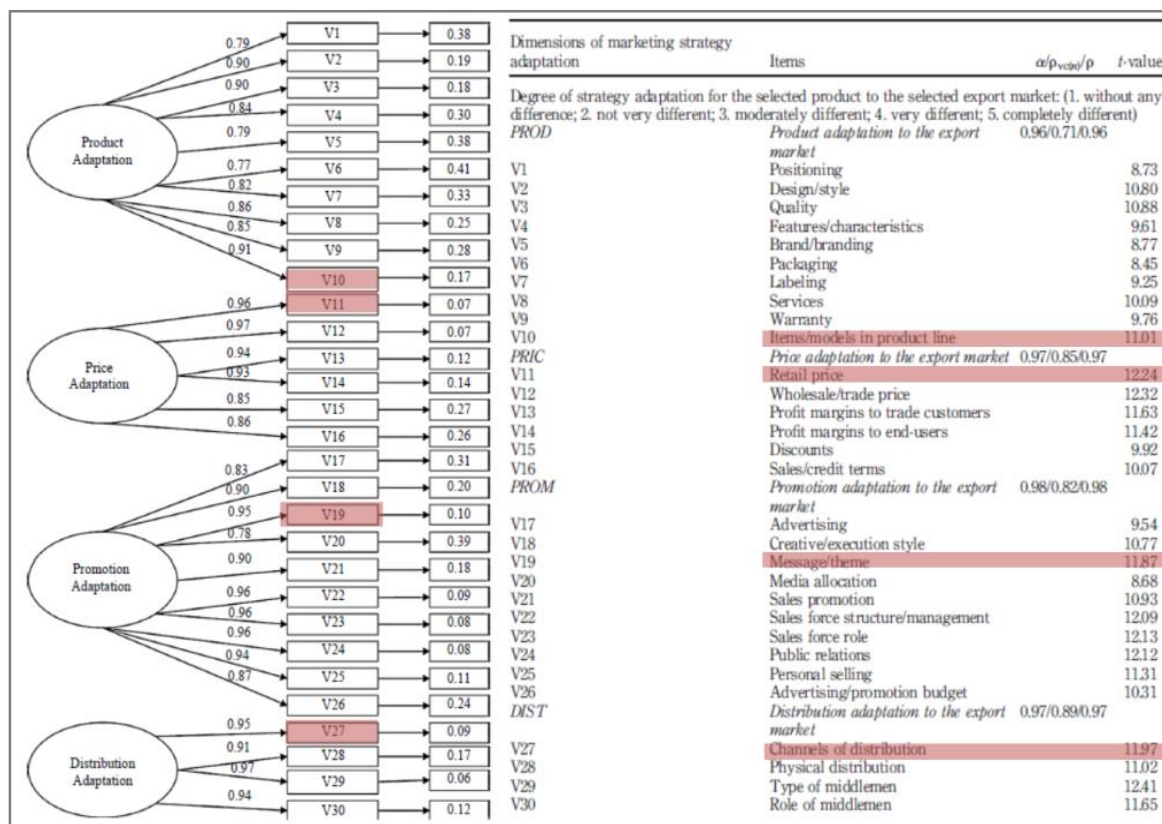
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Figure 1: Used variables in STRATADAPT Model



Source: Adapted from Lages, Abrantes and Lages, 2008

Figure 2: Selected STRATADAPT variables

Variable	Description
V10	Product line itens
V11	Retailing price
V19	Message/ Advertising theme
V27	Channel distribution

Source: Lages, Abrantes e Lages, 2008.

Figure 3 - Index base 10 Brand Value

#	Brand	Value in \$US mi	Índex (base 10)	#	Brand	Value in \$US mi	Índex (base 10)
1	Coca-cola	77.839	10,00	26	Nike	15.126	1,94
2	Apple	76.568	9,84	27	UPS	13.088	1,68
3	IBM	75.532	9,70	28	IKEA	12.808	1,65
4	Google	69.726	8,96	29	Kellogg's	12.068	1,55
5	Microsoft	57.853	7,43	30	Canon	12.029	1,55
6	GE	43.682	5,61	31	Budweiser	11.872	1,53
7	McDonalds	40.062	5,15	32	JP Morgan	11.471	1,47
8	Intel	39.385	5,06	33	HSBC	11.378	1,46
9	Samsung	32.893	4,23	34	Pampers	11.296	1,45
10	Toyota	30.280	3,89	35	Nescafé	11.089	1,42
11	Mercedes-Benz	30.097	3,87	36	eBay	10.947	1,41
12	BMW	29.052	3,73	37	Zara	9.488	1,22
13	Disney	27.438	3,52	38	Gucci	9.446	1,21
14	Cisco	27.197	3,49	39	Volkswagen	9.252	1,19
15	HP	26.087	3,35	40	Sony	9.111	1,17
16	Gillete	24.898	3,20	41	Phillips	9.066	1,16
17	Louis Vuitton	23.577	3,03	42	L'Oréal	8.821	1,13
18	Oracle	22.126	2,84	43	Accenture	8.745	1,12
19	Nokia	21.009	2,70	44	Thomson Reuters	8.444	1,08
20	Amazon	18.625	2,39	45	Ford	7.958	1,02
21	Honda	17.280	2,22	46	Heinz	7.722	0,99
22	Pepsi	16.594	2,13	47	Colgate	7.643	0,98
23	H&M	16.571	2,13	48	Goldman Sachs	7.599	0,98
24	American Express	15.702	2,02	49	Dell	7.591	0,98
25	SAP	15.641	2,01	50	Citi	7.570	0,97

Source: Adapted from the Best Global Brands Report - 2011 (INTERBRAND, 2011).

Figure 4 - Index based on 100 of the 50 largest GDPs in the world in 2011

#	Country	US\$bi 2011	Base 100	#	Country	US\$bi 2011	Base 100
1	United States	15.076	100,00	26	Egypt	519	3,44
2	China	11.300	74,95	27	Pakistan	488	3,24
3	Japan	4.444	29,48	28	Colombia	472	3,13
4	India	4.421	29,32	29	Malaysia	464	3,08
5	Germany	3.114	20,66	30	Nigeria	414	2,75
6	Russia	2.383	15,81	31	Belgium	414	2,74
7	Brazil	2.294	15,22	32	Philippines	391	2,59
8	United Kingdom	2.288	15,18	33	Sweden	385	2,55
9	France	2.214	14,68	34	Venezuela	374	2,48
10	Italy	1.847	12,25	35	Switzerland	354	2,35
11	Mexico	1.667	11,05	36	Hong Kong SAR	351	2,33
12	Korea	1.554	10,31	37	Austria	350	2,32
13	Spain	1.406	9,32	38	Ukraine	329	2,18
14	Canada	1.395	9,26	39	Singapore	315	2,09
15	Indonesia	1.125	7,46	40	Peru	302	2,00
16	Turkey	1.075	7,13	41	Vietnam	300	1,99
17	Islamic Republic of Iran	991	6,57	42	Chile	299	1,99
18	Australia	915	6,07	43	Greece	294	1,95
19	Taiwan Province of China	876	5,81	44	Czech Republic	285	1,89
20	Poland	771	5,11	45	Bangladesh	283	1,88
21	Argentina	716	4,75	46	Romania	267	1,77
22	Netherlands	701	4,65	47	Norway	266	1,76
23	Saudi Arabia	688	4,56	48	Algeria	263	1,75
24	Thailand	602	3,99	49	United Arab Emirates	257	1,70
25	South Africa	555	3,68	50	Portugal	249	1,65

Source: International Monetary Fund - IMF, 2011.

Figure 5 – Findings

Indice de Adaptação	-	9,44	9,5	11,98	9,6	14,85
Smartphone	US	BR	UK	IN	FR	ES
Retail Price	649,00	1155,34	850,00	980,70	878,36	912,42
Products in line	6	6	6	6	6	6
Message Theme	-	=	=	=	=	≠
Channels	-	=	=	≠	=	=

Indice de Adaptação	-	9,44	9,5	11,98	9,6	14,85
Sistema Operacional	US	BR	UK	IN	FR	ES
Retail Price	39,33	33,15	40,30	36,82	39,11	39,11
Products in line	7	7	7	7	7	9
Message Theme	-	=	=	≠	=	≠
Channels	-	=	=	=	=	=

Indice de Adaptação	-	9,44	9,5	11,98	9,6	14,85
Sistema Operacional	US	BR	UK	IN	FR	ES
Retail Price	529,99	1441,38	772,89	810,00	728,95	985,30
Products in line	9	9	9	4	15	16
Message Theme	-	≠	=	≠	=	≠
Channels	-	=	=	=	=	=

Source: websites of manufacturers, Central Bank of Brazil. Adapted by the author.