

# How the domestic industry of Costa Rica became more competitive in the US market.

## Antecedents and Trends

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### Abstract

**Purpose** - The aim of this work is to study the reorientation that the export industrial sectors in Costa Rica have experienced during the last 20 years.

**Research design, data, methodology** - The study employs the Cluster Analysis with the export data (20 years of cut-off period) from Costa Rica to the U.S-market. To make the predictions, the technique of the time series was used, with official data (from 2001 to 2010) from the U.S. Department of Commerce and the U.S. International Trade Commission.

**Results** - The Cluster Analysis, show how the economic sectors of traditional products exports of Costa Rica have progressively become in exporters of non-traditional products, meanwhile, the time series confirms that this trend will continue, at least during the next five years.

**Conclusions** - The industry of traditional products exports of Costa Rica (dressmaking, vegetables, coffee, mate, species, etc.) will progressively become in exporters of non-traditional products with a high-tech component (i.e., mechanical equipment and devices, electronic devices and medical equipment), as a consequence of the Chinese (Costa Rica's main competitor) economy's presence in the Organization for Economic Co-operation and Development (OCDE). This fact has enabled the potential improvement of Costa Rica's international competitiveness in the U.S. market.

**Keywords** : Costa Rican Exports, Industrial Sectors, International Competitiveness, USA Market, China Exports.

**JEL Classifications** : L23, L24, L52, O54.

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### 1. Introduction

The geographic closeness of the U.S. market considerably influences the international trade of the Central American and Caribbean countries (Mathews & Castro, 2010). This is due to the U.S.'s economic and political power, which sets the course and strategies of the Central American and Caribbean countries, and in particular of Costa Rica. This is evident in the exports towards the U.S. market that have historically represented and represent a relevant percentage within the international activities of this country.

According to CEPAL (2009), in 1990 the exports from Costa Rica (CR) towards the U.S. market (USM.) represented 38.7%, from the total exports and for the year 1995 they had a similar behavior (38.2%), later towards the year 2000, the share grew significantly up to 49.1%. In fact, as these data show, the sustained growth of CR exports is based on the U.S. market, as Monge (1996) stated.

Therefore, the role of the United States as a host country for CR exports is still important. Table 1 shows that the U.S. market has continued to be the main trading partner of CR exports for the last three years, with a share rate of approximately 36.7%. In short, we can confirm that this data (see Table 1), shows the need of carrying out a deeper rather than a simple historic analysis in order to quantitatively show the reorientation that the industrial sector of Costa Rica has experimented in the last twenty years.

<Table 1> Structure of the total exports of Costa Rica according to destination markets

EXPORTS	MILLION DOLLARS			PERCENTAGE SHARE		
	2008	2009	2010*	2008	2009	2010*
United States	3570.1	3099.7	3559.4	37.4%	36.0%	36.8%
Mexico and Canada	296.9	243.4	328.1	3.1%	2.8%	3.4%
European Union	1529.6	1505.5	1667.7	16.0%	17.5%	17.2%
Central America	1312.0	1135.4	1667.7	13.7%	13.2%	17.2%
Asia	1625.9	1532.1	1276.0	17.0%	17.8%	13.2%
Caribbean	408.2	363.7	418.4	4.3%	4.2%	4.3%
South America	248.2	203.7	222.7	2.6%	2.4%	2.3%
Others	562.0	532.8	535.8	5.9%	6.2%	5.5%
TOTAL	9552.9	8616.3	9675.8	100.0%	100.0%	100.0%

Source: COMEX (2011) based on data from PROCOMER

(\*) Data subject to revision

Therefore our work has a double objective. On the one hand, we would like to determine whether CR is no longer a traditional and textile products exporter and has already become a hi-tech prod-

uct-with a high added value for the final client – exporter. On the other hand, it is also important to study the trend or the behavior that the international activities of this country will have, which would make our research have clear implications on management and politics.

This paper is structured as follows. First, we develop the literature review on the Costa Rica's exports. In the second section we detail the empirical analysis, data and methodology. Then, the research is discussed and finally the conclusions, implications and limitations are presented.

## 2. Literature review

Traditionally since the beginning of the last century and before the 80s, CR was characterized by exporting traditional products such as fruit, coffee, sugar, mate, etc. (Sánchez, 2005; 2006; Monge, 1996).

As of the early 80s, CR experienced a change in its international activities. The non-traditional products started to play a relevant role in the export-related currency generation. This was due mainly to the active share of the maquila industry. They were characterized by the use of foreign inputs and technology, of cheap local workforce and for dedicating their production especially to exports (Tay-Balderas, 2003). In CR this type of enterprise was focused basically on the textile industry, which served as a platform for this country's products' internationalization, but above all for those countries which offered cheap workforce, thus assuring high profitability levels to the parent companies (Campbell & Verbeke, 1994; Dunning, 1989). According to Nowalski, Morales & Berliavsky (1994), *"the maquila industry was established in Costa Rica in the mid 70s; however, it was not until 1983 that an accelerated growth process started."*

In 1983, there were 45 maquilas and 132 in 1986, from which 90 belonged to the textile industry, and in 1991 the number of established maquilas doubled to 264 maquilas (Nowalski et al., 1994). Such was the importance of the off-shoring phenomenon of the international production of some multinationals- above all American multinationals in the Costa Rican economy, that the number of workers increased from 5,600 in 1982 (equivalent to 5% of the workers in the manufacturing industry) to 46,100 (25%) in 1990.

This development was reinforced during those years with the appearance of the free trade zones for exports where a twofold necessity is solved: on the Costa Rican side, increasing export profits, on the U.S. manufacturers' side, decreasing production costs. Above all, CR needed to generate currency through exports and thanks to cheap workforce, CR represented ideal off-shoring for the U.S. manufacturers (De Alonso, 1992). This growth was motivated mainly by a legal environment of preferential tariffs from the United States of America, which created good opportunities through Provision 807 of the U.S. Tariff Code and the Caribbean Basin Initiative (CBI). Also, in the second half of the 90s, maquila exports experienced an accelerated growth in the textile and clothes industry, the same happened with other products such as electronic devices and medical equipment (BID, 2007).

From 1997 to 1999, maquila exports increased 30.9% annually. In

1999, under this regime, they had reached US\$9.3 billion, exceeding traditional exports for the first time, which amounted to US\$ 8 billion.

Due to the changes in the international trade motivated by the globalization of the markets, in the 90s and during the beginning of 2000, CR started strengthening its institutionalism focusing in the attraction of hi-tech Foreign Direct Investment (FDI), which later served as the basis to improve its competitive capacities (BID, 2007). Gugler & Brunner (2007) affirmed that the growth in the competitiveness of developing countries was due mainly to FDIs. This lesson was effectively applied by the government and the entrepreneurial organizations of CR, motivating the establishment of a regulatory framework that fostered and facilitated the access of foreign enterprises through FDIs (inward). These were reoriented towards other productive sectors different from the traditional maquila factory, thus avoiding to run into one of the main FDI risks, i.e. in investments with no added value, denominated *"the tramp of the low added value"* (UNCTAD, 2002). This latter is related to the attraction of low quality FDIs, where the established enterprises are only interested in setting little churning in the local economy and therefore have little capacity to generate *"spillovers"*, operating then in a short-term period. These enterprises are usually known as *"fly by night"* (CEPAL, 2003).

To that end, CR and the entrepreneurial sectors created specialized agencies, among which the Costa Rican Investment Promotion Agency (CINDE, 2001) and the Promotion of Foreign Commerce (PROCOMER, 2011) stand out. CEPAL (2003) summarizes: *"CINDE along with the government decided to refocus their efforts to attract foreign enterprises towards qualified workforce intense industries. In 1993, CINDE selected three key subsectors: electric, electronic and telecommunications. The strategy proved to be especially successful since it resulted in significant improvement in the country's technological infrastructure and important changes in CR's productive structure."*

However, it is also important to take into consideration that there are other facts that allow understanding the restructuring of CR exports. One of them was the integration of China to the World Trade Organization (WTO) in 2001, and the second is the last elimination stage of quotas that the U.S. had with Central American countries in 2005 under the Multi-Fiber Agreement. As established by the WTO (2011), this agreement set the elimination of restrictions to dressmaking exports for developing countries and producers in stages, so trade would flow as freely as possible.

Due to these facts, greater textile trade activity from China and Asia with the U.S. was expected, mainly in the textile sector. The truth is that concern for the possible impact of China on the OCDE was also shared by all the countries, including the United States and the European Union (Walmsley & Hertel, 2000). In fact, it would not only affect the apparel assembly workers from the Caribbean and Central America, but also Mexican apparel manufacturers. Under these circumstances, CR has diversified its exports, it has experienced change in its composition and substantial improvement in the exports volume to the U.S.

### 3. Methodology and sampling

In order to achieve the first objective of this research, the cluster method analysis will be employed with the export data from CR to the U.S. market and the last 20 years as the cut-off period. In this way, we will establish if in this period there is a technological cluster concentration, or other types of concentration, that have made CR gain new competitive advantages as a country with high export potential. In the cluster analysis, the Euclidian method and the Ward Technique will be used to calculate the distances and the connections between them. To carry out this task the statistics software SPSS ® 15.0 was used.

The study period corresponds to the years 1991-2010. This was divided in four sub-periods of five years each: The first sub-period is from 1991 to 1995, the second from 1996 to 2000, the third from 2001 to 2005 and the fourth from 2006 to 2010. In each sub-period the most important 20 two-digit of the Harmonized Tariff Schedule (HTS) codes of the United States have been selected for their export percentage share from CR to USM. These represent: 93.8%, 94.6%, 93.9% and 97.8% of percentage share for the first, second, third and fourth sub-period, respectively.

In order to accomplish the second objective, a time series analysis of the main 10 categories (HTS) was made using the last ten years (2001-2010). The technique employed to make predictions of time series with or without tendency but with no seasonality was Brown's (2004), renowned model of double exponential smoothing which is a model that uses decreasing moving average in a geometric progression and incorporates a tendency component.

### 4. Data and results analyses

#### 4.1. Cluster Analysis

##### *First Sub-period: from 1991 to 1995*

Table 2 presents the numbers of dendograms and their HTS corresponding to the decade 1991–2000. Using an Euclidian distance of 5, Graph 2 identifies 2 clusters: *First Cluster*: Formed by HTS 39, 17, 95, 98, 22, 84, 20, 6, 40, 90, 7, 3, 71, 9, 2 and 85, these represent 31.8% of the share and belong to six industries: Beverage and tobacco (17, 20 and 22), animal and animal products (2,3), vegetable products (6, 7 y 9), plastics and rubber items (39 and 40), mechanic machinery and electric equipment (84 and 85, with a 5.8% share between both of them), and miscellaneous items such as furniture, toys (94 and 95). *Second Cluster*: formed by HTS 8, 62 and 61. These represent two industries: textiles, (61 and 62, with an average share of 40.8%) and vegetable products (8, with an average share of 21.9%). It can be concluded that in this sub-period, CR exports were mainly focused on workforce intensive industries represented by the textile and vegetable industries that accounted for a 62.7% share.

##### *Second Sub-period: from 1996 to 2000*

From Graph 2, CR exports are grouped in three clusters. *First*

*Cluster*: Formed by 15 categories: 95, 94, 22, 39, 17, 02, 40, 06, 98, 20, 07, 71, 03, 90 and 09, which belong to 5 industries that account for 33% of the average share and are: Beverage and tobacco (17, 20 and 22), animals and animal products (2 and 3), vegetable products (6, 7 and 9), plastics and rubber items (39 and 40) and furniture and toys (94 and 95). *Second Cluster*: Formed by HTS 8, 62, 61 and 85. These correspond to three industries: textile manufacturing (61 and 62, with a share average of 27.6%), vegetable products (08: Fruit and seeds, with an average share of 15.4%) and electric equipment and machinery (85, with an average share of 9.8%). *Third Cluster*: Formed by the machinery industry and mechanical devices (84, with a percentage share of 18.7%). This sub-period starts to show a change in CR exports: The workforce intensive industry (textile and vegetable industries) reached 43%, compared to the hi-tech industry (84 and 85) which already accounted for 28.5% of the average share.

##### *Third Sub-period: from 2001 to 2005*

Table 3 represents the correspondence of the numbers with the categories (HTS) used for the periods between 2000 and 2010, in the graphic representation of the dendograms. From Graph 3, in this sub-period, 3 clusters were identified. *First Cluster*: Formed by 15 HTS: 71, 39, 99, 06, 94, 76, 17, 02, 84, 09, 20, 07, 03, 40 and 98. These belonged to 8 different industries that made 27% of the share and are: Beverage and tobacco (17,20), animals and animal products (2 and 3), vegetable products (6, 7 and 9), plastics and rubber products (39 and 40), machinery and mechanical parts (84), metallic products (98 and 99, natural and cultivated pearls (71) and miscellaneous such as furniture (94). *Second Cluster*: Formed by the textile industry (61 and 62). With an average percentage share of 20%, this industry is no longer important in CR exports because they lost share from 40.8%, 27.6% and 20% in the first, second and third sub-periods, respectively. *Third Cluster*: Formed by 3 HTS: 90, 85 and 08. They represent 3 industries: Machinery and electric equipment (85), medical and optic equipment (90) and the vegetable industry (8, with a share of 16%). The categories 85 and 90, are technology intensive with a share of 33% in CR exports during this period. The vegetable industry, due to a strong competition with the rest of the Central American countries, has achieved significant levels of competitiveness.

##### *Fourth sub-period: from 2006 to 2010*

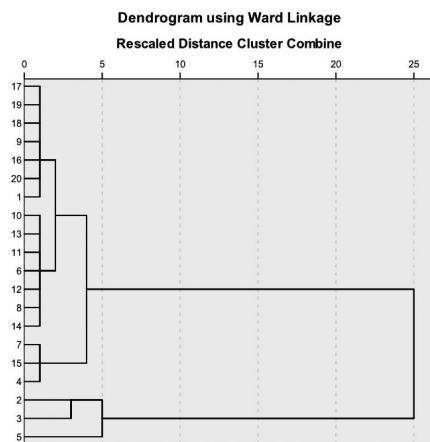
According to Graph 4, in this sub-period 3 clusters are identified: *First Cluster*: Formed by 16 HTS: 02, 76, 94, 17, 71, 07, 03, 06, 39, 99, 62, 20, 98, 40, 61 and 09. They belong to 8 different industries, representing 25% of the average share and they are: Beverage and tobacco (17, 20), animals and animal products (2 and 3), vegetable products (6: live plants, 7: tubers and roots and 9 : coffee, tea and species), plastics and rubber items (39 and 40), metallic products (76), natural and cultivated pearls (71), miscellaneous items such as furniture (94) and the textile industry (61 and 62) which has a very low percentage share with only 6% of the total exports. *Second Cluster*: Formed by HTS 90, 8 and 85, formed by 3 industries: Machinery and mechanical equipment (84), medical and optic products (90) and the vegetable industry (8). There are two industries: Machinery and mechanical equipment (84), medical and optic products

(90) and the vegetable industry (8). There are two industries that belong to industries with hi-tech content and represent 31% of the exports average from CR to USM, and the vegetable industry (8), with a share of 14% of the total exports. Both represent 45%. *Third cluster*: formed by only one HTS: 84 that corresponds to the machinery and mechanical equipment industry, with an average share of 26% of the total exports.

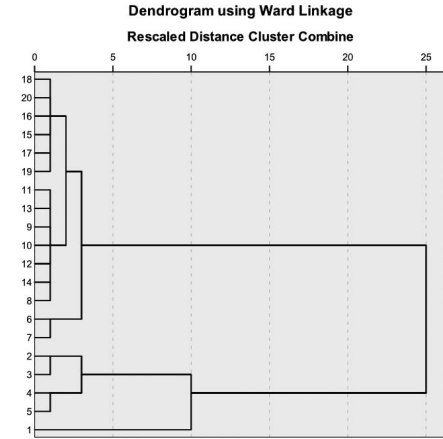
In this last sub-period, between cluster 2 and cluster 3 the technology intense products and therefore, with greater added value, make up a total of 57%, and represent more than half of CR exports. It is precisely in this period in which a *strong concentration of technological industries* is evident, therefore clearly showing international competitive potential. Combining these two clusters, they would represent 71% of the total exports from CR to USM focused on 3 industries, two of them are of hi-tech level and the second one vegetables, which is workforce intensive.

<Table 2> Numbers and their corresponding HTS, using dendrograms from the decade 1991-2000

#	HTS	Description
1	HTS84	Nuclear reactors, boilers, machinery and mechanical appliances
2	HTS8	Edible fruit and nuts, peel of citrus fruit or melons
3	HTS62	Articles of apparel and clothing accessories, not knitted or crocheted
4	HTS85	Electrical machinery and equipment and parts thereof; etc.
5	HTS61	Articles of apparel and clothing accessories, knitted or crocheted
6	HTS90	Optical, photographic, medical or surgical instruments and apparatus
7	HTS9	Coffee, tea, mate and spices
8	HTS3	Fish and crustaceans, mollusks and other aquatic invertebrates
9	HTS98	Special classification provisions
10	HTS20	Preparations of vegetables, fruit, nuts or other parts of plants
11	HTS40	Rubber and articles thereof
12	HTS7	Edible vegetables and certain roots and tubers
13	HTS6	Live trees and other plants; cut flowers and ornamental foliage
14	HTS71	Natural or cultured pearls, precious or semi-precious stones
15	HTS2	Meat and edible meat offal
16	HTS22	Beverages, spirits and vinegar
17	HTS39	Plastics and articles thereof
18	HTS95	Toys, games and sports requisites; parts and accessories thereof
19	HTS17	Sugars and sugar confectionery
20	HTS94	Furniture; bedding, mattresses, and similar stuffed furnishings



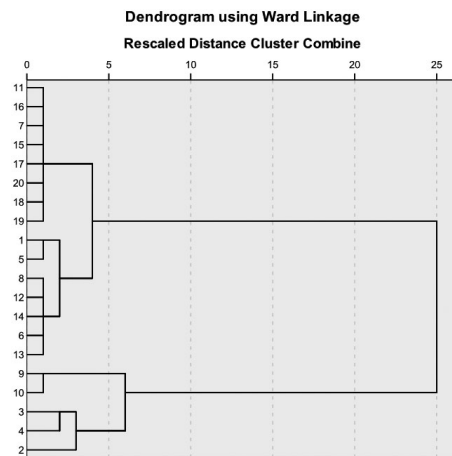
<Figure 1>Dendrogram sub-period 1991 - 1995



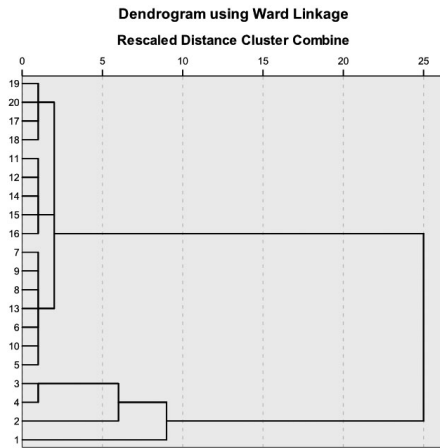
<Figure 2> Dendrogram sub-period 1996 - 2000

<Table 3> Numbers and their corresponding HTS, using dendrograms from the decade 2001 - 2010

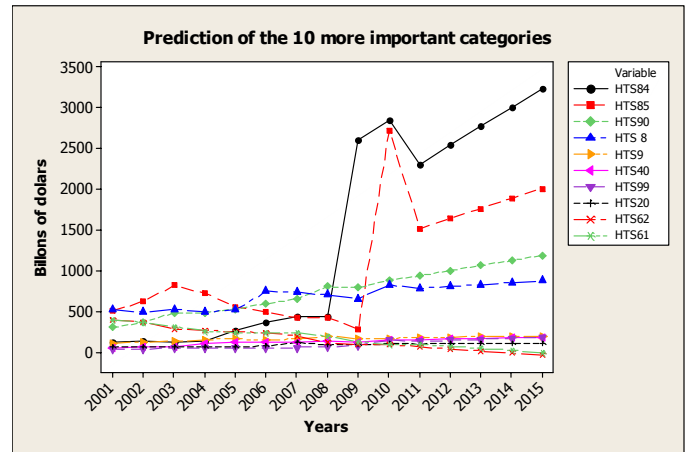
#	HTS	Description
1	HTS84	Nuclear reactors, boilers, machinery and mechanical appliances
2	HTS85	Electrical machinery and equipment and parts thereof, etc.
3	HTS90	Optical, photographic, medical or surgical instruments and apparatus
4	HTS8	Edible fruit and nuts; peel of citrus fruit or melons
5	HTS9	Coffee, tea, mate and spices
6	HTS40	Rubber and articles thereof
7	HTS99	Temporary legislation; temporary modifications proclaimed pursuant
8	HTS20	Preparations of vegetables, fruit, nuts or other parts of plants
9	HTS62	Articles of apparel and clothing accessories, not knitted or crocheted
10	HTS61	Articles of apparel and clothing accessories, knitted or crocheted
11	HTS71	Natural or cultured pearls, precious or semi-precious stones
12	HTS7	Edible vegetables and certain roots and tubers
13	HTS98	Special classification provisions
14	HTS3	Fish and crustaceans, mollusks and other aquatic invertebrates
15	HTS6	Live trees and other plants; cut flowers and ornamental foliage
16	HTS39	Plastics and articles thereof
17	HTS94	Furniture; bedding, mattresses, and similar stuffed furnishings
18	HTS17	Sugars and sugar confectionery
19	HTS2	Meat and edible meat offal
20	HTS76	Aluminum and articles thereof



<Figure 3> Dendrogram sub-period 2001-2005



<Figure 4> Dendrogram sub-period 2006-2010



Source: "The tariff and trade data from the U.S. Department of Commerce and the U.S. International Trade Commission".

Own elaboration

<Figure 5> Prediction of the 10 more important categories of CR exports to USM, during the next 5 years

#### 4.2. Time series analysis

The behavior analysis of CR exports to the U.S. market would be incomplete if they did not have a trend calculation, meaning what could happen in a near future. For our research a time limit of 5 years has been considered as of 2010. We use the historical quantitative data of the 10 main categories.

The method used to carry out this time series calculation corresponds to Brown's Simple Exponential Smoothing (2004). To select the optimal prediction, an optimal weighted coefficient (Alpha) has been first calculated in each of the categories, so as to minimize the mean squared error. This allows calculating a more representative R2 of the model for greater reliability in the results. The results appear in Table 4, the numbers are identified in bold type, to distinguish them from the historical data. This has only been used during the last decade as reference. Graph 5 has been calculated on this.

<Table 4> Trends using exponential moving average from years 2011-2015

Year	HTS 84	HTS 85	HTS 90	HTS 8	HTS 9	HTS 40	HTS 99	HTS 20	HTS 62	HTS 61
2001	115	498	298	514	103	43	32	57	387	384
2002	129	620	365	484	122	54	36	61	362	365
2003	117	814	480	519	126	62	42	60	281	309
2004	132	719	480	490	150	96	42	55	265	253
2005	265	547	524	512	157	111	42	54	246	238
2006	354	491	591	742	139	116	50	72	233	232
2007	430	416	650	731	159	122	52	117	194	229
2008	436	421	800	699	192	128	54	83	114	189
2009	2,610	274	791	648	157	121	76	82	83	123
2010	<b>2,846</b>	<b>2,723</b>	<b>879</b>	<b>819</b>	<b>163</b>	<b>145</b>	<b>141</b>	<b>99</b>	<b>85</b>	<b>83</b>
2011	<b>2,306</b>	<b>1,512</b>	<b>936</b>	<b>778</b>	<b>175</b>	<b>148</b>	<b>125</b>	<b>95</b>	<b>60</b>	<b>89</b>
2012	<b>2,540</b>	<b>1,636</b>	<b>998</b>	<b>803</b>	<b>180</b>	<b>156</b>	<b>139</b>	<b>97</b>	<b>34</b>	<b>65</b>
2013	<b>2,773</b>	<b>1,759</b>	<b>1,060</b>	<b>827</b>	<b>184</b>	<b>164</b>	<b>152</b>	<b>100</b>	<b>7</b>	<b>41</b>
2014	<b>3,007</b>	<b>1,883</b>	<b>1,123</b>	<b>852</b>	<b>189</b>	<b>172</b>	<b>166</b>	<b>103</b>	<b>-19</b>	<b>16</b>
2015	<b>3,240</b>	<b>2,006</b>	<b>1,185</b>	<b>876</b>	<b>194</b>	<b>180</b>	<b>179</b>	<b>106</b>	<b>-45</b>	<b>-8</b>
Alpha	0.15	0.20	0.25	0.20	0.25	0.25	0.25	0.20	0.25	0.25
R <sup>2</sup>	0.60	0.40	0.97	0.70	0.67	0.90	0.61	0.53	0.96	0.95

Source: "The tariff and trade data from the U.S. (2010). Department of Commerce and the U.S. International Trade Commission"(ITA, 2011 by English initials)

Considering that prediction is not an exact science, instead, as mentioned by Heizer & Render (2011) "to make predictions is to combine art and science", and, even more, taking into account the growing complexity of world economy and the violent technological advances that we have experienced this last decade, we dare say that the decisions of future investors and the opening of new businesses in Costa Rica shall consider this. To calculate the above mentioned predictions, the 10 main categories were selected according to their contribution to the activities outside CR (i.e. exports to USM) in 2010.

#### 5. Conclusions and Implications

The first possible conclusion after different analysis carried out indicate that 62.7% of Costa Rican exports directed to the U.S. market from 1991 to 1995 were focused on cheap workforce intensive industries, represented by the textile and vegetable industries. In other words, CR's international competitiveness and therefore its international economy lacked potential to compete internationally with products of high added value, meaning a production that demands a high level of technological development. From 2006 to 2010, 57% of its exports reached enough technological development to be able to compete with enterprises from all over the world, especially with Chinese multinationals. These results show how CR's workforce intensive industrial sectors, i.e. traditional product exports (dressmaking, vegetables, coffee, mate, species, etc.) will progressively become exporters of non-traditional products with a hi-tech component, for example: mechanical equipment and devices, electronic devices and medical equipment.

Without a doubt, this strategic change in CR's international activities (exports) has happened thanks to the contribution of the multinational enterprises established in the country, driven by the global market trends. Also, CR's public policies should be considered and implemented based on the experience with CINDE and PROCOMER.

Not the least important is the creation of factors related to the social and institutional structure, which in one way or another, have contributed with CR's good results, with regards to the market quota of non-traditional exports in the U.S. market. However, this is not the only aspect. In the global markets, also some European countries such as Spain have started off-shoring their industry in the north of Africa.

On the other hand, the exports of traditional products such as coffee, tea, mate and species (except for fruit and seeds), indicate a downward tendency in the next five years. Therefore, interested parties in this industrial segment have an urgent challenge to update and innovate to keep and improve their current competitive advantages. We suggest keeping an eye on the opportunities in the growing market of organic crops.

The textile industry, according to our trends, shows a serious risk of disappearing. Its fall in the 4 sub-periods has been consistent and unstoppable, from a 40.8% share in the first sub-period to a 6% share in the last one. If no external agent modifies these tendencies, we will witness its disappearance in a few years. We should consider the Asian experience of the textile industry of participating in the whole value chain (complete package). We suggest the committed sectors within this sector to ponder over the implementation of an "up-grading" in their industries. Several studies indicate that if they dedicated to produce the complete package, they could generate an increase of about 50% of the final product costs, depending on the apparel (Dusell, 2004).

To conclude these results indicate the need of an active and joined participation of the politicians in charge of designing sustainable development and growth of a country, of the entrepreneurs who execute the growth, and the intellectual capital such as universities, in order to obtain appropriate solutions that allow adequate measures to avoid sad economic situations such as the ones we are currently living.

Finally, in regard to the social implications, we believe that our research becomes in a useful instrument for decision making, for practitioners and policymakers of Costa Rica and also for others Latin American countries, with similar economic international behavior (i.e., CR). Given that, this study encourage them, to development of its institutional technology, the human capital formation and incorporating new technologies in a special manner for the sectors identified as strategic (e.g. *mechanical equipment and devices, electronic devices and medical equipment*) in order to accomplishing the competitiveness of a country in an international context.

One of the limitations that this study shows is that predictions should be assumed under steady local and international economic conditions in time.

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