

Volume 2, Issue 2 - January - June - 2016

E  
C  
O  
R  
F  
A  
N

Journal-Republic of Cameroon

ISSN-On line: 2414-4959

**ECORFAN<sup>®</sup>**



**ECORFAN- Republic of Cameroon**

## **Indexing**

- Google Scholar
- Research Gate
- REBID
- Mendeley
- RENIECYT

## **ECORFAN-Republic of Cameroon**

### **Directory**

#### **CEO**

RAMOS-ESCAMILLA, María. PhD

#### **CAO**

CHIATCHOUA, Cesaire. PhD

#### **Director of the Journal**

IGLESIAS-SUAREZ, Fernando. BsC

#### **Logistic Edition**

PERALTA-CASTRO, Enrique. MsC

#### **Designer Edition**

SORIANO-VELASCO, Jesús. BsC

ECORFAN Journal-Republic of Cameroon, Volume 2, Issue 2, January-June 2016, is a journal edited semestral by ECORFAN. S/C Zacharie kamaha, Street: Boulevard de la Liberté, Apartamente: Immeuble Kassap, Akwa- Douala. P.C.: 5963, Republic of Cameroon. WEB:[www.ecorfan.org/republicofcameroon/](http://www.ecorfan.org/republicofcameroon/), [journal@ecorfan.org](mailto:journal@ecorfan.org). Editor in Chief: RAMOS-ESCAMILLA, María. ISSN-On line: 2414-4959. Responsible for the latest update of this number ECORFAN Computer Unit. ESCAMILLA-BOUCHÁN, Imelda, LUNA-SOTO, Vladimir, S/C Zacharie kamaha, Street: Boulevard de la Liberté, Apartamente: Immeuble Kassap, Akwa-Douala. P.C.: 5963, Republic of Cameroon, last updated June 30, 2016.

The opinions expressed by the authors do not necessarily reflect the views of the editor of the publication.

It is strictly forbidden to reproduce any part of the contents and images of the publication without permission of the Copyright Office, Republic of Cameroon.

## **Editorial Board**

PÉREZ-RAMÍREZ, Rigoberto. PhD  
*Universidad Autonoma del Estado de México, Mexico*

TAVERA-CORTÉS, María Elena. PhD  
*Instituto Politécnico Nacional, Mexico*

GUILLEN-MONDRAGÓN, Irene Juana. PhD  
*Universidad Autónoma Metropolitana, Mexico*

GIRÓN, Alicia. PhD  
*Universidad Nacional Autónoma de México, Mexico*

ALVARADO-BORREGO, Aida. PhD  
*Universidad Autónoma de Sinaloa, Mexico*

SORIA-FREIRE, Vladimir. PhD  
*Universidad de Guayaquil, Ecuador*

HIRA, Anil. PhD  
*Simon Fraser University, Canada*

NOVELO-URDANIVIA. Federico. PhD  
*Universidad Autónoma Metropolitana, Mexico*

VILLALBA-PADILLA, Fatima. PhD  
*Instituto Politécnico Nacional-Escuela Superior de Economía, Mexico*

CÓRDOVA-RANGEL, Arturo,. PhD  
*Universidad Nacional Autónoma de México, Mexico*

## **Arbitration Committee**

CES, PhD

*Universidad Latina, Mexico*

MGM, PhD

*Instituto Politécnico Nacional-Escuela Superior de Economía, Mexico*

CYMR, PhD

*Universidad de Guadalajara, Mexico*

CRMÁ, PhD

*Universidad de Occidente, Mexico*

SCJ, PhD

*Universidad Juarez del Estado de Durango, Mexico*

RRS, MsC

*Universidad de Londres, Mexico*

VSG, PhD

*Posgrado de la Facultad de Economía, Mexico*

APB, PhD

*University of the Punjab, Pakistan*

MGM, PhD

*Universidad Complutense de Madrid, Spain*

GCC, PhD

*Universidad Autónoma Metropolitana - Azcapotzalco, Mexico*

## Presentation

ECORFAN Journal-Republic of Cameroon is a research journal that publishes articles in the areas of:

**E**conomy, **R**egional Development, **B**usiness and **M**anagement of SMEs

In Pro-Research, Teaching and Training of human resources committed to Science. The content of the articles and reviews that appear in each issue are those of the authors and does not necessarily the opinion of the editor in chief.

In Number 1st presented an article Money demand of Paraguay: Estimation within an inflation-targeting framework by BÁEZ-MARTÍNEZ José Fernando with adscription *Universidad Nacional de Asunción*, as folling article Index of sustainability of the greenhouses of Chilcuatla, Hidalgo by CARBALLO-SÁNCHEZ Álvaro, MEJÍA-NÁJERA Carlos, CRUZ-SÁNCHEZ Eduardo and BLANCAS-OLVERA Zoraida, as folling article Intellectual capital for the competitiveness of the agribusiness by CERVANTES María & GALABIZ Audelia Urías, J. as folling article Proposal for the implementación of the French project “La Loire a Velo” for endogenous development on the cenotes route on Yucatán by PÉREZ-GARMENDIA Gloria, GARCÍA-DOMÍNGUEZ Luis Alberto, MARTÍNEZ-RANGEL Armando Luis, PÉREZ-CANTO Julieta Elvira and MEJÍA Nelly with adscription *Economic-Administrative Departament. Tecnological Institute of Merida* as folling article Importance of development of business networks for university students. Exploration UAEMex 2016 by GONZÁLEZ-GARCÍA Guadalupe, ESTRADA-GUTIÉRREZ Enrique, BECERRIL-CARBAJAL María Luisa and SÁNCHEZ-PAZ María de la Luz with adscription *Universidad Autónoma del Estado de México*.

## Content

Article	Page
<b>Money demand of Paraguay: Estimation within an inflation-targeting framework</b> BÁEZ-MARTÍNEZ, José Fernando	1-25
<b>Index of sustainability of the greenhouses of Chilcuatla, Hidalgo</b> CARBALLO-SÁNCHEZ, Álvaro, MEJÍA-NÁJERA, Carlos, CRUZ-SÁNCHEZ, Eduardo and BLANCAS-OLVERA, Zoraida	26-32
<b>Intellectual capital for the competitiveness of the agribusiness</b> CERVANTES, María & GALABIZ, Audelia Urías, J.	33-43
<b>Proposal for the implementación of the French project “La Loire a Velo” for endogenous development on the cenotes route on Yucatán</b> PÉREZ-GARMENDIA, Gloria, GARCÍA-DOMÍNGUEZ, Luis Alberto, MARTÍNEZ-RANGEL, Armando Luis, PÉREZ-CANTO, Julieta Elvira and MEJÍA, Nelly	44-53
<b>Importance of development of business networks for university students. Exploration UAEMex 2016</b> GONZÁLEZ-GARCÍA, Guadalupe, ESTRADA-GUTIÉRREZ, Enrique, BECERRIL-CARBAJAL, María Luisa and SÁNCHEZ-PAZ, María de la Luz	54-62

*Instructions for Authors*

*Originality Format*

*Authorization Form*

## Money demand of Paraguay: Estimation within an inflation-targeting framework

BÁEZ-MARTÍNEZ, José Fernando†\*

*Universidad Nacional de Asunción, Facultad de Ciencias Económicas, Campus de San Lorenzo, Paraguay*

Received January 7, 2016; Accepted June 15, 2016

---

### Abstract

Stability and long-term equilibrium of the demand for real balances contribute to the proper functioning of the transmission channel of monetary policy and to reduce the risks of eventual inflationary pressures episodes. Therefore, this research examines whether the fundamentals of the real money demand of Paraguay has varied during 1994Q1-2014Q4 period and determines whether this theoretical long-term relationship have been stable despite the changes that took place in the monetary policy profile over the same period. Estimations were undertaken using the modification of the Cagan's demand model and by employing the cointegration methods of Engle-Granger and Johansen-Juselius through ordinary least square and vector error correction models techniques. Results indicate that the elasticities of demand for real balances relative to income, the interest rate and the semi-elasticity with respect to the parameter of financial innovation when approaching by the official M1 definition have a range of  $1.15 \pm 0.15$ ,  $-0.15 \pm 0.04$ , and  $-0.02$ , respectively. Additionally, when approaching by the broad M1 definition, the range is  $1.90 \pm 0.90$ ,  $-0.16 \pm 0.06$  and  $0.00 \pm 0.01$ , respectively. Moreover, it is found that the real money demand for the same time span covered is stable.

### Money Demand, Estimation, Cointegration, Inflation Targeting

---

**Citation:** BÁEZ-MARTÍNEZ, José Fernando. Money Demand of Paraguay: Estimation within an Inflation Targeting Framework. ECORFAN Journal-Republic of Cameroon 2016, 2-2: 1-25

---

---

\* Correspondence to Author (email: josba.eco@gmail.com)

† Researcher contributing first author.



## Introduction

The full and updated knowledge of the economy's Money Demand enables the central bank of a country contribute to calibrate monetary policy so that its implementation takes the expected impact on the key macroeconomic variables effectively and efficiently (Goldfeld, 1994). Therefore, regardless of the context of implementation of that policy is found under a scheme of inflation targeting or someone else.

Such it is so an imbalance of the money demand in real terms, given by the difference between the current and the long term values, could well affect the effectiveness of monetary policy long term rate from its effects on the product and/or inflation (Valadkhani, 2005).

Furthermore, the behavior of monetary aggregates is an important element in the transmission mechanism of monetary policy on the economic activity and prices, especially, in times of innovation and financial stress (Calani et al., 2013). Similarly, one of the main arguments is that monetary policy acts not only through the channel of the interest rate, but also, the demand for money provides valuable information regarding allocations portfolio of agents in the economy (Bae and De Jong, 2007).<sup>1</sup> Consequently, the imprecise knowledge of the demand for money may imply inflationary pressures in the economy, thereby risking the expected performance of the economy, by weakening the anchoring of expectations of economic agents and thus, by provoking a failure of the central banks in its task of keeping inflation within the target range on the horizon of time (King, 2001; Valadkhani, 2005; Kahn and Benolkin, 2007; Valadkhani, 2008; Hossain, 2012).

In particular, the Central Bank of Paraguay (BCP, for its abbreviation in Spanish) since May 2011 formally adopted the scheme of inflation targeting, after since 2004 would come using a protocol based on an intermediate target scheme, through monetary aggregates, where an objective of inflation targeting medium and long term with a tolerance range above and below the central target was established (BCP, 2013).<sup>2</sup>

Moreover, the existence of the consensus that financial innovations cause instability in the money demand function of developed countries (Hossain, 2012). And that, even in a scheme of inflation targeting, the analysis of the demand for money and its estimation are a fundamental tool for monetary policy of central banks (Mies and Soto, 2000; Bahmani and Kutan, 2010). Therefore, is considered relevant to conduct this research.

Additionally, given the changes in the stance of the monetary policy and financial environment that have taken place in recent years, it is necessary to analyze whether the fundamentals of demand for money in Paraguay have changed.

Specifically, the objective of this paper is to analyze whether the elasticities that explain the demand for money in Paraguay have undergone a variation and determine whether the relationship have been stable over the period 1994Q1-2014Q4.

In this way, the main contributions of this paper are the update of the estimations of the money demand of Paraguay that have been published in not peer-reviewed working papers before the implementation of the inflation targeting regime.

<sup>1</sup> A deepening on the importance of the role of money demand within the mechanism of monetary policy and in the context of money and financial markets can be found at (Chadha et al., 2010).

<sup>2</sup> The adoption of the scheme of inflation targeting is the establishment of an "inflation target" as a nominal anchor of the economic agents' expectations of the central bank in the management of its policy and towards the fulfillment of its goal through changes in its benchmark short-term interest, known as the Monetary Policy Rate (MPR).

Evenly, the analysis of its foundations and estimations in aggregate and per capita terms using two definitions of demand for real balances (the official domestic and international definitions), as detailed further.

The methodological approach implemented in this research was undertaken by estimating the money demand for Paraguay using the theoretical approach for transactional reasons, proposed by Cagan in 1956, in aggregate and per capita terms using the cointegration methods proposed by Engle and Granger and Johansen and Juselius.

Estimations were performed by applying ordinary least squares (OLS) and vector error correction (VEC) estimation techniques. While, the demand for real balances was approximated by employing the official definition adopted by the BCP (the M1) and a broader definition of M1 (hereinafter referred to as M1\_a), constructed for comparative purposes to further studies.

Based on the obtained results, it may be pointed out that the range elasticities of demand for real balances relative to income, the interest rate and the semi-elasticity with respect to the parameter of financial innovation when approaching by M1 are  $1.15 \pm 0.15$ ,  $-0.15 \pm 0.04$  and  $-0.02 \pm 0.00$ , respectively.

Likewise, when it is approximated by the M1\_a are  $1.90 \pm 0.90$ ,  $-0.16 \pm 0.06$  and  $0.01 \pm 0.00$ , respectively, for the same period. Lastly, it was found that the demand for real balances for the same time span covered was stable.

This article continues with Sect. 2, which shows the review of the literature; Sect. 3, with the presentation of the methods and estimation techniques and data used; Sect. 4, where the obtained results are described; Sect. 5, in which the discussions and conclusion are stated.

And, finally, with Sect. 5.3 that exhibit complementary information employed throughout the development of this research.

### **An overview of the empirical literature**

The aim of this section is to present an indicative summary of the scientific work done recently on this area from a scientific and technical perspective.

Notwithstanding, the reader could deepen about this topic by following the evolution of the money theory along the time in Judd and Scadding (1982); Boughton (1992); Sriram (1999); Mies and Soto (2000); Serletis (2013). Or, taking a review on previous studies carried out for advanced economics. For example, in Fair (1987); Boughton (1992); Mehra (1997); Clausen (1998); Laidler (1991); Sriram (2000); Browne et al. (2005).

Regarding recently developed empirical studies that focus on the estimation of money demand for emerging countries, Bahmani and Kutan (2010) estimate the real demand for money for each of the seven emerging economies of Eastern Europe on a quarterly basis (ranging, on average, from 1995Q1 to 2006Q2), using Pesaran et al. (2001) error correction and cointegration estimation technique.

The applied specification is based on the theory of demand for currency substitution, approximated by each country's M2, gross domestic product (GDP), inflation and nominal effective exchange rate. As a result, they conclude that their estimations are consistent with the theory and that the real money demand in each country is stable.

Anwar and Asghar (2012) based on the technique of autoregressive distributed lag (ARDL) examine the long-term real money demand of Pakistan taking as arguments the real GDP, the Implicit Price Deflator Index of the GDP (as opportunity cost money) and the nominal exchange rate (domestic currency against the US dollar). Employing annual data for the period 1975-2009, both authors find that the real demand for money for M2 has signs in line with the theoretical postulates and that it is stable. Although, their approach lacks of stability for M1.

Bahmani-Oskooee et al. (2013) according to quarterly data from 1995-2010 for six emerging countries of Central and Eastern Europe and four other emerging economies, found that the demand for money (given by M2 in terms real) is stable and correctly specified. The arguments that they used for their model include the inflation, nominal exchange rate, GDP volatility and the volatility in the money supply. While their specification adopted was based on Choi and Oh (2003) and the applied estimation technique relied on Pesaran et al. (2001).

Other authors who introduce innovations in this field and that confirm the stability of money demand and of their related parameters according to the theoretical postulates are: Foresti and Napolitano (2013); Sarwar et al. (2013).

The first performs panel data technique proposed by (Mark and Sul, 2003; Pedroni, 2001) for nine countries of the International Organization for Economic Development (OECD). In the mean time, the second authors do the same for Pakistan but, by using Vector Autoregressive Models (VEC) approach.

For its part, Ivanov et al. (2015) simulate the super neutrality of money based on Sidrauski (1967) and estimate the money demand of Macedonia in quarterly frequency for the 2002-2012 period using a cointegration approach and M2 as a proxy.

Calani et al. (2013) under the systemic approach of the consumer theory estimate the demand for money as a liquid asset for Chile through four estimation techniques (for sub-samples, recursive, state-space and non-parametric procedures) confirm stability and consistent parameters with the theoretical models used for the 1990-2006 period.

Recently, Ferrada et al. (2014) estimate the demand for money in Chile under three specifications based on the analyzes and empirical applications of Tobin (1956); Corbo L (1980); Feenstra (1986); Matte and Rojas (1989); Arrau and Gregorio (1993). The specification of the demand for money is deduced from the optimization of a representative agent approach which maximizes consumption and money demand for transaction purposes. To do this, the use quarterly and monthly seasonally adjusted data and not seasonally adjusted data, as well, in order to check data robustness and make projections. Finally, by using the method Vector Error Correction (VEC) these authors find that long-term elasticity of money demand is about 2 with respect to income and a semi-elasticity of -0.12 in relation to the interest rate for the period 2000-2014.

In the same line, but for an advanced economy, it is worthy to note the work of Lucas Jr. and Nicolini (2015), who examine the stability of money demand by implementing a new empirical construction of this aggregate for the United States during 1915-2012 but taking in to account the effects resulted from changes in the regulation of the banking sector in early the 1980s.

Thereby, there is a long list of current peer reviewed works that deepen the study of money demand in which they show its full force as an influential factor in the transmission mechanism of monetary policy. Regarding this, recent main results of studies published as working papers related directly or indirectly on the money demand of Paraguay are referred to below.

At the regional level, Carrera et al. (2008) conducted a study to estimate the demand for money for 15 countries in Latin America (Paraguay among them) covering the period 1948-2003 in annual frequency by applying the method Fully Modified Ordinary Least Squares (FMOLS) developed by Pedroni (2002) for panel data. The reduced theoretical specification used and proxied is the Keynesian approach which was defined for the M1 of each country. The results indicate that income elasticity and semi-elasticity with respect to the interest rate for the analyzed countries, on average, are 0.94 and -0.01, respectively. While for Paraguay correspondingly values are in 0.44 and -0.009 for the same elasticities, respectively.

At the national level, it should be noted that, according to the review of the literature done in this research, no published peer-reviewed studies on estimates of the money demand for Paraguay were found and, since 2007 no more non-peer-reviewed studies have been done.

In general, these late studies belong to the category of workingpapers. Among them are those authored by Colmán (2005); Rojas and García (2006); Colmán (2007).

The first author, Colmán (2005), estimate the real money demand based on the traditional specification suggested by Fisher (1896) under the Engle and Granger (1987) approach with monthly frequency data.

The dependent variable is approximated by the real M1 aggregate (deflated with the consumer price index), while the arguments of the function are compose by the real income (approximated with the monthly indicator of economic activity), the interest rate (proxied by the average of the interest rate market) and a trend variable (taken as a measure of financial innovation). Both functions (one, with seasonal dummies and other, with seasonally adjusted variables) are estimated monthly basis for the period between 1994: 01 and 2004: 12, finding significantly income elasticities of 0.51 and 0.65 and semielasticities for the interest rate of -0.42 and -0.46 for both models, respectively.

Similarly, Rojas and García (2006), who propose the use of monetary aggregate M1 in an extended version to approximate the demand for money in nominal terms. They replicate Iguini and Licandro (2003)'s work by using theoretical specifications of the money in the utility function suggested by Sidrauski (1967); Clower (1967); Lucas (1980) for cash in advanced model and by Wilson (1979) for transaction costs model. These, ultimately, are modifications made to the original model proposed by Cagan (1958).

Then, by means of cointegration techniques (and inclusion of dummy variables for the crises of 1997 and 2002), these authors confirm stability of the parameters estimated using Ordinary Least Squares approaches, Two Stage Least Squares and Vector Error Correction Models. Moreover, they conclude that the coefficients estimated using quarterly data for the period 1994-2005 are 0.77 for the income, -0.23 for the interest rate and -0.005 for technological factor.

Finally, Colmán (2007) estimates the real money demand (with M1) for 1991-2003 period using Engle and Granger (1987) approach for the traditional theoretical specification of Fisher (1896) by adding dummy variables to capture the national financial crisis of 1995 and the seasonality of the money demand. Their results indicate an elasticity of 0.40 for income, a semi-elasticity of -0.75 for the interest rate and stability of the quarterly and seasonally relationship estimated.

In summary, these three works performed nationwide agree on the stability of money demand during 1991-2005. In terms of estimated parameters, they have magnitudes within a range of 0.40 to 0.77 and from -0.23 to -0.75 for income elasticity and semi-elasticity of the interest rate, respectively.

### Methodological aspects

This section presents the methodological framework and the technique to be applied in order to estimate the money demand for the Paraguayan case. Likewise, a description about the layout, source and evolved characteristics of the data are developed.

### The model

According to Sriram (2000), very important points to take into account when modeling and estimating the demand for money are the selection of the theoretical (or analytic) specification, the estimation technique and the variables that will play as arguments of the function.

In view of the relevance of the preceding points, the selected theoretical approach corresponds to that proposed by Cagan (1958), who poses mathematically the inclusion of the concept of financial innovation as a factor affecting the demand for real balances but which is independent of its other fundamentals.<sup>3</sup>. Hence, the omission of this factor could lead to unsuitable specifications for real money balances modelling that could show unstable parameters and autocorrelation errors (Arrau and Gregorio, 1993; Valadkhani, 2005).

Therefore, this function of real balances is part of the theoretical line of the transaction money demand reasons and it is formulated from the conception of money in the utility function supported by Sidrauski (1967). Moreover, according to Iguini and Licandro (2003) who used this same model, they sustain that it is consistent with the transaction costs model of Wilson (1979) and with the cash-in advance model of Clower (1967) and Lucas (1980).

This theoretical line is adopted because of the primary status of the relative development process of Paraguayan's capital market, which leads to assume that the demand for real balances is, especially, due to transactional and precautionary reasons more than to speculative reasons.

Methodologically, the theoretical specification selected begins as of the maximization of the utility of a representative agent of the economy given its consumption requirements and real balances (real money holding that can buy goods and services) restricted by its budget availability.

<sup>3</sup> For financial innovation, as Arrau and Gregorio (1993), state: "is understood as any factor that produces changes in the demand for real balances that are not explained by its fundamentals (income or consumption and the opportunity cost for using money). Clear innovative

factors of this kind are the technological advances of transactions and financial regulations of regulatory or deregulatory nature. The latter may have a negative or positive effect on the demand for real balances"

As a result of the optimization process and consideration of financial innovations in the economy, the long term demand for real balances in linear terms and natural logarithm is determined by the functional relationship presented in Equation 1 (which can be expressed in aggregates and / or per capita terms).

$$\ln(m_t) = \beta_0 + \beta_1 \ln(c_t) + \beta_2 \ln(\delta_t) + \beta_3(\theta_t) + v_t \quad (1)$$

Where the arguments of the demand for real balances,  $m_t$ , are given by a scale variable (which in real terms can be the consumption or the income),  $c_t$ , is the opportunity cost of using money,  $\delta_t$ , the parameter financial innovation,  $\theta_t$ , and an error term,  $v_t$  (which is assumed normally distributed with zero mean and constant variance).

Also for  $\beta_i$  parameters (with  $i = 0,1,2,3$ ) for the intercept, the elasticities with respect to real income and the opportunity cost of money and for financial innovation semielasticity parameters, respectively.

In this research, as similar to those carried out at national and international levels (already mentioned in the literature review), as a scale variable is used the real gross domestic product as a proxy for the real income; the nominal interest rate as an approximation of the contemporary opportunity cost for the use of money; and, a trend variable to capture the effects of financial innovation.

Relationship among the demand for real balances with each one of the three selected variables and the reasons for their choice are mentioned below.

Firstly, the theoretical behavior expected between the demand for real balances is positive respect to the real income and, this is because as it gets greater, so the amount of real balances required to perform a larger number of transactions will be (Sriram, 1999). Additionally, taking into account the characteristics of the Paraguayan economy, which has an economic model based on the agro-export, and following to Khan (1980), here the real gross domestic product is used as a proxy for non-permanent real income.

Second, as the opportunity cost of use of money is greater, the theoretical relationship stipulates that real balances holding gets lesser because of the existence of better alternatives for the use in the economy. Thus, the interest rate<sup>4</sup> will be the variable that measures the opportunity cost of money. That is, one that quantifies the cost incurred by the trade-off (or dilemma) between holding cash in hand (in the pocket) or money transformed as a financial asset (eg bonds, fixed-term savings, participation in mutual funds, etc.). Therefore, the elasticity with respect to this variable should be negative.

Additionally, the reason because the nominal interest rate,  $i_t$ , in contemporary terms has been chosen is because, according to Arrau and De Gregorio (1993), it is desirable to consider the present accumulated effect of the interest rate on the demand for real balances and not the future cumulative effect (given by its expression as a ratio,  $i_t/(1+i_t)$ ). Besides this, the characteristics and level of development of the capital market of Paraguay (as mentioned above), justify the use of this variable which is wide used, as well, in the empirical literature reviewed before (Sriram, 1999).

<sup>4</sup> It is important to note that in developing country it is usual to replace the interest rate as a proxy of the opportunity cost of using money for the inflation rate. This practice is mainly due to the low degree of financial

market development and speculations that are made in the commodities markets (Bahmani and Kutan, 2010).

The use of a trend variable has become quite common in the empirical literature of money demand estimation, as it has shown good performance when trying to capture financial innovations. For example, see Arrau et al. (1995) and Iguini and Licandro (2003). In addition, other techniques have been proposed to try to bring financial innovation without the use of trend as is by Arrau and De Gregorio (1993).

Therefore, it is important to mention that the contribution made by this research to national literature is twofold, in the sense that, besides estimating Equation 1 in aggregate and per capita terms with the variables listed above, also it is estimated using two definitions of demand for real balances: the official domestic and international definitions, as detailed below.

### Estimation techniques

In order to obtain the basic parameters of the demand for real balances of the Paraguayan economy and see if this has the property of stability.

Equation 1 is estimated in aggregate and per capita terms using the econometric techniques of Ordinary Least Squares (OLS) and Vector Error Correction (VEC),<sup>5</sup> accompanied by the Engle and Granger (1987) and Johansen and Juselius (1990) cointegration methods, respectively.

These two last methods help to avoid potential biases in the estimation as a consequence of the technique chosen for the empirical estimation of the real money demand (Hofman, Rasche and Tieslau, 1995).

In this regard, the co-integration method developed by Engle and Granger (1987), known as the approach based on the residues as well, consists of three steps. In the first one, it is necessary to conduct a unit root test to determine the order of the integration of the variables which compound the long term relationship of the demand for real balances stated in Equation 1.

Secondly, once it is verified that the variables have the same order of integration, for example, that all of them are not stationary (e.g. integrated of order one). Then, the long term relationship of the real money demand (given by the Equation 1) can be estimated using the OLS technique. After that, the integration order of the residues are checked with the ADF Test and, if they are integrated of one order lesser (e.g. of order zero,  $I(0)$ ) according to the Engle and Yoo (1987) tables, then the existence of a long term relationship is confirmed, i.e. there is cointegration. By this way, the equation estimation becomes the cointegrating equation.

In the third step, a second equation is estimated in first differences with OLS.

This becomes called the error correction model because it incorporates the residue generated in the first estimation which, actually, contains cointegrating equation. Finally, it must be verified that the model meets all the OLS assumptions.

On the other hand, the Johansen and Juselius (1990) method or method based on the MLE approach is composed of four steps.

In the first, the order of integration of each of the variables of Equation 1 is verified in the same way as the former method.

<sup>5</sup> A detailed and analytical explanation of the first technical can be found in Greene (2000) and, in Enders (2009) for the second.

In the second step, once it is confirmed that there is an only order of integration of these variables in the previous step, the number of optimal lags are determined by estimating a Vector Autoregression (VAR) and it is proceeded to estimate cointegrating vectors by the method Johansen (1991, 1995). Subsequently, standard cointegration vectors (in the long-term model) and adjustment parameters (in the short-term model) are analyzed.

In the last step, besides verifying the fulfilling of VEC estimation model assumptions, one can optionally carried out the accounting analysis of innovation (analysis of impulse response functions and variance decomposition).

As for the method of testing unit root (in levels and in first differences) for the variables specified in the theoretical model of the demand for real balances (in Equation 1), it is proposed the use of Dickey and Fuller (1979) and Kwiatkowski et al. (1992) tests.

Similarly, in order to check the property of stability of the demand for real balances the approaches of CUSUM and CUSUMQ, originally proposed by Brown et al. (1975), will be used.

Additionally, the econometric examination was supplemented by a prior and comparative statistical analysis of the variables used in this research to provide support and contrast the results.

In short, Equation 1 has two definitions of demand for real balances (M1 and M1 a) with two proposed estimation techniques (Engle and Granger and Johansen and Juselius) and two forms of expression (in terms aggregate and per capita). Consequently, eight specifications (models) of the demand for real balances were estimated.

Additionally, the econometric examination was supplemented by a prior and comparative statistical analysis of the variables used in this research to provide support and contrast the results.

Lastly, the variables that approximate financial innovation were built following recommendations and practices of international literature in which the ratios of M2 over total GDP and M2 are used in relation to M1.<sup>6</sup>

### Data

The data used are quarterly frequency and cover the period 1994Q1-2014Q4. Selecting this period of study was essentially due to the availability of data, which have as a source to different statistical annexes published by the Central Bank of Paraguay for monetary and financial data; and the General Directorate of Statistical Surveys and Census (DGEEC) for demographic data.

In this regard, nominal series of monetary aggregates published and defined by the Central Bank of Paraguay are used: M0 (including bills and coins in circulation or, in other words, notes and coins held by the public plus reserves in private banks); M1, the money supply (which includes bills and coins held by the public plus private sector current account in local currency); and, the money supply M2 (which includes M1 and quasi money added to the composed by sight deposits, also called savings deposits, time deposits and savings certificates).

The fact of using the definition of narrow money (M1) is consistent with the concept of money on utility function model (Sidrauski, 1967) and with the liquidity degree of M1 for transactions (Basu and Salyer, 2001).

<sup>6</sup> See Ireland (1995); Arrau et al. (1995); Carby et al. (2012) for a deepening of financial innovation and guidance on the use of indicators



And, according to Anwar and Asghar (2012), numerous studies in developing country consider a best practice the use of M1 instead of M2, given the nascent development process of their financial sector and the weakness of their banking system (Moosa, 1992; Hossain, 2012). Although this last reason has not been the case of Paraguay for more than a decade.<sup>7</sup>

In addition, here it is employed the series of nominal gross domestic product (NGDP), private consumption, consumer price index (CPI) based in December 2007, the annual deposit rate (weighted average) of the financial system (R), nominal exchange rate Guarani (PYG) to the US dollar (USD) and data total population of Paraguay.<sup>8</sup> Except for the interest rate and the total population, other variables are seasonally adjusted with the X-13 ARIMA method.

The CPI variable is re-scaled to a base year, to 1994, coinciding with the current official basis year used by the BCP (in 2015).

Additionally, in this paper a monetary aggregate that include M1 plus sight deposits is defined in order to get an extended version for comparative purposes. This is the M1 a, and the reason for this definition is because most of the foreign monetary authorities define their M1 in this way.

Following the practices employed by most authors in the empirical literature to obtain variables in real terms, the demand for money (given by M1 and M1 a), income and consumption in aggregate levels and per capita, have been deflated by the CPI.<sup>9</sup>

Moreover, the values of M1, M1 a and the interest rate are calculated as averages for each period. And the original monetary variables (without changes) are expressed in domestic currency (in millions of Guarani PYG).

Finally, with respect to the nominal interest rate used, note that this corresponds to the deposit rate paid as deposits, fixed-term deposits, securities issued and certificates of deposit savings calculated as a weighted average of balances as of 2003.<sup>10</sup>

And, given the short and medium terms characteristic of these deposits and securities in the financial system of Paraguay, this interest rate corresponds to its contemporary expression,  $i_t$ , and the narrow definition of the demand for real balances suggested in this research. Moreover, the use of the long-term interest rate is for broader definitions of the demand for real balance with the purpose of capturing possible financial assets substitutes of the money Valadkhani (2005), which clearly, does not correspond to the objective of this paper.

<sup>7</sup> See the study by Jimnez and Manuelito (2011) and Reports Financial Stability Central Bank of Paraguay until 2015.

<sup>8</sup> This last variable is available in annual frequency but is converted to quarterly terms using the Quadratic-match average conversion method.

<sup>9</sup> Based on estimations made in this research for the period 1994Q-2014Q4 and the proposed specifications for the case of Paraguay, theoretical model highlights that have achieved better results by deflating with the CPI instead of

the Implicit GDP deflator. One of the probable reasons that could explain this fact is that money demand is modeled on the side of the transactions. That is, on the side of purchases, based on the identity of the Quantity Theory and Cagan's model.

<sup>10</sup> Prior to 2003, the interest rate used was calculated based on flows, which could have some effect on the estimates made in this investigation. However, based on estimations made for various temporary cuts within the study period and contrasting with earlier estimates made at the national level, no significant differences were found.

## Results

During the period 1994Q4-2014Q4 can be seen that GDP, M1, M1 a and all other variables presented in the Graphic A1 of the Annex have an evolution characterized by a growing trend (except for the rate of interest), intercept and breaks throughout its history.

In general, these breaks are products of the business cycle, on the one hand, and changes in the profile of monetary policy, on the other. Specifically, during the quarters 1997Q4, 2002Q3, 2003Q2 and 2008Q3 in which some breaks are mainly due to adverse economic results from the performance of the national agricultural sector, domestic banking crisis and impact of financial crises occurred internationally.

However, the regime changes or breaks occurred in 2004Q1 and 2011Q2 quarters, they are coincident with changes in monetary policy profile. The first, given by the abandonment of monetary policy scheme based on control of monetary aggregates that was handled to the previous quarter and the adoption of a monetary policy rule based on an inflation target management through monetary aggregates.

The second is due to the full adoption of a rule based on monetary policy rate control (BCP, 2013).<sup>11</sup>

In this sense, changes in monetary policy are reflected in the statistical properties of the main monetary variables (in quarterly frequency) used in the model of the demand for real balances. Specifically, compared to the period 1994Q4-2003Q4 during the period 2004Q1-2014Q4 lower volatilities are observed in money growth (M1 and M1 a).

Inflation and its quarter to quarter variation and interest rate and its quarterly respective variation (Table A2 in Annex).<sup>12</sup>

Also decreases in average levels of inflation and interest rates accompanied by increased money growth are verified. These facts are consistent with a greater economic dynamism given by a higher economic growth rate average in a context of a greater exchange rate volatility, as well.

On the other hand, throughout the period of analysis, it is checked that the money speed was not constant due to the observed changes in the interest rate and greater financial innovation (Graphic A2). The increase of the latter variable is approximated, as is customary to do so internationally by its main indicators are the M2 to GDP and as a proportion M2 M1. In this case, as a proportion of M1 and M1 expanded official definition of national banking matrix (Graphic A3).

Likewise, advances in terms of financial innovation (technological innovation or technological processes) can be displayed by increasing the amounts of use of credit cards and the average amount consumed (Graphic A3).

Similarly, in correlational terms, higher and meaningful relationships between variables are verified long term in Equation 1, which occurred after migration policy towards inflation targeting scheme (2004Q1-2014Q4 period, Table A3). Positive, between the growth of demand for real balances M1 and M1\_a with growth (0.37 and 0.37, respectively); and negative, to the changes in the interest rate (-0.59 and -0.58, respectively).

<sup>11</sup> The Chow Test 1960 applied to long-term equations using the methodology of Engle and Granger yield p-values equal to  $p = 0.0000$  for all regime changes (or structural breaks) tested for each quarter indicated. With the p-value indicated above, a rejection of the null

hypothesis of no breaks or changes of regime in the quarter tested is performed.

<sup>12</sup> Table A2 presents only aggregated data variables due to correlations with their peers expressed in per capita terms are equal to one. That is to say, there is a perfect linear relationship there-between.

On the other hand, according to the cointegration methodology formulated, the unit root analysis practiced to the variables in aggregate and per capita terms were carried out by the ADF and KPSS test, confirming that, except for the CPI and inflation are integrated of order two and all the other series are integrated of order one (Table A1 in Annex). In other words, all series follow a non-stationary process.

Thus, once verified that the variables approximate the demand for real balances, income and interest rates are integrated of the same order, then, it was proceeded to testing for the existence of a long term relationship. That is, to perform cointegration tests for the variables that compose Equation 1.

In this respect, as indicated in the methodology, the tests were conducted by the method of Engle and Granger, on one hand, and on the other, by the Johansen and Juselius method.

For the first, the long-term equation of the demand for real balances in aggregate (M1 and M1\_a) and per capita (M1\_pc and M1\_a\_pc) terms were estimated with this method. And once the residue of each of the four regressions were obtained, the ADF Test was performed obtaining four ADF statistical (ADF<sup>a</sup>, in the Table A4b of the Annex), which were compared with the critical values Engle and Yoo (1987) tables for cointegration test based on the approach of the residue.

In general, after the null hypothesis of no cointegration have been rejected at 5% of statistical significance (with a respective critical table value equal to -4.11), therefore, it was found cointegration in each of the four estimated equations. The results of this test can be seen in Table A4b of the Annex, in the column where the estimation method (Engle and Granger, E&G) and statistical ADF (ADF<sup>a</sup>) corresponding to each long-term equation residue is indicated.

Similarly, with the second method of cointegration (Johansen and Juselius), having checked a homogeneous integration order of the variable that compounds the long-term relationship, the number of cointegrating vectors was estimated. The contrast based on the Maximum eigenvalue statistical indicated a rejection of the null hypothesis of no cointegration at 1% and 5% significance level. Accordingly, it is concluded that these variables have a long-term relationship with one cointegrating vector (Table A6 of the Annex).

Thus, as it was found the existence of a long-term relationship with both tests, the use of the method of cointegration is duly justified and the estimation of the dynamic model (joint relations long and short term) formulated in Equation 1 was carried out.

In that regard, the results of the estimations obtained with the method of Engle and Granger for the long-run elasticities of demand for real balances approximated by the official domestic definition of M1, on average, are 1.3, -0.11 and -0.015 for the real income, the interest rate and for the parameter of financial innovation, respectively. The latter, is expressed in terms of semielasticity.

For the same approximation and respective parameters, using the method of Johansen and Juselius, the significant coefficients of elasticities and semielasticities, on average, are 1.00, -0.19 and 0.015, respectively.

Meanwhile, the results found for the demand for real balances using the expanded M1 approximation indicate that the basic parameters given by the elasticities of real income, the interest rate and the semi-elasticity in relation to the parameter of financial innovation have significant values and equal to 2.83, -0.11 and -0.01, respectively.

While the estimations base on the Engle and Granger method; and equal to 1.00, -0.22 and 0.01, respectively, when is estimated by the Johansen and Juselius method.

As for the speed of adjustment (in the short term) towards the equilibrium (in the long term), the estimated models with both cointegration methods indicate a 10%, on average and, a range between 8% and 15% per quarter (see Table A4a, A4b). On the other hand, the error correction model (or short-term equation) of each regression performed with Engle and Granger method can be seen in Table A5.

In summary, the demand for real balances elasticities relative to real income, the interest rate and the semi-elasticity with respect to the parameter of financial innovation when they are approximated by the M1 have a range of  $1.15 \pm 0.15$ ,  $-0.15 \pm 0.04$ , and  $-0.02 \pm 0.00$ , respectively. And a range of  $1.90 \pm 0.90$ ,  $-0.16 \pm 0.06$  and  $0.01 \pm 0.00$ , respectively, when is approached by the M1\_a in the same period.

The results of the statistical tests applied to the residues of each regression confirm the acceptance of the null hypothesis respective the absence of serial correlation (LM Test), non-omission of nonlinearities in the specified model, existence of normality (Jarque-Bera Test) and existence homocedasticity (ARCH Test) with a 95% confidence level, respectively. These results account for a performance in line with the provisions of econometric theory (they can be seen in Table A4 of the Annex). Similarly, statistical data Durbin-Watson (DW), adjusted regression coefficient ( $R^2_a$ ) and Standard Error (SoE) of each regression (can be viewed in the same table).

Finally, the contrasts performed by the CUSUM and CUSUMQ tests prove that the demand for real balances has remained stable throughout the period 1994Q1-2014Q4 (Graphic A4).

## Discussion and Conclusion

### Discussion

Both economic performance and changes given by the monetary authority in managing its policy can be appreciated along the paths of the variables that approximate the demand for real balances, real income and interest rate. Similarly, the existence of these changes has been proven statistically and econometrically by comparing their statistical properties for periods and application of tests.

In the 2004Q4-2014Q4 period was observed a slightly greater exchange rate volatility after the adoption of the inflation targeting framework. But this is because when the interest rate is controlled by the monetary policy, generally, the exchange rate volatility increases; something which constitutes a typical fact that have taken place in most countries which have embraced this type of monetary regime.

Similarly, it was visualized an expansionary monetary policy with a lower interest rate which was accompanied by a higher demand for real balances due to an increase in the economic activity. Likewise, as shown in the empirical literature, it was seen a higher economic growth but, in this case, followed by a slight rise in the product volatility. This latter fact, despite not being all contrary with stylized facts, here is mainly explained by the agricultural sector behavior which still is subject to climatic conditions.

Similarly, the highest significant correlations for the same period between the foundations of this money demand are solidified according to determined theoretically by the rule of Poole, which states that in a context of managing interest rate as optional instrument of the monetary policy, monetary shocks or aggregate demand are softened by this kind of assumed governed by compared to control monetary aggregates scheme (De Gregorio, 2007).

Moreover, the fact that the velocity of money has not remained constant throughout the study period covered in this investigation, contrary to the provisions of the Quantity Theory of Money Fischer (1896), this event yet it is consistent with the theory of demand for real balances held by Cagan (1956) which takes into account the distortions that financial innovation causes on the demand for real balances.

In addition to being a fact empirically proven, as mentioned in previous sections. Therefore, this empirically found evidence justifies the use of the latter theory proposed to conduct econometric analysis in the field.

Found elasticities of demand for real balances approximated by the M1 and M1\_a are similar with respect to the opportunity cost of using money and is located between -0.11 and -0.19, taking a least value of -0.22 for broader definition of money, given by the M1\_a.

The latter magnitude is consistent with the definition used. This is because as broader this definition gets, it is natural to expect that the use of money costs also increases given the increment of the range of money substitutes. Similarly, this magnitude of elasticity is very close to that found by Rojas and García (2006) of -0.23 and complies with the terms recorded in the external empirical evidence.

For its part, the elasticity of demand for real balances with respect to real income, is between a range of 1 to 1.30 (statistically significantly) and equal to unity, so that, with the evidence obtained elasticity is fulfilled under unitary model Cagan (1956) and empirical records of relevant literature.

Also worth highlighting that two distinctly accented events occur. First, there are differences in the estimations compared to previous work at national level but, currently, there are resemblances at the international level. And, second, there are some differences between the elasticities found with the Engle and Granger and Johansen and Juselius methods employing the definitions of M1 and M1\_a

In this sense, the case of the first fact of an elasticity with respect to income between 1 and 1.30 it is found. A result which is opposite to those found in the two non peer-reviewed papers published prior to 2008 at the national level that found elasticities lower to the unity. However, this current result is explained by the theory of the demand for real balances which postulates that if the velocity of money possesses a downward trend, it is expected that the elasticity with respect to income be equal to or greater than one.

Empirically, this downward trend in the velocity of money can be observed in Graphic A2, where as of 2003 the growing trend charged a turning point. So, this growing trend is the fact that explains the income elasticities obtained in the two aforementioned works.

Also, as previously indicated, the downward trend in the velocity of money, it is also consistent with the larger phenomenon of financial development and innovation. This result is similar to that obtained by Ferrada et al. (2014) and Ivanov et al. (2015) for countries with an inflation targeting framework, as well.

Consequently, by estimating the elasticity with respect to real income, the first change is observed in the magnitude of this fundamental parameter of the demand for real balances for the 1994Q4-2014Q4 period.

But for the second fact, disparities found in the elasticities with the method of Johansen and Juselius show that the restrictions imposed do hold and that the estimations carried out in the long-term model are correct. A similar conclusion is gotten for the estimations done with the Engle and Granger method. Therefore, the found outcomes would not be affected by the estimation techniques implemented here.

As for the semi-elasticity coefficient of financial innovation, the results for approximating demand using the official definition of M1 compared to that of M1 a, have proven to be robust and maintain the expected theoretical sign and magnitudes between -0.01 and -0.02. Clearly, this is a sign that technological advances have reduced the requirements of demanding real balances.

However, the robustness of the results obtained for this parameter does not apply to the demand for real balances when is approximated by the expanded definition of M1 (which is M1 a), since the sign proves not to be stable, but in terms of absolute value it remains similar.

Moreover, this last result of instability in the sign and magnitude found in the parameter of financial innovation using the M1 a definition, is alike to that found in Rojas and García (2006). Also, these authors indicate that this parameter could have had more accurate outcome estimation if a narrower definition of money would have been used. And, precisely, that is why this parameter is stable when the official definition of M1 is employed as a narrower proxy for the real money demand.

Furthermore, the verification of the stability of the demand for real balances throughout the period 1994Q1-2014Q4, although contrary to some authors' predictions about that real money demand in the context of inflation targeting tends to be unstable, here it is confirmed that it was stable for the referred period and that is consistent with similar results found in countries with inflation targeting schemes. A recent example of this is the case of Chile (Ferrada et al., 2014).

A probable explanation of why the elasticity of the demand for real balances relative to the real income for the whole analyzed period is located between the unit and about three decimals above, it would be due to the achievement of a stable macroeconomic regime. This latter, was obtained by means of fiscal reforms and major liquidity injections made in the economic system that explain a greater elasticity.<sup>13</sup>

For its part, the quarterly adjustment average of the found money velocity was equal to 10%, with a range of 8% and 15% per quarter. These numbers are lower and practically more than a half of the measurements obtained in the previous cited working papers (with an average calculated, approximately, in 30% per quarter) at the national level.

The reason for this different finding has to do with a minor dynamic observed in the use of cash for purchases during each quarter (considering the period 1994Q1-2014Q4). That is to say, at a lower velocity of money from 2003Q1 quarter in comparison to previous studies that covered a maximum time frame until 2005Q4.

<sup>13</sup> See series of economic reports of the Central Bank of Paraguay.

Finally, as of the results obtained here, it can be inferred from a theoretical perspective that the stability of the real money demand contributed to a good performance of the monetary policy transmission channel and that it was unlikely that inflationary pressures would arise through this via neither during the same analyzed period of time nor for the consecutive short-term.

## Conclusions

This research presents estimations of the real money demand of Paraguay and an analysis of the evolution of its foundations during the 1994Q1-2014Q4 period in which, besides the own changes resulting from the economic cycle and international financial environment, some changes in the way that the monetary policy is conducted also took place.

Estimations are made in aggregate and per capita terms, under a modified version of the theoretical approach of the demand for transactional reasons proposed by Cagan (1958). To do so, the ordinary least square and vector error correction model estimation techniques are applied following the cointegration methods designed by Engle and Granger (1987) and Johansen and Juselius (1990). While, for the approximations of the demand for real balances, is adopted the official definition employed by the central bank (M1) and a wider definition for international comparative purposes (the expanded M1 or M1\_a).

Based on the obtained results, it can be highlighted that the elasticities of demand for real balances relative to income, the interest rate and the semi-elasticity with respect to the parameter of financial innovation when approaching by the official M1 definition have a range of  $1.15 \pm 0.15$ ,  $-0.15 \pm 0.04$ , and  $-0.02$ , respectively. Additionally, when approaching by the broad M1 definition, the range is  $1.90 \pm 0.90$ ,  $-0.16 \pm 0.06$  and  $0.00 \pm 0.01$ , respectively.

Furthermore, it is found that the real money demand for the same time span covered is stable.

Eventually, these findings suggest that the transmission channel of monetary policy of Paraguay has had a good performance according to the provisions of the literature and that no feasible inflationary pressures could have arisen by this way neither during the same analyzed period of time nor for the next short-term after the same interval of time covered in this research.

Acknowledgements. The author wishes to recognize and thank the financial support from the School of Economics Sciences and the Rectorate of the National University of Asunción. Likewise, thanks to Natalia N. Vega V. from the Central Bank of Paraguay for their valuable comments and insights on the research.

**Annexes**

Variables	ADF Test <sup>a</sup>				KPSS Test <sup>b</sup>					I(?)
	Prob.	Lag	Max Lag	Obs	Test Statistic <sup>c</sup>	CV: 1%	CV: 5%	CV: 10%	Lag/s	
In levels										
LM1	0.70	1	11	82	0.26	0.22	0.15	0.12	6.00	I(1)
LM1_pc	0.71	1	11	82	0.27	0.22	0.15	0.12	6.00	I(1)
LM1_a	0.89	1	11	82	0.25	0.22	0.15	0.12	7.00	I(1)
LM1_a_pc	0.89	1	11	82	0.25	0.22	0.15	0.12	7.00	I(1)
LPIB	0.47	0	11	83	0.27	0.22	0.15	0.12	6.00	I(1)
LPIB_pc	0.59	0	11	83	0.28	0.22	0.15	0.12	6.00	I(1)
LR	0.49	1	11	82	0.17	0.22	0.15	0.12	6.00	I(1)
LIPC	0.96	0	11	83	0.30	0.22	0.15	0.12	6.00	I(2)
LPYG_USD	0.92	2	11	81	0.27	0.22	0.15	0.12	7.00	I(1)
In first differences										
ΔLM1	0.00	0	11	82	0.24	0.74	0.46	0.35	3.00	I(0)
ΔLM1_pc	0.00	0	11	82	0.27	0.74	0.46	0.35	3.00	I(0)
ΔLM1_a	0.00	0	11	82	0.26	0.74	0.46	0.35	4.00	I(0)
ΔLM1_a_pc	0.00	0	11	82	0.28	0.74	0.46	0.35	4.00	I(0)
ΔLPIB	0.00	0	11	82	0.13	0.74	0.46	0.35	2.00	I(0)
ΔLPIB_pc	0.00	0	11	82	0.18	0.74	0.46	0.35	2.00	I(0)
ΔLR	0.00	0	11	82	0.10	0.74	0.46	0.35	4.00	I(0)
ΔLIPC	0.09	4	11	78	0.70	0.74	0.46	0.35	4.00	I(1)
ΔLPYG_USD	0.00	1	11	81	0.44	0.74	0.46	0.35	3.00	I(0)

Source: Author's calculations.

Note. The ADF and KPSS unit root test are specified with intercept and trend for the series in levels (according to their properties). Series in first differences are specified only with intercept for the KPSS Test without intercept and trend for the ADF Test. Abbreviations: Prob = is the p-value of the calculated ADF statistic; CV = Critical Value; I(?) = tests' conclusion.

<sup>a</sup>The presented ADF Test selection was done with the optimal number of lags based on Schwarz Information Criterion. <sup>b</sup>The number of lags for the KPSS Test are chosen using Bartlett Kernel Bandwidth and the Newey-West selection criteria.

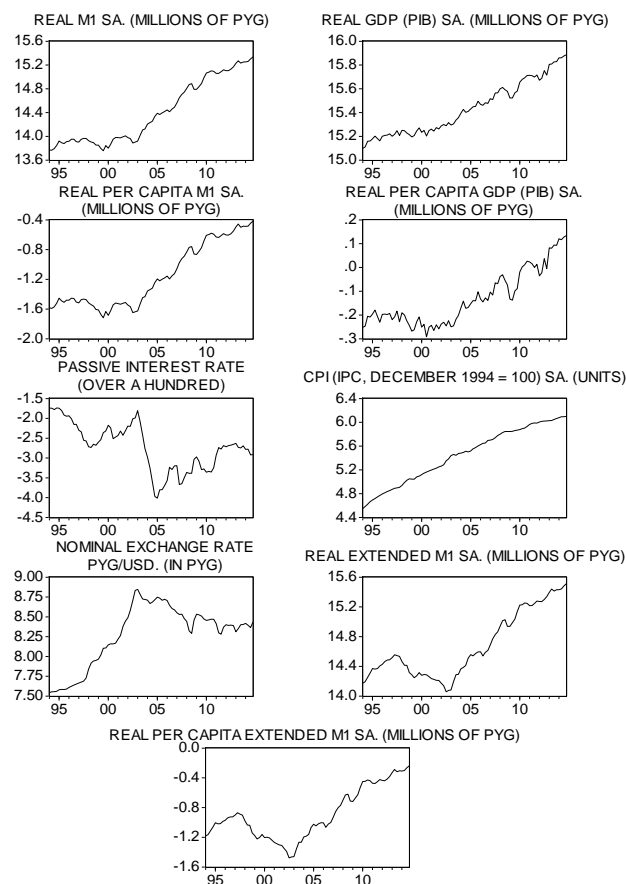
**Table 1** ADF and KPSS unit root tests practiced to the variables of interest

1994Q1-2014Q4 Period								
Var/Stat.	gM1	gM1_a	gPIB	R	ΔR	π	Δπ	gUSD
Average	0.02	0.02	0.01	0.07	0.00	0.02	0.00	0.01
St. Dev.	0.04	0.04	0.03	0.04	0.01	0.01	0.02	0.05
J-B (P-V)	0.71	0.64	0.80	0.01	0.00	0.02	0.25	0.06
Observat.	82	82	82	82	82	82	82	82
1994Q1-2003Q4 Period								
Var/Stat.	gM1	gM1_a	gPIB	R	ΔR	π	Δπ	gUSD
Average	0.009	0.003	0.006	0.109	-0.003	0.023	0.000	0.031
St. Dev.	0.044	0.044	0.025	0.033	0.015	0.015	0.019	0.044
J-B (P-V)	0.530	0.922	0.448	0.240	0.486	0.182	0.506	0.420
Observat.	38	38	38	38	38	38	38	38
2004Q1-2014Q4 Period								
Var/Stat.	gM1	gM1_a	gPIB	R	ΔR	π	Δπ	gUSD
Average	0.028	0.028	0.012	0.045	0.000	0.014	-0.001	-0.006
St. Dev.	0.038	0.039	0.029	0.016	0.007	0.012	0.015	0.050
J-B (P-V)	0.071	0.299	0.618	0.197	0.895	0.606	0.657	0.001
Observat.	44	44	44	44	44	44	44	44

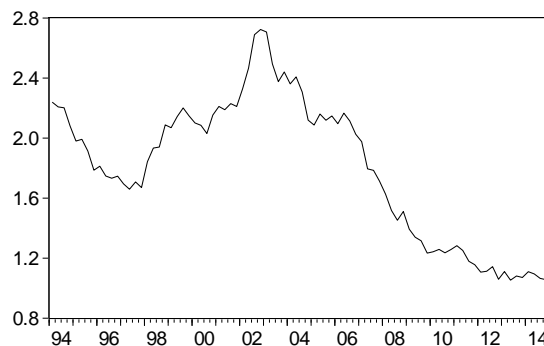
Source: Author's calculations with data from the Central Bank of Paraguay.

Note. Abbreviations: Var/Stat. = Variables/Statistics; St. Dev. = Standard Deviation; J-B (P-V) = Jarque-Bera Test p-value; Observat. = number of observations. Variables: g = quarterly growth; Δ = quarterly change; π = inflation.

**Table 2** Statistical properties of the economic variables for periods (in quarterly frequency)

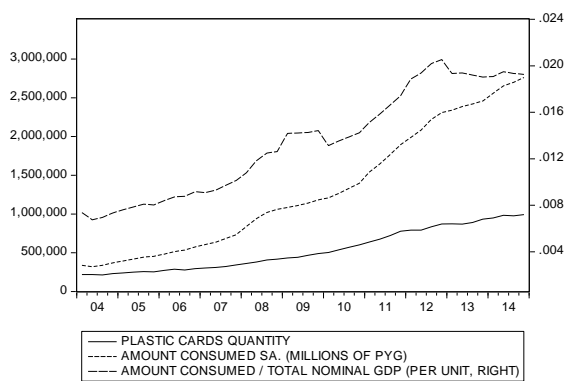
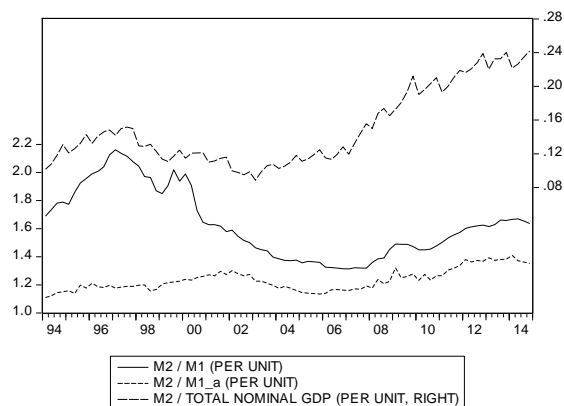


**Graphic 1** Evolution of key macroeconomic variables (in logarithm). Source: Author's calculations with data from the Central Bank of Paraguay and the General Directorate of Statistical Surveys and Census (DGEEC)



**Graphic 2** Velocity of the money in Paraguay (1994Q4-2014Q4 period). Source: Author's calculations with data from the Central Bank of Paraguay





**Graphic 3** Key Indicators of Financial Innovation (2004Q1-2014Q4 period). Source: Author's calculations with data from the Central Bank of Paraguay

1994Q1-2014Q4 Period								
Variables	gM1	gM1_a	gPIB	R	$\Delta R$	$\pi$	$\Delta \pi$	gUSD
gM1	1.00	0.87	0.27	-0.16	-0.45	-0.30	-0.37	-0.49
gM1_a	0.87	1.00	0.31	-0.11	-0.40	-0.29	-0.32	-0.50
gPIB	0.27	0.31	1.00	-0.06	-0.11	-0.09	-0.04	-0.13
R	-0.16	-0.11	-0.06	1.00	0.01	0.35	-0.03	0.26
$\Delta R$	-0.45	-0.40	-0.11	0.01	1.00	0.33	0.26	0.24
$\pi$	-0.30	-0.29	-0.09	0.35	0.33	1.00	0.60	0.11
$\Delta \pi$	-0.37	-0.32	-0.04	-0.03	0.26	0.60	1.00	0.21
gUSD	-0.49	-0.50	-0.13	0.26	0.24	0.11	0.21	1.00

1994Q1-2003Q4 Period								
Variables	gM1	gM1_a	gPIB	R	$\Delta R$	$\pi$	$\Delta \pi$	gUSD
gM1	1.00	0.76	0.12	0.17	-0.49	-0.26	-0.52	-0.57
gM1_a	0.76	1.00	0.21	0.45	-0.43	-0.19	-0.42	-0.59
gPIB	0.12	0.21	1.00	0.08	-0.14	-0.09	-0.03	0.09
R	0.17	0.45	0.08	1.00	0.17	0.40	-0.03	-0.15
$\Delta R$	-0.49	-0.43	-0.14	0.17	1.00	0.44	0.37	0.53
$\pi$	-0.26	-0.19	-0.09	0.40	0.44	1.00	0.62	0.35
$\Delta \pi$	-0.52	-0.42	-0.03	-0.03	0.37	0.62	1.00	0.41
gUSD	-0.57	-0.59	0.09	-0.15	0.53	0.35	0.41	1.00

2004Q1-2014Q4 Period								
Variables	gM1	gM1_a	gPIB	R	$\Delta R$	$\pi$	$\Delta \pi$	gUSD
gM1	1.00	0.98	0.37	-0.28	-0.59	-0.24	-0.19	-0.36
gM1_a	0.98	1.00	0.37	-0.26	-0.58	-0.27	-0.22	-0.32
gPIB	0.37	0.37	1.00	-0.04	-0.13	-0.03	-0.05	-0.22
R	-0.28	-0.26	-0.04	1.00	0.17	-0.34	-0.12	0.11
$\Delta R$	-0.59	-0.58	-0.13	0.17	1.00	0.33	0.03	0.02
$\pi$	-0.24	-0.27	-0.03	-0.34	0.33	1.00	0.63	-0.35
$\Delta \pi$	-0.19	-0.22	-0.05	-0.12	0.03	0.63	1.00	0.06
gUSD	-0.36	-0.32	-0.22	0.11	0.02	-0.35	0.06	1.00

Source: Author's calculations with data from Central Bank of Paraguay.

Note. Abbreviations: g = quarterly growth;  $\Delta$  = quarterly change;  $\pi$  = inflation.

**Table 3.** Correlations matrix of key macroeconomic variables by periods

Explained variable	Explanatory variables							
--------------------	-----------------------	--	--	--	--	--	--	--

Real money demand approximated by M1 in aggregate and per capita terms (M1\_pc)

Ln(m1)	$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$	D1997Q4	D2008Q3	EC(t-1)	
	-6.43	1.34	-0.11	0.01		-0.23	-0.22	-0.15
SE	4.72	0.31	0.03	0.00		0.07	0.07	0.05
t-S	-1.36	4.30	-3.60	2.06		-3.40	-3.13	-2.75
P-V	0.18	0.00	0.00	0.04		0.00	0.00	0.01

Ln(m1)	$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$	D1997Q4	D2008Q3	EC(t-1)	
	2.23	-1.00	0.19	-0.02		-0.04	-0.12	-0.09
SE			0.09	0.00		0.02	0.04	0.03
t-S			1.96	-6.64		-1.95	-3.03	-2.82

Ln(m1_pc)	$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$	D1997Q4	D2008Q3	EC(t-1)	
	-1.28	1.34	-0.11	0.01		-0.22	-0.22	-0.13
SE	0.10	0.30	0.03	0.00		0.07	0.07	0.06
t-S	-12.71	4.50	-3.66	4.07		-3.33	-3.09	-2.15
P-V	0.00	0.00	0.00	0.00		0.00	0.00	0.03

Ln(m1_pc)	$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$	D1997Q4	D2008Q4	D2008Q4P	EC(t-1)	
	2.11	-1.00	0.18	-0.01		-0.05	0.01	-0.13	-0.11
SE			0.08	0.00		0.02	0.01	0.04	0.04
t-S			2.15	-3.33		-2.02	1.35	-3.13	-2.84

Real money demand approximated by the M1\_a (extended version of M1) in aggregate and per capita terms (M1\_a\_pc)

Ln(m1_a)	$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$	D(D1997Q4)	D2002Q3	D2008Q3	D(D2008Q4P)	EC(t-1)	
	-29.20	2.89	-0.11	-0.02		0.17	-0.11	-0.37	-0.09	-0.09
SE	4.60	0.30	0.03	0.00		0.02	0.05	0.08	0.02	0.05
t-S	-6.35	9.58	-3.60	-4.95		7.49	-2.45	-4.70	-5.06	-1.94
P-V	0.00	0.00	0.00	0.00		0.00	0.02	0.00	0.00	0.06

Ln(m1_a)	$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$	D1997Q4	D2008Q4P	D2008Q4	EC(t-1)	
	1.81	-1.00	0.22	-0.01		-0.06	-0.13	0.02	-0.09
SE			0.10	0.01		0.02	0.04	0.01	0.02
t-S			2.15	-2.00		-2.75	-3.28	1.81	-3.90

Ln(m1_a_pc)	$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$	D(D1997Q4)	D2002Q3	D2008Q3	D(D2008Q4P)	EC(t-1)	
	-0.29	2.78	-0.11	-0.01		0.17	-0.11	-0.36	-0.09	-0.08
SE	0.10	0.28	0.03	0.00		0.02	0.05	0.08	0.02	0.04
t-S	-2.99	9.91	-3.82	-2.72		7.39	-2.47	-4.58	-5.46	-2.04
P-V	0.00	0.00	0.00	0.01		0.00	0.02	0.00	0.00	0.05

Ln(m1_a_pc)	$\beta_0$	$\beta_1$	$\beta_2$	$\beta_3$	D1997Q4	D2008Q4P	D2008Q4	EC(t-1)	
	17.19	-1.00	0.22	-0.01		-0.06	-0.13	0.02	-0.09
SE			0.10	0.01		0.02	0.04	0.01	0.02
t-S			2.10	-1.13		-2.75	-3.28	1.77	-3.91

Source: Author's calculations.

Note. Abbreviations: SE = Standard Error; t-S = t-statistic calculated; P-V = P value; The VEC models are specified with two lags based on the comparison of the performance of the estimated model post (with one or two lags) and the Akaike information criteria and Schwarz.

**Table 5** Real money demand estimations results in aggregate and per capita terms for 1994q4-2014q4 period (cointegrating equations coefficients)

Explained variable	Long-term Equation Statistics	Short-term Equation Statistics	EM	ET
--------------------	-------------------------------	--------------------------------	----	----

Real money demand approximated by M1 in aggregate and per capita terms (M1\_pc)

Ln(m1)	R2a	SEoR	DW	J-B (P-V)	ADF <sup>a</sup>	R2a	SEoR	DW	J-B (P-V)	LM Test <sup>d</sup>	HT ARCH <sup>e</sup>	R. RESET T. <sup>f</sup>	E&G	OLS
	0.98	0.07	0.80	0.25	-4.57	0.49	0.03	1.79	0.47	0.75	0.97	0.82		

Ln(m1)	R2a	SEoR	LM Test (1-3) <sup>b</sup>	J-B (P-V)	LR Test (r=1) <sup>c</sup>	J&J	VECR
	0.17	0.10	0.63	0.94	0.02		

Ln(m1_pc)	R2a	SEoR	DW	J-B (P-V)	ADF <sup>a</sup>	R2a	SEoR	DW	J-B (P-V)	LM Test <sup>d</sup>	HT ARCH <sup>e</sup>	R. RESET T. <sup>f</sup>	E&G	OLS
	0.97	0.07	0.80	0.27	-4.58	0.54	0.03	1.96	0.96	0.73	0.69	0.66		

Ln(m1_pc)	R2a	SEoR	LM Test (1-3) <sup>b</sup>	J-B (P-V)	LR Test (r=1) <sup>c</sup>	J&J	VECR
	0.16	0.10	0.57	0.95	0.05		

Real money demand approximated by the M1\_a (extended version of M1) in aggregate and per capita terms (M1\_a\_pc)

Ln(m1_a)	R2a	SEoR	DW	J-B (P-V)	ADF <sup>a</sup>	R2a	SEoR	DW	J-B (P-V)	LM Test <sup>d</sup>	HT ARCH <sup>e</sup>	R. RESET T. <sup>f</sup>	E&G	OLS
	0.96	0.09	0.89	0.18	-4.79	0.45	0.03	1.81	0.23	0.79	0.26	0.78		

Ln(m1_a)	R2a	SEoR	LM Test (1-3) <sup>b</sup>	J-B (P-V)	LR Test (r=1) <sup>c</sup>	J&J	VECR
	0.29	0.09	0.46	0.81	0.43		

Ln(m1_a_pc)	R2a	SEoR	DW	J-B (P-V)	ADF <sup>a</sup>	R2a	SEoR	DW	J-B (P-V)	LM Test <sup>d</sup>	HT ARCH <sup>e</sup>	R. RESET T. <sup>f</sup>	E&G	OLS
	0.94	0.09	0.86	0.17	-4.67	0.47	0.03	1.87	0.56	0.92	0.30	0.81		

Ln(m1_a_pc)	R2a	SEoR	LM Test (1-3) <sup>b</sup>	J-B (P-V)	LR Test (r=1) <sup>c</sup>	J&J	VECR
	0.29	0.09	0.46	0.81	0.41		

Source: Author's calculations.

Note. Abbreviations: EM = Estimation Method; ET = estimation technique; OLS = Ordinary Least Squares; VECR = Restricted Vector Error Correction Model; R2a = adjusted R-squared; SEoR = Standard Error of the Regression; DW = Durbin-Watson statistic; J-B (P-V) = p-value statistic of the Jarque-Bera normality test; ADF = Dickey-Fuller Test statistic with lags chosen according to Schwarz Information Criterion. VEC models are specified with two lags as of the performance comparison of the post estimated model (with one or two lags) and the Akaike and Schwarz information criteria.

<sup>a</sup>Corresponds to the Statistical Calculated values of the Test ADF (without intercept or trend) practiced to the residue. The null hypothesis of the test is that the tested series has a unit root (i.e., is a stationary serie). Critical values calculated by Engle and Yoo (1987) for the ADF Statistic when there are three variables in the cointegration relationship with intercept are -4.84, -4.11 and -3.73 at 1%, 5% and 10% significance level, respectively.

Whereas, the calculated critical values for two variables I(1) in the right member of the relationship multicointegration linear trend of Engsted, Gonzalo and Harlstrup (1997) are -5.47 and -4.74 at 1% and 5% significance levels, respectively. <sup>b</sup>Presents the lowest p-value obtained from the Serial Autocorrelation LM Test for the VEC model' residue between 1 and 3 lags. The null hypothesis test postulates absence of serial autocorrelation. <sup>c</sup>Shows the p-value for the LR test for contrasting the compliance of the restrictions imposed on the VEC with rank equal to one. The null hypothesis is that the restrictions imposed do hold. <sup>d</sup>It shows the p-value of the serial autocorrelation LM test applied to the first 4 lags of the model's residue. The null hypothesis is that there is no serial autocorrelation. <sup>e</sup>It shows the p-value of the F statistic test for Heteroskedasticity under the ARCH specification with one lag. The null hypothesis indicates no heteroscedasticity. <sup>f</sup>It shows the lowest value (p-value) among t, F and Likelihood Ratio statistics corresponding to Ramsey's Reset Test whose null hypothesis is that there are not omission for nonlinearities in the specified model.

**Table 6** Real money demand estimations results in aggregate and per capita terms for 1994q4-2014q4 period (cointegrating equations statistics)

<b>Real money demand approximated by M1 in aggregate and per capita terms (M1_pc)</b>				
DL1(m1)		SE	t-S	P-V
C	0.01	0.01	1.55	0.13
DL1PIBN_D11_D	0.42	0.09	4.88	0.00
DLR	-0.09	0.02	-5.07	0.00
DLR(-1)	0.09	0.02	5.14	0.00
DL1GDOLAR	-0.28	0.10	-2.77	0.01
<b>EC(t-1)</b>	-0.15	0.05	-2.75	0.01
D2004Q1	0.02	0.01	2.57	0.01
D2011Q2	-0.01	0.01	-1.84	0.07
DL1(m1_pc)		SE	t-S	P-V
C	-0.01	0.01	-0.87	0.39
DL1M1_D11P_D(-1)	0.22	0.10	2.33	0.02
DL1PIBN_D11P_D	0.32	0.11	2.89	0.01
DLR	-0.07	0.02	-3.74	0.00
DLR(-1)	0.07	0.02	3.90	0.00
DL1IPC94_D11	-0.75	0.19	-3.90	0.00
DL1IPC94_D11(-1)	0.98	0.22	4.52	0.00
<b>EC(t-1)</b>	-0.13	0.06	-2.15	0.03
D2004Q1	0.03	0.01	4.14	0.00
D2008Q4P	-0.12	0.01	-12.93	0.00
D2011Q2	-0.02	0.01	-2.38	0.02

<b>Real money demand approximated by the M1_a (extended version of M1) in aggregate and per capita terms (M1_a_pc)</b>				
DL1(m1_a)		SE	t-S	P-V
C	0.03	0.01	2.30	0.02
DL1M1_A_D11_D(-1)	0.27	0.10	2.58	0.01
DL1PIBN_D11_D	0.32	0.12	2.56	0.01
DL1R	-0.08	0.03	-2.37	0.02
DL1R(-1)	0.03	0.03	0.94	0.35
DL1IPC94_D11	-0.47	0.37	-1.27	0.21
DL1GDOLAR	-0.27	0.09	-3.00	0.00
<b>EC(t-1)</b>	-0.08	0.04	-1.93	0.06
D1997Q4	-0.01	0.01	-1.27	0.21
D(D1998Q4P)	-0.05	0.02	-2.31	0.02
D(D2000Q1)	-0.03	0.01	-3.13	0.00
D2008Q4	0.00	0.01	0.12	0.90
DL1(m1_a_pc)		SE	t-S	P-V
C	0.03	0.01	2.34	0.02
DL1M1_A_D11P_D(-1)	0.28	0.11	2.62	0.01
DL1PIBN_D11P_D	0.32	0.12	2.58	0.01
DL1R	-0.08	0.03	-2.38	0.02
DL1R(-1)	0.03	0.03	0.99	0.33
DL1IPC94_D11	-0.50	0.35	-1.42	0.16
DL1GDOLAR	-0.27	0.09	-3.03	0.00
<b>EC(t-1)</b>	-0.08	0.04	-2.04	0.05
D1997Q4	-0.01	0.01	-1.32	0.19
D(D1998Q4P)	-0.05	0.02	-2.30	0.02
D(D2000Q1)	-0.03	0.01	-3.54	0.00

**Table 7** Real money demand estimations results in aggregate and per capita terms for 1994q4-2014q4 period (Error Correction models). *Source: Author's calculations.*

Note. Abbreviations: SE = Standard Error; t-S = t-statistic calculated; P-V = P value. The VEC models are specified with two lags based on the comparison of the performance of the estimated model post (with one or two lags) and the Akaike information criteria and Schwarz

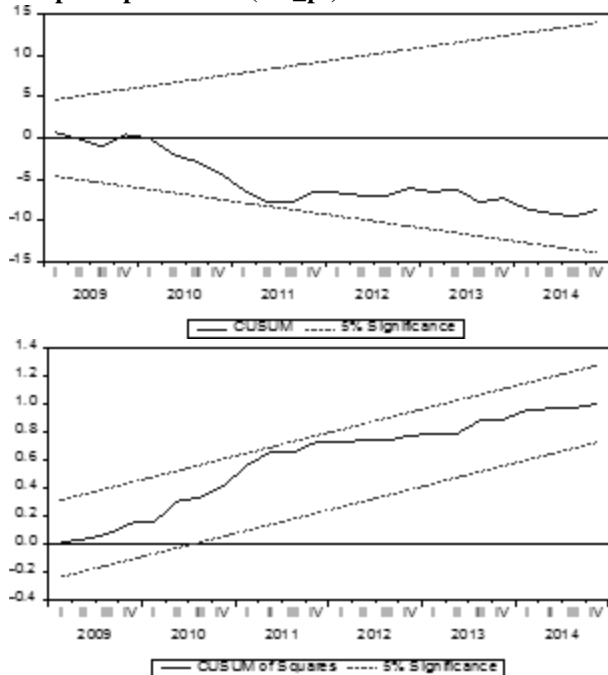
Endogenous variables	HO	Maximum Eigenvalue		Critical Value	Prob.
		Eigenvalue	Statistic		
LM1	0	0.302	29.102	25.823	0.018
LPIB	1	0.120	10.374	19.387	0.579
LR	2	0.044	3.631	12.518	0.795
LM1_pc	0	0.301	29.022	25.823	0.018
LPIB_pc	1	0.113	9.720	19.387	0.649
LR	2	0.041	3.411	12.518	0.824
LM1_a	0	0.330	32.439	25.823	0.006
LPIB	1	0.162	14.352	19.387	0.231
LR	2	0.014	1.114	12.518	0.998
LM1_a_pc	0	0.330	32.436	25.823	0.006
LPIB_pc	1	0.158	13.917	19.387	0.260
LR	2	0.011	0.869	12.518	1.000

Source: Author's calculations.

Note. Maximum eigenvalue test applied for the 1994Q1-2014Q4 period using co-integration trend, a dummy variable for 2003Q2 and a total of 81 observations. The null hypothesis test establishes the absence of cointegration for each number (0, 1 and 2). HO = Null hypothesis; Obs. = Observations; Prob. = P-value of the maximum eigenvalue statistic.

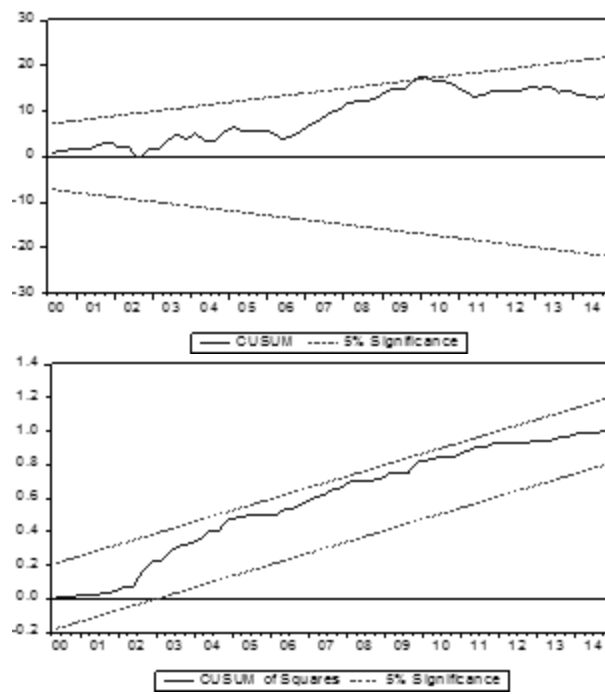
**Table 8** Johansen cointegration test results: Maximum eigenvalue.

**Real money demand approximated by M1 in aggregate and per capita terms (M1\_pc)**



Estimated models for Ln(m1\_a)

**Real money demand approximated by the M1\_a (extended version of M1) in aggregate and per capita terms (M1\_a\_pc)**



Estimated models for Ln(m1\_a\_pc)

**Graphic 4** CUSUM and CUSUMQ stability tests applied to the real money demand estimated models for the 1994Q1-2014Q4 period. Source: Author's calculations

## References

- Anwar, S. and Asghar, N. (2012). Is Demand for Money Stable in Pakistan? *Pakistan Economic and Social Review*, 50(1):1–22.
- Arrau, P. and De Gregorio, J. (1993). Financial Innovation and Money Demand: Application to Chile and Mexico. *The Review of Economics and Statistics*, 75(3):524–530.
- Arrau, P., De Gregorio, J., Reinhart, C. M., and Wickham, P. (1995). The demand for money in developing countries: Assessing the role of financial innovation. *Journal of Development Economics*, 46(2):317–340.
- Bae, Y. and De Jong, R. M. D. (2007). Money Demand Function Estimation by Nonlinear Cointegration. *Journal of Applied Econometrics*, 22(4):767–793.
- Bahmani, S. and Kutan, A. M. (2010). How Stable Is the Demand for Money in Emerging Economies? *Applied Economics*, 42(25-27) : 3307–3318.
- Bahmani-Oskooee, M., Kutan, A. M., and Xi, D. (2013). The Impact of Economic and Monetary Uncertainty on the Demand for Money in Emerging Economies. *Applied Economics*, 45(22-24):3278–3287.
- Basu, P. and Salyer, K. D. (2001). A note on modelling money demand in growing economies. *Bulletin of Economic Research*, 53(1):53–60.
- BCP (2013). Política Monetaria en Paraguay: Metas de Inflación, un Nuevo Esquema. Technical report, Sub Gerencia General de Política Monetaria. Banco Central de Paraguay., Asunción.
- Boughton, J. M. (1992). International comparisons of money demand. *Open Economies Review*, 3(3):323–343.
- Brown, R. L., Durbin, J., and Evans, J. M. (1975). Techniques for testing the constancy of regression relationships over time. *Journal of the Royal Statistical Society. Series B (Methodological)*, pages 149–192.
- Browne, F., Fagan, G., and Henry, J. (2005). Money Demand in EU Countries: A Survey. *Macroeconomics 0503004*, EconWPA.
- Cagan, P. (1958). The demand for currency relative to total money supply. In *The Demand for Currency Relative to Total Money Supply*, pages 1–37. NBER.
- Calani, M., Fuentes, J. R., and Schmidt-Hebbel, K. (2013). A Systemic Approach to Modelling and Estimating Demand for Money(ies). *Applied Economics*, 45(16-18):2141–2162.
- Carby, Y., Craigwell, R., Wright, A., and Wood, A. (2012). Finance and growth causality: A test of the patrick's stage-of-development hypothesis. *International Journal of Business and Social Science*, 3(21).
- Carrera, C. et al. (2008). Long-run money demand in latin-american countries: Non-stationary panel data approach. Technical report, Mimeo.
- Chadha, J. S., Corrado, L., and Sun, Q. (2010). Money and liquidity effects: Separating demand from supply. *Journal of Economic Dynamics and Control*, 34(9):1732–1747.
- Chow, G. C. (1960). Tests of equality between sets of coefficients in two linear regressions. *Econometrica: Journal of the Econometric Society*, pages 591–605.

- Clausen, V. (1998). Money Demand and Monetary Policy in Europe. *Weltwirtschaftliches Archiv*, 134(4):712–740.
- Clower, R. (1967). A reconsideration of the microfoundations of monetary theory. *Economic Inquiry*, 6(1):1–8.
- Colmán, H. A. (2005). Demanda por Dinero y Condiciones Monetarias. Technical report, Studies and Analysis Department. Undersecretary of State for Economic Affairs and Integration. Ministry of Finance.
- Colmán, H. A. (2007). Dinero y Política Monetaria. Technical report, Programa de las Naciones Unidas para el Desarrollo, 22. Proyecto PAR 02/007.
- Corbo L, V. (1980). Expectativas de inflación y demanda por dinero en una economía con una tasa de inflación intermedia: Chile en los sesenta. *Cuadernos de Economía*, pages 143–153.
- De Gregorio Rebeco, J. F. (2007). *Macroeconomía: Teoría y políticas*.
- Dickey, D. A. and Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American statistical association*, 74(366a):427–431.
- Enders, W. (2009). *Applied Econometric Time Series*. Wiley Series in Probability and Statistics. Wiley.
- Engle, R. F. and Granger, C. W. (1987). Co-integration and error correction: representation, estimation, and testing. *Econometrica: journal of the Econometric Society*, pages 251–276.
- Engle, R. F. and Yoo, B. S. (1987). Forecasting and testing in co-integrated systems. *Journal of econometrics*, 35(1):143–159.
- Fair, R. C. (1987). International Evidence on the Demand for Money. *The Review of Economics and Statistics*, 69(3):473–80.
- Feenstra, R. C. (1986). Functional equivalence between liquidity costs and the utility of money. *Journal of Monetary Economics*, 17(2):271–291.
- Ferrada, C., Tagle, M., et al. (2014). Estimación reciente de la demanda de dinero en Chile. *Notas de Investigación Journal Economía Chilena (The Chilean Economy)*, 17(3):86–109.
- Fisher, I. (1896). *Appreciation and Interest: A Study of the Influence of Monetary Appreciation and Depreciation on the Rate of Interest with Applications to the Bimetallic Controversy and the Theory of Interest*, volume 11. American economic association.
- Foresti, P. and Napolitano, O. (2013). Modelling Long-Run Money Demand: A Panel Data Analysis on Nine Developed Economies. *Applied Financial Economics*, 23(22-24):1707–1719.
- Goldfeld, S. (1994). Demand for money: empirical studies, in *The New Palgrave Dictionary of Money & Finance*. London. Newman, M. Milgate & J. Eatwell (Eds) Macmillan Press.
- Greene, W. H. (2000). *Econometric analysis (international edition)*.
- Hossain, A. A. (2012). Modelling of narrow money demand in Australia: an ARDL cointegration approach, 1970–2009. *Empirical Economics*, 42(3):767–790.

- Iguini, E. B. and Licandro, G. (2003). La demanda de dinero en Uruguay: 1980.1-2002.4. *Revista de economía*, 10(2):59–96.
- Ireland, P. N. (1995). Endogenous financial innovation and the demand for money. *Journal of Money, Credit, and Banking*, 27(1):92–3.
- Ivanov, M., Petkovski, M., and Naumovska, E. (2015). Money-in-the-Utility Function: Model Simulations and Money Demand Estimation in the Case of the Republic of Macedonia. *South East European Journal of Economics & Business* (1840118X), 9(2):7–20.
- Jimnez, L. F. and Manuelito, S. (2011). América Latina: sistemas financieros y financiamiento de la inversión. Diagnósticos y propuestas. *Revista de la CEPAL*, (103):47–75.
- Johansen, S. and Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration with applications to the demand for money. *Oxford Bulletin of Economics and Statistics*, 52(2):169–210.
- Judd, J. P. and Scadding, J. L. (1982). The Search for a Stable Money Demand Function: A Survey of the Post-1973 Literature. *Journal of Economic Literature*, 20(3):993–1023.
- Kahn, G. A. and Benolkin, S. (2007). The role of money in monetary policy: why do the fed and ecb see it so differently? *Economic Review-Federal Reserve Bank of Kansas City*, 92(3):5.
- Khan, A. H. (1980). The demand for money in Pakistan: Some further results. *The Pakistan Development Review*, 19(1):25–50.
- King, M. (2001). No money, no inflation the role of money in the economy. *Economie internationale*, (4):111–131.
- Kwiatkowski, D., Phillips, P. C., Schmidt, P., and Shin, Y. (1992). Testing the null hypothesis of stationarity against the alternative of a unit root: How sure are we that economic time series have a unit root? *Journal of econometrics*, 54(1-3):159–178.
- Laidler, D. (1991). The quantity theory is always and everywhere controversial-why?\*. *Economic Record*, 67(4):289–306.
- Lucas, R. E. (1980). Two illustrations of the quantity theory of money. *The American Economic Review*, 70(5):1005–1014.
- Lucas Jr., R. E. and Nicolini, J. P. (2015). On the stability of money demand. *Journal of Monetary Economics*, 73:48–65.
- Mark, N. C. and Sul, D. (2003). Cointegration vector estimation by panel dols and long-run money demand. *Oxford Bulletin of Economics and Statistics*, 65(5):655–680.
- Matte, R. and Rojas, P. (1989). Evolución reciente del mercado monetario y una estimación de la demanda por dinero en Chile. *Cuadernos de Economía*, pages 195–216.
- Mehra, Y. P. (1997). A review of the recent behavior of m2 demand. *FRB Richmond Economic Quarterly*, 83(3):27–43.
- Mies, V. and Soto, R. (2000). Demanda por Dinero: Teoría, Evidencia, Resultados. *Revista de Economía Chilena*, 3(3).
- Moosa, I. A. (1992). The demand for money in India: a cointegration approach. *Indian Economic Journal*, 40(1):101.
- Pedroni, P. (2001). Fully modified OLS for heterogeneous cointegrated panels, page 93130. Emerald.
- Pedroni, P. (2002). Fully modified OLS for heterogeneous cointegrated panels. In B.

- H. Baltagi (Ed.). In *Recent Developments in the Econometrics of Panel Data*, volume 1 of Chapter 20, pages 424–461. Edward Elgar academic publications edition.
- Pesaran, M. H., Shin, Y., and Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of applied econometrics*, 16(3):289–326.
- Rojas, B. D. and Garc'ia, H. T. (2006). *Estimacin de la Demanda de Dinero en Paraguay*. Technical report, Department of Monetary and Financial Studies. Economic Studies. Central Bank of Paraguay.
- Sarwar, H., Sarwar, M., and Waqas, M. (2013). Stability of Money Demand Function in Pakistan. *Economic and Business Review*, 15(3):197–212.
- Serletis, A. (2013). *The Demand for Money: Theoretical and Empirical Approaches*. Springer Science & Business Media.
- Sidrauski, M. (1967). Rational choice and patterns of growth in a monetary economy. *The American Economic Review*, 57(2):534–544.
- Sriram, S. (1999). Survey of literature on demand for money: theoretical and empirical work with special reference to error-correction models.
- Sriram, S. S. (2000). A survey of recent empirical money demand studies. *IMF Staff Papers*, pages 334–365.
- Tobin, J. (1956). The interest-elasticity of transactions demand for cash. *The Review of Economics and Statistics*, pages 241–247.
- Valadkhani, A. (2005). Modelling Demand for Broad Money in Australia. *Australian Economic Papers*, 44(1):47–64.
- Valadkhani, A. (2008). Long-and short-run determinants of the demand for money in the asian-pacific countries: an empirical panel investigation. *Faculty of Commerce Papers*, page 378.
- Wilson, C. (1979). An infinite horizon model with money. *General equilibrium, growth, and trade: Essays in honor of Lionel McKenzie*, pages 79–104.



## **Index of sustainability of the greenhouses of Chilcuatla, Hidalgo**

CARBALLO-SÁNCHEZ, Álvaro†\*, MEJÍA-NÁJERA, Carlos, CRUZ-SÁNCHEZ, Eduardo and BLANCAS-OLVERA, Zoraida

Received January 7, 2016; Accepted June 15, 2016

---

### **Abstract**

The present research project aims to analyze whether greenhouses located in the municipality of Chilcuatla, Hidalgo, are social, economic and environmentally sustainable. Although, greenhouses are controlled production systems and increase the effectiveness of production, they do not guarantee sustainability. In order to carry out this project the methodology structure was divided into three main stages: First, a census including the greenhouses in the city was elaborated. Second, a survey embracing social, economic and environmental aspects was administered. Third, the data obtained was analyzed and processed. The contribution of this work is to have a census and create a database of economic and environmental data of greenhouses located in the municipalities analyzed to determine if they meet the conditions of sustainability

### **Sustainability, Socioeconomic Responsibility, Environmental Responsibility**

---

**Citation:** CARBALLO-SÁNCHEZ, Álvaro, MEJÍA-NÁJERA, Carlos, CRUZ-SÁNCHEZ, Eduardo and BLANCAS-OLVERA, Zoraida. Index of sustainability of the greenhouses of Chilcuatla, Hidalgo. ECORFAN Journal-Republic of Cameroon 2016, 2-2: 26-32

---

---

\* Correspondence to Author (email: acarballo@upfim.edu.mx)

† Researcher contributing first author.

## Introduction

The present work aims to analyze if the greenhouses located in the municipality of Chilcuatla, located in the Mezquital valley, Hidalgo are sustainable or not from the economic, social and environmental points of view, applying an index of sustainability. It should be mentioned that this work is part of a research on the greenhouses located in the municipalities of the Mezquital valley, Hidalgo. The production of food as one of the fundamental activities for society should be a sustainable activity to ensure food supply, hence the importance of determining if the productive activity of greenhouses is sustainable.

The present work was focused on gathering and analyzing relevant information to determine the operating characteristics of the greenhouses established in the mentioned municipality, in order to determine if they comply with the conditions of economic, social and environmental sustainability. This information was collected through a survey; the objective of this work is to determine if producers of protected crops in the municipality of Chilcuatla meet the socioeconomic and environmental factors necessary to achieve sustainability in greenhouse activity. Due to the need to have a more mathematical and non-subjective tool, the information was analyzed by introducing sustainability indexes.

Sections in which this work is divided are: Background where the location of the municipality studied is exposed, the current situation of the subject; Methodology; Results where the information obtained is presented and the analysis of this and finally conclusions.

## Background

Chilcuatla is located south of the state of Hidalgo, between the parallels 20° 20" north latitude, at 99° 14" west longitude with an average height of 1860 meters above sea level, adjoins the north with the municipality of Ixmiquilpan; to the south with Chapantongo and Mixquiahuala; To the west with Alfajayucan and Chapantongo and to the east with Progreso and San Salvador. It has a surface area of 222.94 Km<sup>2</sup>, which represents 1.10% of the surface of the state of Hidalgo. It has about 1624 bodies of water, pass the rivers Tula, Pánuco, Amajac, the river Agulia and the basin of the Moctezuma River. Its soil is semi-desert and rich in organic matter and nutrient, regular amount of lithosol type in 55%, rendzin in 30% and luvisol in 10% and a minimal part fluvisol. The main use of the land is agricultural. (INAFED, 2010).

Food production should be a sustainable activity to ensure food supply. Greenhouses being a controlled production system, increase the effectiveness of production, but do not ensure its sustainability. In the case of protected crops (Greenhouses) A relevant point is the generation of fixed jobs compared to traditional planting, in which, during the vegetative development of the crop, only temporary labor is required. It is estimated that a greenhouse of 2000 m<sup>2</sup> generates 4 direct and 10 indirect fixed jobs, which is why this technology should be considered as a factor of rural development in marginalized areas. The impact of the introduction of protected crops brings a positive increase in the quality of life, food security, economy of a region and therefore in the general progress of the nation (Hernández-Díaz, 2006); are also known to generate impact on the environment such as chemical waste, plastics and organic waste, however this type of crop provides protection against adverse environmental factors and regardless of geographical location. (Campos, 2005; DeVere y Cooper, 2009)

The National Development Plan 2013-2018 presents the actions that the Government of the Republic will implement in the finance and financial sectors to ensure the availability of fiscal and financial resources for the development of Mexico in specific, the program is marked within the National goal Prosperous Mexico where one of its main objectives is to democratize access to financing projects with growth potential that comply with protected crops (greenhouses) (PRONAFIDE, 2013; SAGARPA, 2012)

Sustainability of greenhouses depends on many factors such as the type of substrate used, nutrients (post-harvest residue), energy, income (economic profitability), must also include the changes that greenhouses generate in the ecosystem (changes in the landscape, changes in the composition of water and soil, poisoning, ignorance of pesticide handling) (Montero, 2008; Hernández-Díaz, 2006; Alonso, 2004; Gómez-Arrollo, 2013).

The sustainable development of any one process is defined as that which satisfies the needs of the present generation without compromising the ability of future generations to meet their own needs (Thiersein and Walser, 1997: 159), we will analyze three factors to assess the sustainability of greenhouses: economic-social, technical and environmental viability, in each of the various aspects will be verified to determine if they meet the requirements necessary to be considered sustainable by means of a BSI business sustainability index (Moctezuma, 2015). Greenhouses in a more global way by municipalities (Carballo, 2015), in the present work will be done individually by each greenhouse to be able to determine the individual situation of each one.

## Methodology

The present work was proposed in four stages and was addressed to producers in the greenhouses of the municipality of Chilcuatla. First, a census of the greenhouses was carried out in the municipality. Second, a questionnaire was structured with two sections (economic-social, and environmental), in order to identify the main social, environmental and economic risk factors. Third, students were trained in the Financial Engineering educational program of the Polytechnic University of Francisco I. Madero, in terms of the mechanics of application of the questionnaires designed. Fourth, the questionnaire was applied and the information collected analyzed.

## Results

In the present work, socioeconomic, environmental and productive factors were evaluated in the greenhouses present in the municipality of Chilcuatla, in order to determine the conditions in which the greenhouses are located, in these areas and to determine if these are sustainable or not, in This municipality were found 19 active greenhouses and none outside of operation.

Municipality of Chilcuatla	Greenhouses
Active	19
Closed	0
Total	19

**Table 1** Population surveye

The Economico-social factor will be divided in two, therefore the BSI will be based on 4 factors: Economic, Social, Environmental and Technical; the following scale will be considered in the determination of the corporate sustainability index.

BSI	Sustentability level
0	None
1	Very low
2	Low
3	Intermediate
4	High

**Table 2** Index scale

In each of the factors we will analyze several aspects, which will be assigned a proportional value and will be considered to meet this characteristic if it obtains more than 66% this on the basis that in some of the evaluations will be considered three aspects, Meet at least two, you get 66.66%. If we consider four aspects to meet two will have 50% and if it meets three will have 75%. If the analyzed factor complies with the above, it will be assigned a point, if not zero. These will be added and a rating will be given according to Table 2. The following table lists the aspects to be analyzed in the economic factor.

Aspect	Caracterización	Weighing
Registered to SHCP	Yes	1/3
	No	0
Has funding	Yes	1/3
	No	0
Has reliable system	Yes	1/3
	No	0

**Table 3** Economic Factor

The following tables show the analyzed aspects for the factors: Social, Environmental and Technical.

Aspect	Caracterización	Weighing
Workers	De 0 a 5	0
	6 ó más	1/3
Workers benefits	Si	1/3
	No	0
Job rotation	De 0 a 6 meses	0
	7 ó mas	1/3

**Table 4** Factor Social

Aspect	Caracterización	Weighing
Water recycle	Si	1/3
	No	0
Uses Biofertilizers	Si	1/3
	No	0
Fumigations per year	De 1 a 2	1/3
	3 ó mas	0

**Table 5** Environmental factor

Aspect	Caracterización	Weighing
Train staff	Yes	1/4
	No	0
It has adequate technology	Yes	1/4
	No	0
It has irrigation system and fertilization	Yes	1/4
	No	0
It has maintenance program	Yes	1/4
	No	0

**Table 6** Technical Factor

Based on the above aspects the BSI of the 19 greenhouses of the municipality of Chilcuatla was determined, showing the results obtained in table 7.

No. Inv	Factor				ISE
	Eco.	Soc.	Amb.	Tec.	
1	0	0	0	0	0
2	1	1	0	1	3
3	1	0	0	0	1
4	0	0	0	0	0
5	0	0	1	1	2
6	0	0	0	0	0
7	0	0	0	0	0
8	0	0	0	0	0
9	0	0	0	0	0
10	0	0	0	0	0
11	0	0	0	0	0
12	0	0	0	0	0
13	0	0	0	1	1
14	1	0	0	1	2
15	0	0	0	1	1
16	1	0	0	0	1
17	0	0	0	0	0
18	0	0	0	0	0
19	0	0	0	0	0

**Table 7** Índice de sustentabilidad Empresarial

## Conclusions

In the greenhouses analyzed, located in the municipality of Chilcuatla, it was observed that of the 19 greenhouses, none reaches a high degree of sustainability, one reaches an intermediate degree, two a low degree, four a very low degree and the remaining twelve a degree null; It should be noted that the environmental and social factors were the lowest with only a greenhouse that meets these headings and are different greenhouses that meet these points, in the economic factor only four greenhouses meet and in the technician only meet 5 out of 19.

The Numbered greenhouse with 2 is the one that reaches a degree of intermediate sustainability and the greenhouse number 5 a low degree and the rest a very low or null degree. From the above it appears that most of the greenhouses are not sustainable in economic, social and environmental aspects, the last two are not fulfilled in almost all the greenhouses and are the ones that require more attention and the technical aspect (26.32%), followed by the economic aspect with 21.05% and social and environmental aspects with 5.26%.

## References

- Alonso, M.. (2004). Producción Sustentable en Invernaderos. 13/08/2014, de New AG International ES Sitio web: <http://www.newaginternational.com/es/lineaeditorial/ProductosTendencias200412.pdf>
- CARBALLO-SÁNCHEZ, Álvaro, HERNÁNDEZ-GÓMEZ, Diana, BLANCAS-OLVERA, Zoraida y MEJÍA-NÁJERA, Carlos. Sustentabilidad de los invernaderos de la zona este del Valle del Mezquital, Hidalgo. *Revista de Administración y Finanzas* 2015, 2-2: 288-298.
- Campos Aranda, D. F. (2005). *Agroclimatología cuantitativa de cultivos*. México: Trillas.
- DeVere Burton, L., y Cooper, E. L. (2009). *Agrociencia: Fundamentos y Aplicaciones* (4a. Edición). México: Cengage Learning.
- Gómez-Arrollo, S., Martínez-Valenzuela, C., Carbajal-López, Y., Martínez-Arroyo, A., Calderón-Segura, ME., Villalobos-Pietrini, R. & Waliszewski, SM.. (Septiembre 2013). Riesgo Genotóxico por la Exposición Ocupacional a Plaguicidas en América Latina. *Revista Internacional de Contaminación Ambiental*, 29, 159-180.
- H. Congreso de la Unión. (07/07/2014). Constitución política de los Estados Unidos Mexicanos. 13/08/2014, de Cámara de Diputados Sitio web: <http://www.diputados.gob.mx/LeyesBiblio/html/1.htm>
- Hernández-Díaz MI, Chailloux-Laffita M, Ojeda-Veloz A. (2006). Cultivo Protegido de las Hortalizas. *Medio Ambiente y Sociedad*, 10(30), 25-31.
- INAFED. (2010). Enciclopedia de los municipios y delegaciones de México. 05/09/2016, de Insituto Nacional para el Federalismo y el Desarrollo Municipal. Sitio web: <http://www.inafed.gob.mx/work/enciclopedia/EMM13hidalgo/index.html>
- INEGI. (2011). Información Nacional, por Entidad Federativa y Municipios. 13/09/2014, de Instituto Nacional de Estadística y Geografía Sitio web: <http://www3.inegi.org.mx/sistemas/mexicocifras/>
- Moctezuma Navarro, E. M., Hernández Gómez, D., & Mejía Nájera, C. (2015). Aplicación en invernaderos de un índice de sustentabilidad empresarial: El caso de Santiago de Anaya, Hidalgo. En J. Feregrino Feregrino & S.S. Pérez Castañeda (coordinadores), *Los estudios empresariales en México: Una perspectiva multidimensional* (pp. 1328-1338). Coacalco, México: Tecnológico de Estudios Superiores de Coacalco.
- Montero, J., Stanghellini, C. & Castilla, N.. (2008). Invernadero para la Producción Sostenible en Áreas de Clima de Invierno Suaves. *Horticultura Internacional*, 65, 12-31.

PRONAFIDE. (2013). Programa nacional de financiamiento del desarrollo 2013-2018. 13/08/2014, de SHCP Sitio web: [http://www.shcp.gob.mx/RDC/prog\\_plan\\_nacional/pronafide\\_2013\\_2018.pdf](http://www.shcp.gob.mx/RDC/prog_plan_nacional/pronafide_2013_2018.pdf)

SAGARPA (Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación) (2012). Agricultura protegida 2012. Recuperado el 8 de junio del 2015, de <http://2006-2012.sagarpa.gob.mx/agricultura/Paginas/Agricultura-Protegida2012>.

Thierstein, A. y M. Walser, Sustainable regional development; the squaring of the circle or a gimmick, en *Entrepreneurship and Regional Development* (9) 1997, pp. 159-173.

## **Intellectual capital for the competitiveness of the agribusiness**

CERVANTES, María†\* & GALABIZ, Audelia Urías, J.

Received January 7, 2016; Accepted June 15, 2016

---

### **Abstract**

Changes in the business environment generated product of globalization as well as economic, social and environmental problems have forced companies to seek competitive advantages that allow them to stay in the market. Intellectual capital has been gaining ground in the knowledge society and the dynamics of the global market. In this context, the management of intellectual capital becomes a strategic tool that promotes loyalty stakeholders and strengthens the image. The purpose of this paper is to analyze in what forms the intellectual capital in guasavenses agribusiness is managed and the impact that has on the competitiveness; It was carried out a descriptive investigation, cross-section through a questionnaire to a sample of agribusiness. Among the main findings we can mention the importance given to the potentiation of knowledge, however, we also found that companies do not appreciate in full extent the benefits of proper management of intellectual capital.

### **Management strategic, society of the knowledge, agribusinesses**

---

**Citation:** CERVANTES, María & GALABIZ, Audelia Urías, J. Intellectual capital for the competitiveness of the agribusiness. ECORFAN Journal-Republic of Cameroon 2016, 2-2: 33-43

---

---

\* Correspondence to Author (email: [maría.cervantes@udo.mx](mailto:maría.cervantes@udo.mx))

† Researcher contributing first author.



## Introduction

Today, companies are more dedicated to selling knowledge than traditional products, they live in the age of knowledge and intellectual work is on the rise (Stewart, 1999). On the other hand, Joya et al. (2015) point out that knowledge today becomes one of the main sources of competitive advantages; The most important assets of the companies are no longer the tangible ones, but the intangibles, which have their origin in the knowledge, skills, values and attitudes of the members of the organization, as well as the loyalty of the clients, the relationships with suppliers and Other participants in its value chain, in addition to the use of information technology and strategic alliances, among others.

Likewise, Lopez and Grandío (2005) agree that within the intangible resources of a company, human capital is undoubtedly the most strategic resource of the company, but at the same time, the most difficult and complex to manage. For companies to achieve greater competitiveness requires a sustained increase in investment and trade opening, however, this concept is much richer than what is commonly understood and that to achieve an authentic sustainable competitiveness over time, It is necessary to implement a diversity of policies that allow the overcoming of existing obstacles to achieve it (Suñol, 2006).

Castellanos, et al. (2013) point out that it is the companies that compete and not the countries, and competitiveness is not a short- or medium-term policy objective, but the search for a sustainable condition characterized by its permanence and directed towards market in January. Therefore, the key to successful competition lies mainly in permeating the entire organization of the culture to offer something different and better than the competition.

The basic competition factors are those that directly impact customer preference and, therefore, market share (Ramírez and Cabello, 2000).

In this context, Porter (2002) states that competition determines the success or failure of companies. The competitive strategy is the search for a favorable position within an industry, the fundamental scenario where the competition takes place. Its purpose is to establish a profitable and sustainable position against the forces that govern competition in the industry.

For Moreno et al (2007), competitiveness is a tool of nations, companies and agro-industries, which is why companies in Mexico are in need of competitiveness to remain in the market. The need to be more efficient, to have better profitability and to provide a better service, has made companies look more competitive and identify strategies for better performance.

In this research, the central question is: How does the management of intellectual capital influence the competitiveness of the agribusiness in Guavi? To solve this question was raised as a goal Analyze how the intellectual capital is managed in the agribusiness of Guavians and the impact it has on competitiveness.

The municipality of Guasave, located in the state of Sinaloa, Mexico; Is recognized as "the agricultural heart of Mexico for having an eminently agricultural economy, however, agricultural businesses are complicated to remain in the market due to constant changes in the environment, high levels of competition for small markets, changes in The climate patterns derived from the global changes for that reason.

It becomes imperative that they implement strategies that favor their permanence and the increase of benefits that strengthens their competitive position. Intellectual capital is one of the strategic resources that can help in strategic plans so that proper management is not only advisable but necessary.

It is for this reason that the investigation of the way in which intellectual capital is managed in agribusiness opens a perspective focused on improving competitiveness which directly influences regional and organizational development. The central hypothesis raised is the following: The management of intellectual capital in the agribusiness of Guavians increases its competitiveness.

First, it includes the background, then develops strategy and competitiveness starting from the conceptualization of the strategy and the formulation of the same ending the section with the competitive strategy. To finish the theoretical framework, the evolution of intellectual capital as well as its three dimensions are included briefly: human, relational and structural capital.

## Background

While sometimes only conceive the world production or the world of finance as genuine wealth creators, competitive strategy is essential in creating value. Value is not in things (products) but in people (markets). The new logic that streamlines the current economy is not the only competition between different suppliers and reduces but affects all actors in the scene. Economic history shows that often is poverty that creates wealth, as in the case of Japan or Korea, where the comparative disadvantages did see them competitive ntajas essential; or the case of Switzerland thanks to its small but demanding market allowed the development of leading companies such as Nestle and Ciba-Geigy.

Competitiveness is "the ability to sustain and increase participation in international markets, with a parallel rise in the standard of living of the population. The only solid path to achieve this, based on increased productivity "(Porter, 1990).

## Strategy and Competitiveness

A strategy is an integrated and coordinated set of commitments and actions designed to leverage core competencies and gain competitive advantage. An effectively formulated strategy directs, integrates, and distributes the resources, capabilities, and capabilities of a business to successfully address the external environment (Hitt, et al., 1999).

For Porter (1996) the essence of the formulation of a competitive strategy is to relate a company to its environment, the key aspect of the company environment is the sector or industrial sectors in which it competes. Competition, in a broader sense, could be defined as amplified rivalry; the competition between supply and demand provokes movements based on differentiation, not forgetting that competitiveness is the essential factor of development.

The competitive advantage comes basically from the value that a company manages to create for its customers, something that is called a value chain. It is born of many discrete activities that are executed when designing, manufacturing, and marketing, delivering and supporting its product (Porter, 2002). Therefore, it proposes the five competitive forces.

For Porter (1996) a competitive strategy comprises an offensive or defensive action in order to create a defensible position against the five competitive forces. In general this includes several possible approaches:

- Positioning of the company in such a way that its capacities provide the best defensive position in function of the existing competitive forces;
- Influence the balance of forces through strategic movements thus improving the relative position of the company; or
- Anticipate changes in the factors that underpin the forces and respond to those changes quickly, taking advantage of the change to choose a strategy appropriate to the new competitive equilibrium before the competitors recognize it.

The five factors determine the profitability of the industry because they influence the prices, costs, and investment that companies must make, that is, the elements of performance (Porter, 2002).

To address the five competitive forces, there are three generic strategies of potential success to perform better than other firms (Porter, 1996):

1. Cost Leadership
2. Differentiation
3. Focus or high segmentation

In order to achieve strategic competitiveness and achieve above-average returns, a company analyzes its external environment, identifies opportunities in that environment, determines which of its internal resources and capacities are core competencies, and selects an appropriate strategy to implement it (Hitt, Et al 1999).

Competitive strategy involves positioning a company to maximize the value of the capabilities that distinguish it from its competitors. It follows that a central aspect of the formulation of the strategy is the perceptive analysis of the consumer.

However, the success of its implementation requires different resources and skills for effective implementation, constant dedication to one of the strategies as the primary goal, is generally necessary to achieve success (Porter, 1996).

### Intellectual capital

It is the set of knowledge that owns the employees of a company and that give them the necessary tools to make it more competitive, it is an intangible asset. Intellectual capital is intellectual material, knowledge, information, intellectual property, experience, which is often used to create wealth (Stewart 1998).

In this sense Chiavenato (2011) states that one of the main aspects of the current management of human resources of companies is that there must be a mutual and continuous development between organizations and individuals, as it is the only way to cope To the obstacles and problems that may arise in the future and above all so that companies are up-to-date and viable.

In the analysis of several authors such as Stuart (1998), Edvinsson and Malone (1997), Viedma (2001) and other experts on the subject, Joya, et al (2015) defended the position that any definition of intellectual capital must reflect the share of knowledge, intangibles, human, structural and relational factors, as well as contribute to the generation of value. Likewise, these authors state that "in the presence of a new global paradigm that includes social responsibility of organizations, several authors agree on the incorporation of a new regularity: integration, commitment and impact on the territory and society in general".

It should be noted that, in this sense, Monagas (2012) takes up the metaphor of Edvinsson and Malone (1999) 2 to explain the concept of intellectual capital, where they say that every company is like a tree (with a visible and another hidden), And for every tree to grow and fruit, it is necessary that its roots are healthy and nourished. This applied to businesses would be; that if managers only focus on financial results and ignore hidden values, the company will not stand in the long run.

Intellectual capital consists of three dimensions: human capital, relational capital, and structural capital.

**Human Capital:** For Chen, Zhu and Xie (2004), are the skills that every human being has, and the ability to perform an activity or work in any discipline that is. Roos et al. (2001) point out, that are the abilities that a human being has to perform a determined job that generate an income. On the other hand Bontis and Fitz-enz (2002) mention that this includes satisfaction and commitment, motivation, congruence of personal values with institutional, leadership, generation and transmission of knowledge. Lopez and Grandío (2005) point out that human capital is "the set of skills, knowledge and skills of people working in the company; Is an unquestionable source of long-term competitive advantage."

**Structural Capital:** It is composed of the base of human capital as the organizational philosophy, mission, vision, values, manuals and procedural positions, culture and infrastructure systems. For Stewart (1998) the knowledge is property of the company since it is she who uses it to meet the demands of the market through the skills of the collaborators. Seetharanam et al. (2002) establish that it is the ability of a person to develop potential activities such as trademarks, licenses, patents, etc.

**Relational Capital:** consists of relationships with customers and suppliers (Sveiby, 2001), the most important part of this capital is the one that has to do with the users of the services that are going to generate the revenue to the company, Is to whom the organization directs its efforts so it becomes essential to take care of this relationship. Sveiby (1997) points out that it is the relationships with the actual and potential clients that represent the company.

## Methodology

The present work was done under the quantitative methodology, it is considered a statistical study since it deals with processes and relations between variables that are inferred from the analysis of the information collected (Namakforoosh, 2010). It is descriptive or transverse or transectional; Information was collected seeking to answer the research problem; is non-experimental since only what happens in relation to intellectual capital in agricultural organizations is reported without manipulating the variables.

The study population is the agribusiness located in the municipality of Guasave, of which it was possible to locate 68, when comparing with the inclusion criteria: enrolled in the Ministry of Finance, formal operation and with at least three workers left only 53 agribusiness. By applying the statistical formula for finite populations with a 95% confidence level and a margin of error of 5%, a sample of 47 was obtained when the instrument applied the response rate of 86% for which the data presented correspond to 40 businesses dedicated to the production and industrialization of agricultural products, purchase, sale, inputs or services to farmers (they are not considered companies that are dedicated to the sale of fuels because they are not directly related to agriculture).

A survey was designed in order to know the state of intellectual capital management and the level of competitiveness perceived by companies, two variables were considered from the literary review shown in the previous sections. In addition, information is requested to obtain the profile of the respondent, the age of the company and the number of strong competitors.

The instrument was applied to the middle managers and managers at their convenience, starting with the ones that were more easily accessible and more available; It was taken into account that they had sufficient information to respond to the survey. The information was collected in the months of April to July 2016.

The surveys were processed using the SPSS statistical program; In order to guarantee the reliability of the instrument, Cronbach's alpha was calculated, which yielded a value of 0.963, which is considered excellent (Namakforoosh, 2010).

Var. Indep.	Dimensions	Operational definition	Indicators
Intellectual capital	Human capital	Skills, knowledge and skills (López and Grandio, 2005)	Commitment, openness to change, ability to work in teams, creativity, critical thinking, academic training, ability to solve problems, entrepreneurship, learning
	Structural Capital	It is the basis for the development of human capital (Stewart, 1998)	Organizational philosophy, mission, vision, values, manuals of posts and procedures, culture, technological platforms, certifications
	Relational capital	Relationship with users that generate income for the company	Loyalty of customers, relationships with suppliers, competitors, strategic alliances

**Table 1** Operationalization of independent variables. Source: Authors' compilation with information from López and Grandio (2005), Stewart (1998) and Sveiby (1997)

Var. D.E.P.	Dimensions	Operational definition	Indicators
Competitiveness	Competitive situation	It is the location of the company in relation to those of its sector (Porter, 1996)	Competitive position perceived, better economic position than competition
	Organizational Performance	Improving profitability through strategies that facilitate permanence (Moreno et al, 2007)	Modification of products and processes, greater participation in the market, improvement of financial results, increase of portfolio, changes in processes

**Table 2** Operationalization of dependent variables. Source: Own elaboration with information from Porter (1996) and Moreno et al (2007)

## Results

Profile of the company and the respondent Of the total companies surveyed, 37.5% are engaged in the commercialization of agricultural products, 37.5% in production and industrialization, and 25% in the provision of services. They report an average of 52.74 employees and a 41.5% growth.

Regarding the person interviewed has an average age of 36.95 with a fashion of 24, the average age in office is 7.68, 35% are women and 65% are men; 35% are single, 60% married and the rest of another civil status; 87.5% have a bachelor's degree, 5% graduate and 5% preparatory.

## Intellectual Capital in Agribusiness

When asked if agribusiness seeks to boost knowledge, 60% said that they fully agree with the statement, 32.5% agree while 7.5% more or less agree.

## Human capital

When analyzing the variable denominated human capital, the average averages found refer to the work in equipment with average of 4.73; Creativity and competence development with 4.55; Learning and experience with 4.53 and 4.50 respectively; Problem solving and training with 4.48; Coinciding with an average of 4.45 hiring staff with knowledge for the position and opening to change with average; Application of knowledge in practice and development of the entrepreneurial spirit with 4.43; The lowest means are placed in the realization of meetings to generate learning with 3.95.

HUMAN CAPITAL DIMENSION: DESCRIPTIVE STATISTICS				
Items	Min.	Max.	Half	Desv. Typ.
Teamwork	3	5	4,73	, 554
Creativity	3	5	4.55	, 677
Competitions	3	5	4.55	, 639
Learning	3	5	4.53	, 679
Experience	3	5	4.50	, 716
Problem resolution	3	5	4,48	, 716
Training	1	5	4,48	, 933
Knowledgeable staff	2	5	4.45	, 815
Opening to change	2	5	4.45	, 677
Application of knowledge	2	5	4.43	, 844
Entrepreneurial spirit	2	5	4.43	, 844
Critical thinking	2	5	4.30	, 791
Active participation	2	5	4.25	, 840
Academic Fromation	1	5	4,20	1.018
Meeting to generate learning	1	5	3.95	1,154
Database	1	5	3.35	1.494

**Table 3** Dimension of human capital. Source: Own elaboration (MACR, 2016) with research results

In the dimension of structural capital the highest means were found in the preventive and corrective maintenance of machinery and the improvement of the climate with 4.73; Communication with 4.70; The focus on solving problems with 4.55; The pursuit of improvement in quality 4.48; The lowest averages are located in having manuals of position with 3.73 and web pages with 3.38.

### Dimension of structural capital

STRUCTURAL CAPITAL: DESCRIPTIVE STATISTICS				
Variables	Min.	Max.	Half	Desv. Typ.
Maintenance	2	5	4,73	, 679
Weather	3	5	4,73	, 599
Communication	2	5	4,70	, 608
Problem solving	2	5	4.55	, 714
Quality	2	5	4,48	, 784
Organization	1	5	4,28	1.062
Mission, Vision, Values, Goals	1	5	4.23	1,121
Technology Platforms	1	5	4.23	1.074
Certifications	1	5	4.18	1,083
Technologies	1	5	4,15	1,252
Capactiation Courses	1	5	4.05	1,176
Competitiveness Approaches	1	5	3.98	1,387
Search for certifications	1	5	3.90	1,499
Manuals	1	5	3.73	1,281
Websites	1	5	3.38	1,705

**Table 4** Structural dimension. Source: Own elaboration (MACR, 2016) with research results

In the dimension of relational capital, high averages were found in fair treatment of clients and suppliers with 4.78 and in the solidity of relations with suppliers 4.73; strengthening of customer portfolio and loyalty of clients and suppliers with 4.45, followed by an average of 4.43 for the strengthening of the value chain. The lowest means are appreciated in the evaluation of competitors as well as the collaborative relationships with them with 3.55.

## Relational capital

RELATIONAL CAPITAL: DESCRIPTIVE STATISTICS				
Variables	Min.	Max.	Half	Desv. Typ.
Just treat customers and provide,	3	5	4.78	, 480
Solid supplier relationships	3	5	4,73	, 506
Strengthening client portfolio	1	5	4.45	, 904
Loyalty customers and suppliers.	3	5	4.45	, 714
Strengthening of value chain	2	5	4.43	, 874
Timely Suppliers	3	5	4.30	, 758
Alliances	1	5	4,28	, 960
Market studies	1	5	3.60	1,317
Evaluation comp.	1	5	3.55	1,395
Competitors collaboration	1	5	3.55	1.319

**Table 5** Dimension of relational capital. Source: Own elaboration (MACR, 2016) with research results

When reviewing the results of competitiveness and organizational performance, the highest average was found in the part related to the preparation of financial statements with 4.78; The preparation of financial statements under accounting standards with 4.55; However, the use of financial information for decision making has an average of 4.15; The part related to image improvement 4.45 and the increase of productivity 4.33; The recognition of the benefits derived from intangible assets has an average of 4.30 and the increase of the customer portfolio 4.78; The lowest average is in the strength of the position relative to the competition with 3.90.

## Competitiveness and Organizational Performance

Competitiveness and performance: Descriptive statistics				
Variables	Min.	Max.	Half	Desv. Typ.
Preparation of financial statements	2	5	4.78	, 620
Application of financial reporting standards in the preparation of financial statements	1	5	4.55	, 932
Image	1	5	4.45	, 959
Increment prod.	1	5	4.33	1,095
Intangible assets	1	5	4.30	1,159
Portfolio increase	1	5	4,28	1.086
Changes in processes	1	5	4.23	1,165
Use of financial information for decision making	1	5	4,15	1,001
Satisfied Investors	1	5	4.13	1.042
Improvement in products or services	1	5	4.08	1,228
Strong position in relation to competition	1	5	3.90	1,105

**Table 6** Competitiveness and Organizational Performance. Source: Own elaboration (MACR, 2016) with research results

## Gratitude

This research was supported by the University of the West.

## Conclusions

After reviewing the results obtained, it can be seen that the main strengths of the agribusiness in Guayaquil in the management of intellectual capital are found in teamwork, the promotion of creativity, the development of competences, learning and the use of experience In the human capital dimension.



In the structural capital the maintenance of machinery, the improvement of the organizational climate and the promotion of communication; In relational capital, fair dealing with customers and suppliers, solid relationships, customer loyalty and the strengthening of the customer portfolio and value chain and in the part related to competitiveness and organizational performance, Related to the preparation of financial statements under accounting regulations, improvement of the image and increase of production; It is appreciated that the agribusinesses of Guavians have incorporated the management of intellectual capital with which they have not only improved their competitiveness but also influenced their image with what proves the hypothesis raised, however, it is appreciated that the information is not properly used Decision-making.

The agribusinesses of Guasavans have an area of opportunity in terms of technologies since they do not have a web page, with job manuals that define the activities to be carried out by the collaborators or have databases that provide updated information. This can affect their permanence in the markets or their competitive situation, which they indicate not very solid.

It is necessary that agribusinesses strengthen their position in the market and adapt to changes in the environment by valuing their intellectual capital in order that it generates benefits and is susceptible of becoming a competitive advantage.

One of the limitations of the research is that the information was collected from the leaders and owners of the agricultural negotiations so it would be important to compare this information with what the collaborators, customers and suppliers say.

Likewise, it was not verified that they actually prepare financial statements under the rules established in the financial reporting standards.

## Referencias

- Bontis, N., Fitz-enz, J., (2002), "Intellectual Capital ROI: A causal map of human capital antecedents and consequents", *Journal of Intellectual Capital*. Vol. 3.
- Chen, J., Zhu, Z. y Xie, H. Y (2004) "Measuring Intellectual Capital: a New Model and Empirical Study". *Journal of intellectual capital*, Vol 5.
- Chiavenato, I. (2011). *Administración de recursos humanos*. Mc Graw Hill. México.
- Edvinsson L. y Malone M (1997). *El capital intelectual, al darse cuenta de su empresa verdadero valor mediante la búsqueda de su capacidad intelectual oculto*, de Haper Collins Publisher, Inc.1ªed.
- Hitt, M., Ireland, R. y Hoskins, R. (1999) *Administración Estratégica "Conceptos, Competitividad y Globalización"*. International Thomson Editores, México, D.F.
- Joya, R.; Gámez, L.; Paniagua, M. y Gálvez, A. (2015). *Medición del capital intelectual en empresas mexicanas*. Retos. Vol. 9. No. 1. Cuba,
- López, A. y Grandio, A. (2005). *Capital humano como fuente de ventajas competitivas. Algunas reflexiones y experiencias*. Gesbiblo. España.
- Monagas, M. (2012). *El capital intelectual y la gestión del conocimiento en Revista de Ingeniería Industrial*. Vol. 33. No. 2. La Habana, Cuba.

Moreno, I., Calderón, L. y Guzmán, J. (2007) Modelos de Competitividad de la Agroindustria en México. Una compilación de “La Competitividad y Calidad de las Empresas en Latinoamérica”. México.

Namakforoosh, M. (2010). Metodología de la Investigación. Segunda edición. México: Limusa.

Porter, M. (2002), Ventaja Competitiva “Creación y Sostenimiento de un Desempeño Superior”. CECSA, México.

Porter, M. (1996), Estrategias competitivas “Técnicas para el análisis de los sectores industriales y la competencia”. CECSA, México.  
Porter, M. (1990). The competitive advantage of nations. The Free Press.

Ramírez, D. y Cabello, M. (2000). Empresas competitivas “Una estrategia de cambio para el éxito”. McGrawHill. México.

Roos, J., Roos, G., Dragonetti, N. y Edvinsson, L. (2001). Capital Intelectual. Buenos Aires: Paidós.

Seetharanam, B. (2002) “Intellectual capital accounting and reporting in the knowledge economy”. Journal of intellectual capital. Vol. 3.  
Stewart, T. (1998). La nueva riqueza de las Organizaciones: “El Capital Intelectual”. Argentina. Ediciones Granica.

Suñol, S. (2006). Aspectos teóricos de la competitividad. Redalyc Ciencia y Sociedad, Instituto Tecnológico de Santo Domingo. República Dominicana.

Sveiby, K. (2001) “A knowledge- based theory of the firm to guide and strategy formulation”. Journal of intellectual capital. Vol. 2.

Viedma, J. (2001). ICBS Innovation Intellectual capital benchmarking system en Bontis, N. (Ed.): World Congress on Intellectual Capital Readings, Butterworth Heinemann,

## Proposal for the implementación of the French project “La Loire a Velo” for endogenous development on the cenotes route on Yucatán

PÉREZ-GARMENDIA, Gloria†\*, GARCÍA-DOMÍNGUEZ, Luis Alberto, MARTÍNEZ-RANGEL, Armando Luis, PÉREZ-CANTO, Julieta Elvira and MEJÍA, Nelly

*Economic-Administrative Department. Technological Institute of Merida*

Received January 7, 2016; Accepted June 15, 2016

### Abstract

Background. The idea to reproduce a project in the French region of La Loire, represents an area of interesting opportunity for a set of geopolitical demarcations of the state of Yucatan, whose natural, cultural and historical wealth, they make suppose the possibility of their implementation. The aim is to develop a socioeconomic study to determine the feasibility of reproduction of model of French tourism development "La Loire a Velo" in the path of the cenotes of Yucatan. The methodology begins with an investigation of qualitative type with an exploratory scope through the analysis of official public documents, to develop the diagnostic of status of the community as well as construction of the dimensions of socio-economic survey of the community, work in community focus groups and analysis of the used instruments through SWOT. Result; it sketches out the articulation of a project that involves the adoption of a proven strategy, specifically the project "La Loire a Velo" implemented in the region of the same name in France. In this sense, in the region of cenotes in the Yucatan state, apparently, it has sufficient resources that help to boost tourism development based on its natural attractions, allowing assume the possibility of assimilation of this model, considering the elements or traits of success in its implementation as basic conditions to find on this route.

### Socioeconomic, feasibility, tourism development, La Loire a Velo, Yucatan

**Citation:** PÉREZ-GARMENDIA, Gloria, GARCÍA-DOMÍNGUEZ, Luis Alberto, MARTÍNEZ-RANGEL, Armando Luis, PÉREZ-CANTO, Julieta Elvira and MEJÍA, Nelly. Proposal for the implementación of the French project “La Loire a Velo” for endogenous development on the cenotes route on Yucatán. ECORFAN Journal-Republic of Cameroon 2016, 2-2: 44-53

\* Correspondence to Author (email: gloriaperez22@hotmail.com)

† Researcher contributing first author.

## Introduction

La Loire region in France, has found in the evolution of the "visit of the castles", an historical tourist attraction, a new concept of development based on the use of the bicycle, nowadays synonymous with a better quality of life, that allows to concatenate, through stages, the diverse local supply of the communities bordering the river that gives name to the region. In this sense, it is interesting to identify the viability of the reproduction of the French model in the geopolitical space that occupies the municipality of Cuzamá, whose features suggest its suitability in terms of basic implementation conditions, considering it concentrates natural resources such as cenotes and caves, prehispanic vestiges, colonial buildings that highlight its past, as well as a basic road infrastructure, and the proximity to the capital of the state of Yucatan, similar elements to the French project, considering the natural beauty of the river La Loire, the historical value of its castles, as well as its road infrastructure and the proximity to the capital of the country, Paris.

Under these circumstances and with the aim of dynamizing through actions that contribute to the improvement in the quality of life of the people, it was decided to choose a municipality whose location characteristics, historical background, population aspects, as well as its current economic situation, made the intervention of a group of researchers and students suitable for the aforementioned purpose. In this sense, it was decided to work in the municipality of Cuzamá, which is located in the center of the state of Yucatan, 25 minutes from the city of Mérida, whose historical characteristics and natural wealth, mainly cenotes, pose a potential and interesting development, but nevertheless, according to data from the National Evaluation Council (CONEVAL), of a total population of 4,966 inhabitants in 2010, 71.4% lived in poverty.

With 52.8% moderate poverty and 18.5% extreme poverty.

## Methodology

The first stage begins using a qualitative research with an exploratory scope through the analysis of official public documents (Hernández, Fernández, and Baptista 2014) to develop the diagnosis-situation of the community.

1. Selection of official documents (2012-2015 municipal development plan, state and federal official diary ... official municipality statistics) that look at the background of the area
2. Construct the dimensions of the socio-economic study of the community
3. Analysis of selected documents.
4. Management of visits with community interest groups.
5. Design of observational records, surveys and focus groups.
6. Visits to fill in the observational records and the application of the surveys
7. Work in community focus groups.
8. Analysis of the instruments applied, through the SWOT framework (strengths, weaknesses, opportunities and threats).

Likewise, areas of opportunity of the municipality will be identified in order to be able, in a second stage, to generate and / or develop through the strategies of the Local Action Groups (LAGs).

The theoretical and practical knowledge of the administration, and to develop skills in functional areas of the organization, such as marketing, finance, production and human development, in a touristic context.

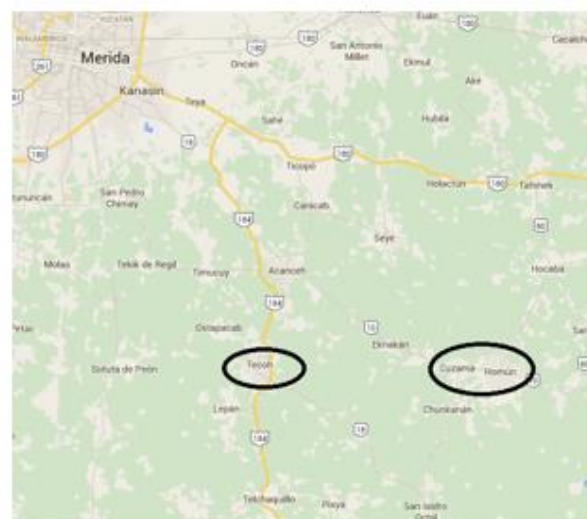
### Analysis from the Structural Method

It is necessary to carry out a feasibility analysis in this region, where despite the apparent tourist potential there is a lack of well-paid employment opportunities.

According to the methodological strategy proposed, the analysis of the documents containing relevant information of the municipality was carried out, being able to observe a panorama of its geopolitical space, allowing to determine the viability of the implementation of the French Veló project, based on the analysis of each one Of the three municipalities:

#### Cuzamá, its strengths, opportunities, weaknesses and threats

The municipality of Cuzama is located in the north - central region of the state, between the parallels 20° 38" and 20° 47" north latitude and the meridians 89° 17" and 89° 25" west longitude, With a height of 17 meters above sea level, bordering to the north with the municipalities of Acanceh and Seyé, to the south with the municipalities of Homún and Tecoh, to the east with the municipalities of Seyé and Homún, and to the west with the municipalities of Homún and Tecoh. 1



**Figure 1** Cuzamá and Homun location in Yucatán. Source: Google maps

The municipal head or county seat, of the same name that the municipality, occupies an area of 150.73 km, with a geographic distance of 45 kilometers in a southeasterly direction, with respect to the capital of the state of Yucatán. The municipality is integrated by four localities of name, Eknakán, Nohchakán, Chunkanán and Yaxcueul. (Figure 1).

The strength observed in the community of Cuzamá are its natural beauties, mainly its "Cenotes" (from the Maya dzonoot: "hole filled with water") that are spring water reservoirs, typical of the state of Yucatan.

Beyond the strengths and opportunities found in the municipality, there were weaknesses that need to be addressed through the generation of synergies between different sectors of society and government.

The inhabitants of the municipality, possessing a great natural and historical wealth, have not been able to capitalize on their strengths, attending only to their daily lives, without a future development vision that allows them to optimize their resources and promote a better quality of life.

Development opportunities were observed through the generation of business plans based on local vocations, which, although they have been inherited, begin to find in their current settlers an outline of updating, which has allowed them, among other things, to generate incipient schemes based on what exists, with little or no incorporation of added value, which could be a niche of opportunity for the next years.

Attending to the existing infrastructure is another area of opportunity where, although it is possible to access the municipality by road from the state capital, there are many factors that must be taken care of, such as better signs, paving, beautification of green areas, as well as improvements in health, education and leisure services which are still very basic.

All efforts in favor of the development program in the community must be agreed and shared by public and private agents, as well as society.

It is important to raise awareness in government agencies that are in charge of fostering touristic development in the state that is also necessary to promote public and private investment in this sector and strengthen the current ones, in order to be able to achieve an improvement in the infrastructure of regions with greater affluence of tourism.<sup>2</sup>

This would surely result in the creation of a much more modern municipality, which would also allow the appropriation of new productive schemes to local vocations through sensitization and training processes in general schemes of productive efficiency, as well as certain levels of specialization, with added value according to the historical activities of the municipality.

### **Tecoh, its strengths, opportunities, weaknesses and threats**

Located in the second northwest region of the state of Yucatan, the Tecoh municipality occupies an area of 452.2 km<sup>2</sup>, within which are its ten police stations, Chinkilá, Oxtapacab, Sotuta de Peón, X'canchakan, Itzincab, Lepad, Telchaquillo, Mazhucil, Pixhya and Sabacché.

With a population of 16,200 inhabitants in 2010, the municipality of Tecoh comprises 0.8% of the population of the state of Yucatán, according to INEGI, 5 located between the parallels 20° 33' and 20° 48' N, and the meridians 89 ° 22' and 89° 36' west longitude, bordering Timucuy to the north, Chapab to the south, Cuzamá, Homún and Tekit to the east and Abalá, Sacalum and Merida to the west.

Based on the information collected, the theoretical background developed and the contextual elements outlined, according to the objective of the study, the following conclusions are expressed:

A municipality with natural elements, was found where cenotes can be emphasized by their endemic characteristics and their importance as a potential tourist resource, if it includes other services of a cultural or recreational nature, that, although they could contribute to create an environment that favors Local development, based on its distinctive features, has not identified and dimensioned its tourist potential, observing carelessness, disorder and lack of cleanliness in some areas of habitual traffic and even in those that appear as incipient tourist attractions.

Although a population of friendly treatment, an indispensable condition to carry out the tourist activity, was not identified in her personal, cultural and historical elements that support the possibility of ensuring that this same population will be able to incorporate to its daily life the basic features of a community with medium tourist vocation.

It is possible to distinguish a potential market for these ecosystems holders, since there is a real demand for cenotes as an ideal leisure center for families due to its low cost and associated services (landscape beauty, birding, and mammals and flora studies, among others). The road network that connects the capital of the state with the municipality, allows easy access to the environment of the capital of the municipality, however, entrances and exits of the same, mainly those that communicate between police stations, present deficiencies in its design and construction, In addition to a lack of maintenance, which makes access difficult. It is notorious the lack of signaling, not only of the tourist services, which practically is not, but also the basic signage for the rest of public services. It was observed a municipality with a basic infrastructure of services that barely reaches to satisfy its endogenous needs, which generates the impossibility that under current conditions will support tourist activity.

Economic indicators of the municipality constitute an area of opportunity, considering the levels of poverty, with a population that, although is mostly occupied, does not have sufficient income to enable them to escape the lag in which they are.

Although there are interesting elements for the reproduction of the tourist development model "La Loire a Velo" in the municipality of Tecoh, Yucatan, it is necessary to establish a comprehensive strategy incorporating different groups of organized civil society.

As well as Public actors, in order to establish a series of articulated actions, with the aim of attending both human development and basic infrastructure management for the municipality.

A dual strategy is proposed, in which local vocations are first worked by inviting groups representing the community to inform them of the benefits of improving the conditions of their natural attractions for touristic purposes. Actions are aimed at generating a transversal tourist vision, independently of the economic activities that they develop, for which, it would work in specific workshops for each group, in which besides the specific training, stimulate the vision of adding the tourist sense to its Activity, offering it as an added value

Finally, public management constitutes a pillar for the development of this community, since it was perceived the need to improve the basic conditions of communication, both in the periphery of the municipality and in its interior, as well as the undoubted need to have Better health services and to promote the arrival of complementary services for the development of tourist activity, which independently of local authorities' development plans, would constitute a mechanism of attraction, propitiating better conditions that facilitate the staying of tourists, regardless of the value To improve services for a population that has historically exceeded them. Homún, its strengths, opportunities, weaknesses and threats

With an area of 192.89 km<sup>2</sup>, the municipality of Homún is located between the parallels 20° 38" and 20° 49" of north latitude and the meridians 89° 14" and 89° 22" of west longitude. It borders to the north with Hocabá and Seyé, to the south with Tekit, to the east with Huhí and Sanahcat and to the west with Cuzamá and Tecoh. In addition to the municipal head of the name Homún, the municipality comprises other localities.

Such as Kanun, Kanpepen, Polabán, San Antonio, Chichi Lagos, Yahalán, San Isidro Ochil, Cho chich, Chan Santo, Sintunil, Culul, Kanka chen, Kan Kadzonot, Santa cruz and Sipchac.

Based on what was discussed in the theoretical background and the results obtained, according to the objective of the study, the following conclusions are expressed:

The natural elements, of evident wealth, are primary factors that could be exploited from a revaluation of their components, given their distinctive nature, however, their tourist potential has not been identified and dimensioned, observing carelessness, disorder and lack of cleanliness, in most of the municipality.

In the social aspect, a friendly population was found, although of a distrustful nature, not identifying in it personal and cultural elements, that allow to assume the possibility that this same population managed to incorporate to its daily life the basic features of a community with touristic vocation.

On the other hand, although there is easy access between the municipality and the state capital, it is not the same situation with regard to the police station, given the obsolescence of the roads, its poor layout and neglect. In addition to the above, there is a lack of signaling of the services that the municipality has, beyond the basic existence of which they can not meet the needs of their own inhabitants.

The economic indicators denote a municipality with severe deficiencies, considering its level of poverty, with a population, which although is mostly occupied, does not perceive the sufficient income that allows them to leave the lag in which they are.

Beyond the existence of elements that could be transformed as a basis for potential touristic development, through the reproduction of the "La Loire a Velo" model, it is necessary to establish, where appropriate, a comprehensive strategy involving actors from the community in which articulated actions of government and civil society are established, with a view to strengthening basic infrastructure and human development.

Finally, the possibility of a dual strategy, in which one works, on the one hand, in the strengthening of local productive vocations, with a vision of tourism as a transversal added value, independently of the economic activities that are developed, and by the other in public management, which is the pillar for development in this community, since it is perceived the urgency to improve basic road communication conditions, as well as the need to have better health services and encourage the arrival of Complementary services for the development of touristic activity.

## Results

The results report outlines the articulation of a project involving the adoption of a proven strategy in another country, specifically the "La Loire a Velo" project implemented in the region of the same name in France, traditionally recognized for its architectural heritage, mainly castles, and through this strategy of tourism development, has managed to organize a coordinated growth pole, which has dynamized directly to the communities in the region. In this sense, in the region of cenotes in the state of Yucatan, apparently has sufficient resources to promote a touristic development based on its natural attractions.



Which allow us to assume the possibility of assimilation of this model and its reproduction to a short term, considering the elements or traits of success in its implementation as basic conditions to be found in the route of the cenotes of the state of Yucatan.

## Proposal

### Stimulate the conditions and attractions of the Cenotes territory

Based on the local vocations is intended to propose a circuit of touristic products surrounding the cenotes of the locality. Taken on the basis of a logic of sustainable local development, taking into account the environmental, economic, social and cultural dimension of rural territories; The wealth that the community preserves through the natural beauty of its cenotes and its ancestral culture is an important asset that represents new possibilities through the initiative LEADER (Liaisons between actions of développement de l'économie rurale) that has been engine of development in the rural area of the European Community.

The Leader approach was launched in 1991 to improve the development potential of rural areas by harnessing local initiative and skills, promoting the acquisition of knowledge on integrated local development and disseminating this knowledge in other rural areas. (Comunidades europeas, 2006)

The Communitarian Initiative proposes A rural development approach which is based on some principles:

1) Organization – called “local action group” (LAG) – of a local association equipped with a small permanent technical team. It is responsible for the definition (with the effective participation of local actors) and the implementation of an action plan;

2) Development and implementation, in a series of rural territories, of a "local action plan" that defines several axes of intervention for development actions;

3) Multisectoriality and systematic search for links between actions, within the framework of an integrated global strategy (hence the acronym L.E.A.D.E.R.: “Liaisons Entre Actions de Développement de l’Economie Rurale”, “Links between Rural Economy Development Actions”);

4) Co-financing of these action plans by the European Commission, Member States and / or Regions in the form of an overall financial envelope rather than several sectoral budget lines;

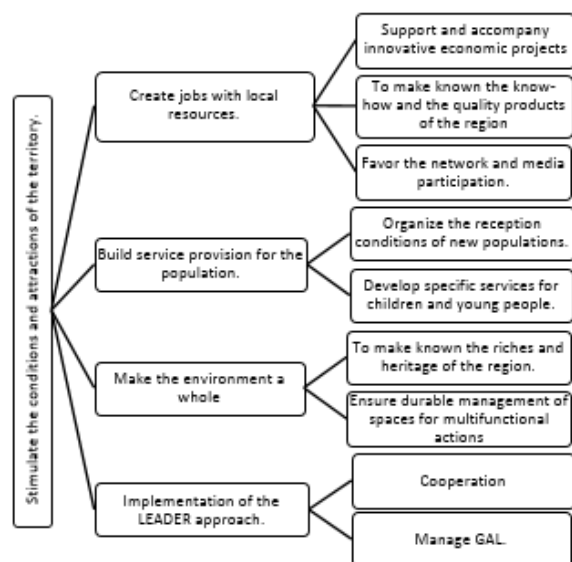
5) Networking of the territories involved on the basis of a "European LEADER Observatory" ("European Observatory of Rural Territories" for LEADER+) based in Brussels and connected with National Animation Units.

Through this program three main goals are intended:

- Strengthen the agricultural and forestry sectors, which are two basic rural areas;
- Improve the competitiveness of rural areas in order to ensure the employment and quality of life of their populations;
- Preserving the region's environment, landscape and rural heritage.
- It is based on four main principles:
- Multifunctionality of agriculture;
- A multisectoral and integrated focus of the rural economy;

- The flexibility of rural development aid;
- Transparency in program development and management.

To develop the strategy followed by the LEADER Model (figure 2) will be to stimulate the conditions and attractions of the Cuzamá cenotes region, by creating jobs based on local vocations, supporting and accompanying them. Considering that one of the weaknesses that the community has is the low level of education, we will support students from the Technological Institute of Mérida, who are native to this region who wish to contribute in the development of their community.



**Figura 2** Estimular las condiciones de atracción del territorio. Fuente: Pays de Saint Flour Haute Auvergne



**Figure 3** Zonal approach. Leader approach. Source: Basic guide. European Communities (2006)

We propose the application of the model of integral community development, based on the teaching-learning model based on a system of sensitization in human values that promotes that people are willing to learn to learn, to build intelligent communities and to break paradigms, where there is no place for manipulated electoral decisions or welfare programs, but the strategy is aimed at alleviating the difficulty from its origin, the person, the family, the community, from the internal perspective without the intervention of external agents (Arte and Valores, s/f).

**Integral Community Development based on universal values.**

	Stage 1. We listen to you ...	Community Diagnostics.	
Local Analysis for Integral Community Development.	Stage 2. You listen to us ...	Training of community leaders	Overall community, professional and institutional evaluation.
	Stage 3. We act together ...	Specific High Impact Projects in the Community.	
	Stage 4. We evaluate the impact ...	Periodic report of progress and achievements.	

**Table 1** Methodology of integral community development. Source:Arte y Valores A.C.

## Conclusions

With gathered data on the first phase (community diagnosis) we identify the areas of opportunity and select the change agents, who will be the leaders in the development of innovation projects for local vocations.

In the second stage (Formation of community leaders) we work in the integral formation with the philosophy sustained in the human being. Universal values of teamwork.

In the third stage (Specific projects with high impact in the community) the projects are implemented to benefit the community. Experts are sought in the know-how of innovative projects. (Technical, financial, administrative, distribution, etc.)

On the fourth phase we evaluate the impact of the projects in the community, as well as the behavior of the community leader.

This provides the basis for stimulating the creation of jobs with local resources and the accompaniment of innovative economic projects through the "Leader" model of the European Union.

## References

INEGI. Prontuario de información geográfica municipal de los Estados Unidos Mexicanos. 2009.

<http://www3.inegi.org.mx/sistemas/mexicocifras/datos-geograficos/30/30173.pdf>

Revista del centro de graduados de investigación: Instituto Tecnológico de Mérida, Volumen 21 No. 58 pp. 23-29 jun. 2015 ISSN0185-6294

Enciclopedia de los municipios y delegaciones de México.  
<http://www.inafed.gob.mx/work/enciclopedia/EMM31yucatan/municipios/31076a.html>

Gobierno del estado de Yucatán.  
[http://www.yucatan.gob.mx/estado/municipios/ver\\_municipio.php?id=36](http://www.yucatan.gob.mx/estado/municipios/ver_municipio.php?id=36)

H. Ayuntamiento de Tecoh 2012-2015, Plan Municipal de Desarrollo 2012-2015

INEGI. Censo de Población y Vivienda 2010.

INEGI. México en Cifras.  
<http://www3.inegi.org.mx/sistemas/mexicocifras/default.aspx?e=31>

INEGI. México en Cifras.  
<http://www3.inegi.org.mx/sistemas/mexicocifras>

Gobierno del estado de Yucatán.  
[http://www.yucatan.gob.mx/estado/municipios/ver\\_municipio.php?id=36](http://www.yucatan.gob.mx/estado/municipios/ver_municipio.php?id=36)

Pays de Saint Flour Haute Auvergne. Programme sur le pays.  
<http://www.paysdesaintflourhauteauvergne.eu/fr/leader-programme.php> Traducido por Martínez y Rangel. A. L.

Plan Municipal de Desarrollo del Municipio de Cuzama 2012-2015 (2013)

Prontuario de información geográfica municipal de los Estados Unidos Mexicanos, disponible en [www3.inegi.org.mx/sistemas/mexicocifras/datos-geograficos/31/31036.pdf](http://www3.inegi.org.mx/sistemas/mexicocifras/datos-geograficos/31/31036.pdf)

SEDESOL (2016)  
<http://www.microrregiones.gob.mx/catloc/LocalMun.aspx?tipo=clave&campo=loc&ent=31&mun=01>

SEDESOL. CONEVAL.  
[https://www.gob.mx/cms/uploads/attachment/file/47148/Yucatan\\_015.pdf](https://www.gob.mx/cms/uploads/attachment/file/47148/Yucatan_015.pdf)

SEDESOL. CONEVAL.  
[http://www.sedesol.gob.mx/work/models/SEDESOL/Informes\\_pobreza/2014/Municipios/Yucatan/Yucatan\\_076.pdf](http://www.sedesol.gob.mx/work/models/SEDESOL/Informes_pobreza/2014/Municipios/Yucatan/Yucatan_076.pdf)

SEDESOL-CONEVAL  
[www.dof.gob.mx/SEDESOL/Yucatan\\_036.pdf](http://www.dof.gob.mx/SEDESOL/Yucatan_036.pdf)

SEFOE.  
[http://www.sefoe.yucatan.gob.mx/esp/estado/municipios\\_31076.php](http://www.sefoe.yucatan.gob.mx/esp/estado/municipios_31076.php)

SEFOE.  
<http://www.sefoe.yucatan.gob.mx/secciones/ver/homun>

## **Importance of development of business networks for university students. Exploration UAEMex 2016**

GONZÁLEZ-GARCÍA, Guadalupe†\*, ESTRADA-GUTIÉRREZ, Enrique, BECERRIL-CARBAJAL, María Luisa and SÁNCHEZ-PAZ, María de la Luz

*Universidad Autónoma del Estado de México*

Received January 7, 2016; Accepted June 15, 2016

### **Abstract**

This article intends to report the findings about the belief that certain authors have of the importance of networking in entrepreneurship. The results of this research confirm the importance of the promotion and use of business networking in the university. There is no evidence of a clear interest in defining goals, making personal approaches or promoting changes with the intention of achieving positive results that can be beneficial for all parts. It can be observed through the data analysis that students are not focusing on how to modify their conduct however, they rely on the fact that they have the necessary skills to change people's behaviour at a certain point. Designing strategies for the development of business networking such as promoting a connection with the business sector and encouraging students to make part of groups or associations related to this sector is essential for students at this level of education. The strengthening of networking relies on the access to information, interactive learning and the spread of innovation.

### **Entrepreneurship, business, networking, University students, business administration**

**Citation:** GONZÁLEZ-GARCÍA, Guadalupe, ESTRADA-GUTIÉRREZ, Enrique, BECERRIL-CARBAJAL, María Luisa and SÁNCHEZ-PAZ, María de la Luz. Importance of development of business networks for university students. Exploration UAEMex 2016. ECORFAN Journal-Republic of Cameroon 2016, 2-2: 54-62

\* Correspondence to Author (email: guadalupe\_ggg@hotmail.com)

† Researcher contributing first author.

## Introduction

Innovative, cost-effective projects that solve economic and social problems of a region and that also allow their sustainable development, are attended every day by various instances, which implies that the development of entrepreneurs is a function to take into account in universities. In the same way, today's markets are increasingly demanding and do not forgive mistakes, require entrepreneurs with greater preparation and care in the management of their business. Thus, entrepreneurship can be the difference between professional education that fosters an entrepreneurial culture and the one that does not, as mentioned by Bygrave and Minniti (2000).

The university instruction uses positive models of the entrepreneurial role in the student's environment to influence the decision to undertake and is associated with the probability of realizing their project, that is to say, the use of entrepreneurial patterns throughout the academic development allows to promote professional entrepreneurs. Because the characteristics of the entrepreneurial profile are being reinforced through the internalization of the knowledge and skills that imply being an entrepreneur.

In many university curricula, the commitment to integrate an entrepreneurial and entrepreneurial vision that allows graduates to perform better in the work context is increasingly considered. Of particular note is the development of a corporate culture defined by Gibb (1999: 27-38) as the "set of values, beliefs and skills commonly shared in a society, which supports the idea that an entrepreneurial way of life is desirable. Continuously supporting the search for effective entrepreneurial behavior by individuals or groups "and the formation of entrepreneurs able to offer their services independently, create companies or innovate in existing ones.

So it is emphasized that within the various actions in the Higher Education Institutions aimed at the integral formation of the student is to foster entrepreneurship, the focus of this research.

## Development

### Business

To begin with the development of this concept some definitions are taken up again. Undertaken by its etymology it is made by the suffixes "in: en, prehendere: take, hold"; start a company. Company is made up: in / prehensa: taken, captured. To undertake according to the context in which it is used, can have two meanings: in business, the entrepreneur is an entrepreneur or owner of a company for profit, while in the academic environment rather describes a profile, a set of characteristics that Make a person act in a certain way to demonstrate certain competencies to define and achieve objectives (Finley, 1990 and Ronstad, 1985 quoted by Alcaraz, 2011).

An entrepreneur is a person or organization able to generate a new business project or activity that creates value (Juárez, 2012). Finally, the term enterprise or entrepreneurship is both words by way of translation of entrepreneurship that is the way to address the entrepreneurial spirit and is defined in the dictionary of the Royal Academy as the quality of the entrepreneur. The Global Entrepreneurship Monitor 1 (GEM) defines entrepreneurship as any attempt made by individuals to start a new business, including that of becoming self-employed.

Reflecting that young people have clearly established rights to develop their full potential in the workplace through universal principles such as: universality, indivisibility, equality and efficiency (United Nations, 2004) implies for universities that a fundamental part in the training of professionals includes entrepreneurship. Another relevant component in this respect is the International Labor Organization, which states that vocational training consists of "activities that tend to provide the practical capacity, knowledge and attitudes necessary for work in an occupation or group of occupations in any Branch of economic activity". Thus the substantive functions of the universities are aimed at providing students with the theoretical contents and development of competencies in order to train them for professional life, which today also demands to be enterprising either internal or external organizations.

Last but not least, UNESCO's (United Nations Educational, Scientific and Cultural Organization) statement in Incheon 2030 (Korea) on education recognizes the importance it plays Education as the main driver of development, as well as the key to achieving full employment and poverty eradication, for which fairness, inclusion, quality and learning outcomes are required, within a learning Long life. Given this, to generate entrepreneurship in students of higher education becomes a necessary competence of study programs, and that is why boosting entrepreneurship and innovation, involves taking responsibility for the development of relevant skills.

Now, as mentioned the skills to be an entrepreneur can be fostered; Campos, Figueroa and Sandoval (2014) argue that Aronsson (2004) and Kirby (2004) found empirical evidence that the acquisition of entrepreneurship skills can be a factor influencing the development of entrepreneurial skills.

And that Aronsson On the one hand points out that entrepreneurship can be encouraged through teaching and, on the other, Kirby asserts that entrepreneurial skills are not only innate but can also be acquired through learning.

According to Spinelli and Adams (2012), entrepreneurship as a new management paradigm, as proposed by Spinelli and Adams (2012), considers that throughout the curriculum of a university career mainly in the Administration sciences and related, it should include related topics that can range from finance and accounting, through marketing and information technology to a business perspective.

In many curricula there are specific subjects that address the creation of companies and consequently some studies have been carried out on their problematic for university students (Rubio, Cordón and Agote, 1999, Grande, 2001, Cano, García and Gea, 2003). In Cano, 2003), in which it is concluded that many of the problems are those related to the start-up of any business and that need to be faced and considered as part of the entrepreneur's learning.

In the process of change to encourage students' entrepreneurial behaviors, it is important first to determine the characteristics they already have as entrepreneurs. Research on the characteristics of the entrepreneur should consider three aspects according to Uriarte and González (2007):

1. The existence of characteristics: psychological or logical, social, hereditary, environmental, educational or experimental, that differentiate the entrepreneur with the success of other human groups.
2. As I be, if possible that these pre-existing characteristics entrepreneurial behavior.

3. Determine the possibility of evaluating and anticipating the process of creation or a company.

According to Vargas (2007) it is essential to foster an entrepreneurial culture, as a frame of reference for values that shape productive activities. Hence, as Gilder (1984) mentions, it is important to determine the entrepreneurial characteristics and how entrepreneurs are people capable of learning, but who also pursue their goals despite failures and frustrations and finally achieve success through breaking Old patterns and create your own new order. This is strengthened by the professional alignment of knowledge and values that allow eminently humanistic training; The relevance of education and research in universities is not discussed in any way, but also the importance and necessity of creativity and innovation in them are part of this new model.

### Business Networks

For the integration of the theoretical structure of this article the issue of corporate networks, which are not a fashion, although some recent, finding definitions with different approaches addressed: economic, administrative, sociological, etc. Of which they have made a compendium Rauch and Casella (2001). Networks are a mechanism for cooperation between businesses and entrepreneurs, in which they participate voluntarily to obtain individual benefits through joint action. In this mechanism each participant maintains its legal independence and managerial autonomy, although the participants agree to cooperate using the appropriate environments and methods (Rodríguez, 2008).

A business network is "a permanent strategic alliance between a limited and clearly defined group of independent companies, which collaborate to achieve common medium- and long-term goals.

Aimed at developing the competitiveness of the different participants" (López, 1999). They are a response to the need to establish linking and collaboration systems between companies, whether new or in operation. Relationships of trust, solidarity and cooperation with others are encouraged and privileged, although their dynamics are complicated. Unlike clusters, networks are made up of a more limited number of enterprises, are clearly identifiable and their members do not necessarily belong to the same territory (Dini, 1997).

The functional components of Maeso's business network emphasize: cooperation mechanisms, legal independence and autonomy management of the members, voluntary affiliation, obtaining individual benefits through joint action, there is no agreement on the size or size of the network although it is important the management difficulty in networks too large. A network of companies (López-Cerdán, 1999) requires a minimum structure that maintains a group of companies together, providing them with benefits and advantages of joint actions. From them emanates perspectives of exchange of products and services, but also of contacts and supports of economic, social and technological character.

According to Grabher (1993, quoted by Cervilla 2007) whatever the definition adopted, the relationships between the companies of a network have the following characteristics: they refer to transactions within a context of reciprocity not to transactions in the market or to Hierarchical relationships in a company; Refer to a system of multiple interconnections, responses and reactions of companies and actors, and it is about relationships of interdependence between companies or actors.



The same Cervilla (2007) emphasizes that Ceglie et al (1998) see a business network as a group of companies that cooperate in the development of a joint project, complementing each other and specializing with the purpose of solving common problems, achieving collective efficiency and conquer markets that would be very difficult to address individually. It also states that Camagni (1991) states that it is a closed set of selected and explicit links of a company with preferential partners, in the field of complementary assets and market relations, which has been established with the main objective of reducing the levels Of uncertainty.

Establishing a definition of the business network concept among university students is not easy, so the use of models makes it easier to differentiate business creation from a totally independent point of view or create companies within networks. It is advisable to start from the elements of a model such as the one shown in Diagram 1, which can serve as a guide for the implementation of entrepreneurial culture development processes, such as the acquisition of entrepreneurial skills, abilities and professional skills. Theoretical interaction for characterizing business networks h to widely mulled by Dr. Carlos Hernán González-Campo (2010), highlighting the factors that should be implicit in the formation of entrepreneurial culture

### **Social networks in business networks**

Electronic social networks have changed the focus of human relations and potentialized their most important feature: the ease of finding and establishing relationships with other members of similar interests as noted by Brent (2007). This evolution also impacts the formation of social organizations, in which groups of individuals are connected to coordinate and act together as Martínez points out (2011, quoted by Sandoval-Almazán et al, 2013).

Social networks are the result of an evolutionary process of forms of social organization, in which groups of individuals are connected to coordinate and act together Rondfelt (2007). Today, new technologies and the media are changing our way of living, working, communicating and determining our relationship. Hence, it has been necessary to incorporate the world of information and communication technologies into the workplace. Herrera (2009) highlights the evidence that the theoretical perception about entrepreneurship is not individualistic, but a social phenomenon and as such immersed in social structures and networks.

### **Methodology**

The field research was carried out based on a questionnaire addressed to the students of Administration and some related areas. Being of transversal type derived that the results were obtained in a single moment during the first semester of the year 2016. The target population was of 375 students. It is a descriptive research that seeks to establish the personal business characteristics of a group of individuals, identifying behaviors and attitudes that lead to concrete behaviors, to discover and determine the relationships between the various variables of the study. The research is non-experimental in the absence of manipulation of variables and only observed the phenomenon as such occurs in the natural context and subsequently analyzed.

For the collection of data needed in this research, the questionnaire on Management Systems International's Personal Business Characteristics was applied in order to know the level of entrepreneurial skills of the students under study. Said instrument reviews in a summarized form personal business characteristics required to form a company. Its main objective is that the profile can be elaborated on these characteristics.

Is a test that in the best of cases can mark trends in one direction or another. It does not necessarily have a value in absolute terms and its effectiveness and impact among the participants is precisely its neutral and depersonalized character. This instrument is integrated by 55 statements that evaluate ten characteristics, which were extracted those oriented to the dimension of this research: "Business networks".

## Results and discussion

The sample size was 375 students of the LAM and some related subjects such as International Relations (REI), Actuarial (LAC), International Business (NIB) and Marketing (MKT), chosen at random without regard to specific parameters Gender, age or semester in progress and were distributed as shown in Figure 1. The assertions of the instrument are analyzed below.

For the claim 9: "Achievement others support my recommendations, " we observed an average of 3.66 is usually very close to the value, as shown in Figure 2.

As the claim 20 is complementary to 9, as it says, "I do not spend much time thinking about how to influence people" and observed that the response of the sample is sometimes what makes us assume that even if Managers in general do not invest much time thinking about how to influence people, they finally achieve it, as can be seen in Figure 3.

Figure 3 "I do not invest much time in thinking how to influence people"

For statement 31: "I use influential people to achieve my goals" we note that managers do not fully agree with it, but they are not against it either, which suggests that in the issue of taking all resources to the Reach, managers are more humanistic. See Figure 4.

For statements 42 and 53: "To reach my goals I seek solutions that benefit all people involved in a problem"; while "I get people with strong convictions and opinions change of mindset" it is that there is usually an important bias because the averages are 3.83 and 3.54 respectively. This reinforces the humanist approach expressed in statement 31 and gives us the assumption that this generation of managers is more person-oriented rather than task-oriented.

However, in statement 9 when analyzing the degree in Administration on the one hand and related careers on the other, we obtained what is shown in Figure 7. It is significant the tendency to "Achieving that others support my recommendations" in the graduates In Administration with respect to the other bachelor's degrees.

With regard to the statement 20: "I do not spend much time thinking about how to influence others" it is evident as the other races are more prone to indecision, while graduates in rare Administration once they consider important, as seen In Graph 8 a clear trend.

In reviewing the answers to statement 31 "I use influential people to achieve my goals", for managers is not important, while for other careers represents a trend, as shown in Graph 9

In statement 42: "In order to achieve my goals I seek solutions that benefit all people involved in a problem," all careers show an interest in win-win, as shown in Figure 10.

Finally, in Figure 11, the result is given to statement 53: "I can get people with firm convictions and opinions to change their way of thinking", it is evident that for graduates in Administration is a topic of interest, while for other related careers is not.

The following table shows the correlations of all questions in the "Business Networks" dimension of the questionnaire, applied to the bachelor's degree in Administration and related fields and the following is found:

1. Among men to the recommendations issued by these professionals support, you can make people with strong convictions and opinions change their thinking (affirmation or affirmation or n 9 n 53)
2. It is important that these professionals avail themselves of influential people to achieve their goals because they can achieve with this change their thinking (affirmation or affirmation or n 31 n 53)
3. The analysis to an Appendix also shows that by achieving these professionals that students demand to support their recommendations to students could use those people to achieve their goals (31 Affirmation Affirmation or n or n 9)

Correlations					
	Preg9	Preg20	Preg31	Preg42	Preg53
Pearson's Correlation	1	-.014	.262	.226	.273
Preg9 Sig. (Bilateral)		.791	.000	.000	.000
N	375	375	375	375	375
Pearson's Correlation	-.014	1	.113	-.022	.062
Preg20 Sig. (Bilateral)	.791		.029	.666	.229
N	375	375	375	375	375
Pearson's Correlation	.262	.113	1	.186	.363
Preg31 Sig. (Bilateral)	.000	.029		.000	.000
N	375	375	375	375	375
Pearson's Correlation	.226	-.022	.186	1	.181
Preg42 Sig. (Bilateral)	.000	.666	.000		.000
N	375	375	375	375	375
Pearson's Correlation	.273	.062	.363	.181	1
Preg53 Sig. (Bilateral)	.000	.229	.000	.000	
N	375	375	375	375	375

**Table 1**

When evaluating the values obtained in the questionnaire we find that the score reached for the dimension of "Business Networks" is 17.24, which implies that our working opportunity margin is 7.76, equivalent to 31% in it, as observed in Figure 12

## Conclusions

It is important to consider that in situations of crisis and scarcity or problems that companies cannot face on their own, they choose to establish inter-company links (Hernández, 2015). Hernán and Gálvez (2008) explain in their proposal that entrepreneurs must know the differences between creating a company to operate independently or to do it within a network. Veronica Alderete (2015) highlights the recognition of the value of networks for business success derived from the fact that cooperation is a strategy to improve competitiveness and overcome some weaknesses such as access to external markets, financing and technological backwardness.

With the results obtained in this research, the importance of promoting the creation and use of Business Networks from university is confirmed. The skills and competences developed by the graduates in Administration and related careers do not show a clear interest in clarifying goals, approaching others, seeking changes and thus achieving results with mutual benefits. Although there is progress, with the analysis of the "Business Networks" indicator of the instrument applied, there is evidence that there is a long way to go in this topic.

It should be noted that these degrees are considered an ability to make people with firm convictions change their thinking if the relevant recommendations are made to a problem. Thus the search for solutions should bring a benefit to all the people involved in a project, without detracting from the humanism that was also appreciated throughout the research.

With regard to the time spent to think how to influence others, no significant evidence was found that there is interest on the part of the sample.

Given the importance of theory that time should be given to thinking about how to modify behaviors; as it was observed in the results analyzed our students are not doing it, it would be advisable to work on the development of this skill.

The strategies for the development of "Business Networks" fundamental to share in this educational level would include: strengthening entrepreneurship through linkage with the business sector; To bring university students closer to the chambers, associations and organizations that concentrate a group of companies; Perform collaborative and teamwork with other professions; To study the existing models for the formation and management of networks in Mexico and in other countries, making the necessary adjustments.

In the topic of business networks, it is important to reconsider how an entrepreneur who wants to start a business or to join an intrapreneur can make the decisions to achieve its objective taking into account the existing external conditions generated by the other member companies of a Network (Minniti, 2005). The strengthening of the business network is supported by access to information, interactive learning and the diffusion of innovation.

## References

- Alderete, M. V. (2015). Redes de pymes: una visión desde las teorías de club y de equipo. *Revista de Economía Institucional* 17(32) 2015, pp. 317-348. DOI: 10.18601/01245996.v17n32.11
- Alcaraz R., R. (2011). *El emprendedor de éxito*. Cuarta edición. México: Mc Graw Hill.
- Brent, R. (2007). *Data Base For Advances. Information Systems*, 38 (3), 20.
- Bygrave, W., Minniti, M. (2000). *The Social Dynamics of Entrepreneurship. Entrepreneurship: Theory and Practice*. Vol. 24. Núm.3: 25-36. Ed. Universidad de León. León:España
- Cano, C. J., García, J., y Gea, A. B. (2003). *Actitudes emprendedoras y creación de empresas en los estudiantes universitarios*. Almería: Servicio de Publicaciones de la Universidad de Almería y Consejo Social de la Universidad de Almería
- Campos, Figueroa y Sandoval (2014). *Memorias XV Congreso Internacional sobre Innovaciones en docencia e investigación en Ciencias Económicas Administrativas* Zacatecas:México. [www.fca.uach.mx/apcam/2014/04/.../Ponencia%20147-UPZacatecas/recuperado 11/02/2016](http://www.fca.uach.mx/apcam/2014/04/.../Ponencia%20147-UPZacatecas/recuperado%2011/02/2016).
- Cervilla de Olivieri, M. (2007). Estrategias para el desarrollo empresarial: Asociatividad en el sector plástico venezolano. *Revista de Ciencias Sociales*, 13(2), 230-248. Recuperado en 19 de septiembre de 2016, de [http://www.scielo.org.ve/scielo.php?script=sci\\_arttext&pid=S1315-95182007000200004&lng=es&tlng=es](http://www.scielo.org.ve/scielo.php?script=sci_arttext&pid=S1315-95182007000200004&lng=es&tlng=es).
- Dini, M. (1997). *Enfoques conceptuales para el estudio de pequeñas y medianas empresas*. Mimeo, Santiago de Chile: CEPAL.
- GEM. *Global Entrepreneurship Monitor, Informe ejecutivo 2016*. Global Entrepreneurship and Development Institute. [https://thegedi.org/global-entrepreneurship-and-development-index/recuperado el 30 de marzo de 2016](https://thegedi.org/global-entrepreneurship-and-development-index/recuperado%20el%2030%20de%20marzo%20de%202016).
- Gibb, A. (1999). *Creating an entrepreneurial culture in support of SMEs. Small Enterprises Development*”, Vol.10, no.4

Gilder, G. (1984). *El Espíritu de Empresa*. Madrid: Espasa-Calpe

González-Campo, Carlos Hernán. (2010). Interacción teórica para la caracterización de redes empresariales. *Innovar*, 20(37), 117-132. Recuperado Junio 30 de 2016, from [http://www.scielo.org.co/scielo.php?script=sci\\_arttext&pid=S0121-50512010000200010&lng=en&tlng=es](http://www.scielo.org.co/scielo.php?script=sci_arttext&pid=S0121-50512010000200010&lng=en&tlng=es)

Juárez, L.F. (2012). *Principios de contabilidad. Enfoque emprendedor*. México: Cengage

Hernán González Campo, C; Gálvez Albarracín, É J; (2008). Modelo de Emprendimiento en Red -MER. Aplicación de las teorías del emprendimiento a las redes empresariales. *Academia. Revista Latinoamericana de Administración*, () 13-31. Recuperado de <http://www.redalyc.org/articulo.oa?id=7161210003> ISSN 1012-8255

Hernández, A y Zapata G. (2015). Vinculaciones interempresariales colaborativas en contextos de red. Estudio de caso en organizaciones pertenecientes al sector de maquinaria pesada. Barquisimeto, Estado Lara. Venezuela. *Visión Gerencial Enero-Junio 2015*(89-118).

Herrera Echeverri, Hernán, Investigación sobre redes sociales y emprendimiento: revisión de la literatura y agenda futura *INNOVAR. Revista de Ciencias Administrativas y Sociales [en línea]* 2009, 19 (Enero-Abril): [Fecha de consulta: 13 de agosto de 2016] Disponible en:<<http://www.redalyc.org/articulo.oa?id=81819022003>> ISSN 0121-5051

López-Cerdán Ripoll, C. (1999). *El Desarrollo de Mecanismos de Promoción para el Agrupamiento de Pequeñas y Medianas Empresas*. En Revisión para publicar por el SELA-AECI. Caracas, Venezuela.

Maeso, A. (1998). *Los consorcios de exportación en el Uruguay. Taller de Expertos sobre Asociacionismo y Competitividad SELA-AECI-SER*. Lima, Per

Rauch, J. & A. Casella. (2001). *Networks and markets*, Nueva York, Russell Sage Foundation. Rodríguez, C. a. (2008). *Redes Empresariales. Alianzas productivas colaborar para competir*. Cámara de Comercio de Bogotá ISBN 978-958-688-218-7 LEGIS S.A. 2008

Rondfelt, D. (2007), *How societies work. Tribes –The first and forever form (Reports and Bookstore No. WR-433-RPC)*. Working papers (p.102). RAND corporation. Recuperado a partir de: [http://www.rand.org/pubs/working\\_papers/WR433.html](http://www.rand.org/pubs/working_papers/WR433.html).

Sandoval-Almazán, R., Romero-Romero A., Heredia, E.(2013). *Comunicación e intercambio con redes sociales en la educación universitaria: caso estudiantes de Administración e Informática*. *Apertura Revista de Innovación Educativa*. Vol. 5, núm 2. ISSN: 2007-1094 México.

Spinelli, S. Jr. & Adams, R. (2012). *New venture creation. Entrepreneurship for the 21st century*. 9 ed. U.S.A: Mc-Graw-Hill Irwin

Uriarte, J., y González, P. (2007). *Métodos e instrumentos de evaluación psicológica de jóvenes emprendedores*. España. <http://www.psicologiacientifica.com/bv/psicologia-264-1-metodos-enstrumentos-de-evaluacion-psicologica-de-jovenes-.html>

UNESCO (2015). *Declaración de Incheon: Educación 2030*. <http://es.unesco.org/world-education-forum-2015/about-forum/declaracion-de-incheon>

## Instructions for authors

---

### **[Title in Times New Roman and Bold No.14]**

Last name -First name, (in uppercase) -1st † Last name -First name (in uppercase) -2nd Author's name

*Institutional mail No.10 Times New Roman and Italic*

(Report Submission Date: Month, Day, and Year); accepted (Insert date of Acceptance: Use Only ECORFAN)

---

### **Abstract**

Title

Objectives, methodology

Contribution

(150-200 words)

Keywords

Indicate (3-5) keywords in Times New Roman and Bold No.11

---

**Citation:** Last name -First name (in uppercase) -1st † Last name -First name (in uppercase) -2nd Author's name. Paper Title. Title of the Journal. 2015 1-1: 1-11 - [All in Times New Roman No.10]

---

---

† Researcher contributing as first author.

# Instructions for authors

## Introduction

Text in Times New Roman No.12, single space.

General explanation of the subject and explain why it is important.

What is your added value with respect to other techniques?

Clearly focus each of its features

Clearly explain the problem to be solved and the central hypothesis.

Explanation of sections Article.

## Development of headings and subheadings of the article with subsequent numbers

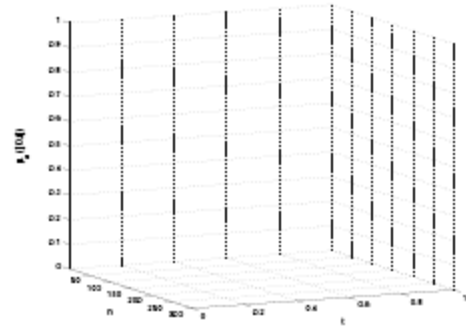
[Title No.12 in Times New Roman, single spaced and Bold]

Products in development No.12 Times New Roman, single spaced.

## Including graphs, figures and tables-Editable

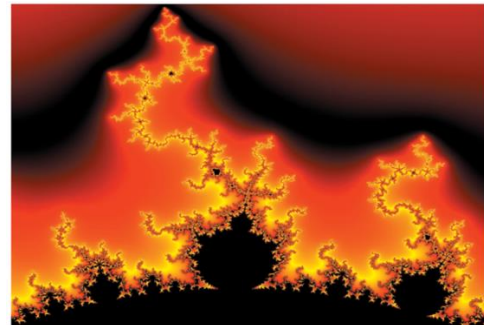
In the article content any graphic, table and figure should be editable formats that can change size, type and number of letter, for the purposes of edition, these must be high quality, not pixelated and should be noticeable even reducing image scale.

[Indicating the title at the bottom with No.10 and Times New Roman Bold]



**Graphic 1** Title and Source (in italics).

Should not be images-everything must be editable.



**Figure 1** Title and Source (in italics).

Should not be images-everything must be editable.


**Table 1** Title and Source (in italics).

Should not be images-everything must be editable.

Each article shall present separately in **3 folders**:  
a) Figures, b) Charts and c) Tables in .JPG format, indicating the number and sequential Bold Title.

## For the use of equations, noted as follows:

$$Y_{ij} = \alpha + \sum_{h=1}^r \beta_h X_{hij} + u_j + e_{ij} \quad (1)$$

They must be editable and number aligned on the right side.

## Instructions for authors

---

### Methodology

Develop give the meaning of the variables in linear writing and important is the comparison of the used criteria.

### Results

The results shall be by section of the article.

### Annexes

Tables and adequate sources thanks to indicate if they were funded by any institution, University or company.

### Conclusions

Explain clearly the results and possibilities of improvement.

### References

Using APA system, should **Not** be numbered, either bulleted, however, if necessary, will be because reference number or referred to in any of the article.

### Data Sheet

Each article must submit your dates into a Word document (.docx):

Journal Name

Article title

Abstract

Keywords

Article sections, for example:

*1. Introduction*

*2. Description of the method*

*3. Analysis from the regression demand curve*

*4. Results*

*5. Thanks*

*6. Conclusions*

*7. References*

Author Name (s)

Email Correspondence to Author

References





Akwa- Douala, Republic of Cameroon \_\_\_\_, \_\_\_\_ 20\_\_\_\_

### **Originality Format**

I understand and agree that the results are final dictamination so authors must sign before starting the peer review process to claim originality of the next work.

---

Article

---

Signature

---

Name



**Akwa- Douala, Republic of Cameroon \_\_\_\_ , \_\_\_\_ 20 \_\_\_\_**

**Authorization Form**

I understand and accept that the results of evaluation are inappealable. If my article is accepted for publication, I authorize ECORFAN to reproduce it in electronic data bases, reprints, anthologies or any other media in order to reach a wider audience.

---

Article

---

Signature

---

Name

# ECORFAN Journal-Republic of Cameroon

“Money demand of Paraguay: Estimation within an inflation-targeting framework”

**BÁEZ-MARTÍNEZ, José Fernando**

*Universidad Nacional de Asunción*

“Index of sustainability of the greenhouses of Chilcuatla, Hidalgo”

**CARBALLO-SÁNCHEZ, Álvaro, MEJÍA-NÁJERA, Carlos, CRUZ-SÁNCHEZ, Eduardo and BLANCAS-OLVERA, Zoraida**

“Intellectual capital for the competitiveness of the agribusiness”

**CERVANTES, María & GALABIZ, Audelia Urías, J.**

“Proposal for the implementación of the French project “La Loire a Velo” for endogenous development on the cenotes route on Yucatán”

**PÉREZ-GARMENDIA, Gloria, GARCÍA-DOMÍNGUEZ, Luis Alberto, MARTÍNEZ-RANGEL, Armando Luis, PÉREZ-CANTO, Julieta Elvira and MEJÍA, Nelly**

*Economic-Administrative Department. Technological Institute of Merida*

“Importance of development of business networks for university students. Exploration UAEMex 2016”

**GONZÁLEZ-GARCÍA, Guadalupe, ESTRADA-GUTIÉRREZ, Enrique, BECERRIL-CARBAJAL, María Luisa and SÁNCHEZ-PAZ, María de la Luz**

*Universidad Autónoma del Estado de México*

