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In this number is presented *Analysis on the profitability of Green Bonds in Mexico* by ZAPATA-GARZA, Claudia Gabriela, PADILLA-VILLAEÑOR, Jaime Luis and DEMMLER, Michael, next article *Indicators of quality in the service in the private health enterprise* by MORALES-MORALES, Jaime, OVALLES-TOLEDO, Luiz, VALDEZ-ACOSTA, Nadia and MORALES-MORALES, Jesús with adscription Universidad Autónoma de Sinaloa, next article *The digital economy and the value of the virtual in the labor market of Mexico* by INZUNZA-MEJÍA, Patricia Carmina and MONTOYA-ANGÚLO, Valeria Guadalupe with adscription in Universidad Autónoma de Sinaloa, in the next Section the article *The use of smartphones to enhance language learning* by RODRÍGUEZ, Verónica, MARTÍNEZ, Jorge, GUEVARA, Isaí and LÓPEZ-OLIVERA, Rosvenraver.

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Analysis on the profitability of Green Bonds in Mexico

ZAPATA-GARZA, Claudia Gabriela†*, PADILLA-VILLAEÑOR, Jaime Luis and DEMMLER, Michael

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Abstract

Mexico recently issued Green Bonds (GBs) in 2015. The great importance which represents climate change on the planet resulted in a stronger commitment of countries in the mitigation of effects produced by the emission of Greenhouse Gases (GHG) into the atmosphere. Issuing GBs implicates investing in projects of environmental protection and in addition, a financial profit is given to investors. This article aims to comparatively analyse the performance of GBs in Mexico. Since the GBs, like government bonds, are low yield and low-risk debt instruments, it is interesting to know which instrument offers a better performance. To obtain these results inflation rates based on historical rates were projected and compared with yields and Sharpe's ratio, which leads to determine that from a financial standpoint GBs are unattractive to investors at least over a time horizon of five years.

Green bond, performance, rate of return

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Introduction

The financial system of a country can generally be divided into two parts: the banking system and the stock exchange system. For financial product claimants both offer different alternatives. The securities sector offers, on the one hand, transactions in short-term debt securities such as the Treasury Certificates (CETES) of a government issuer or commercial papers of private companies and financial institutions. On the other hand there is the capital market where the interested investor can invest in stocks or bonds (Ross, Westerfield and Jordan, 2014).

The Green Bonds (GBs) are debt instruments that are used to finance projects whose objective is to reduce and / or mitigate the effects of climate change through energy regeneration projects, alternative energy use, waste management, reforestation, others (IBRD, 2015).

In the last decades, the effects of climate change have become more and more acute. As a result, global awareness of the protection of the environment and its actions, such as the implementation of renewable energies, energy efficiency, others. This allows for the creation of new economic opportunities to reduce the impact of environmental pollution.

The link between green finance management and sustainable business development not only impacts economic development but also social and environmental balance, because governments, organizations and individuals are expected to produce environmental impacts.

Green finance is a concept that encompasses all the instruments that can finance environmental sustainability projects, which will generate a better quality of life for the present and future generations (Garay and Ticas, 2013).

According to the importance of the protection of the environment that is already evident by the actions registered worldwide to promote it, it is known that much of a decade has been financed large green projects. This means that it is a new area of opportunity; a fertile field of investment for Mexican investors and other countries that wish to contribute to reducing the impact of climate change, through VHLs.

The approach of the problem arises in knowing what is the profitability that the investors would have to bet in Mexican GBs, since within the categories of bonds they are instruments of new presence in investment. The objective is to compare the performance and performance of the Mexican GBs listed on the Mexican Stock Exchange (BMV) with the Federation Treasury Certificates (CETES), so the research question is how attractive are the GBs, considering their performance and performance against CETES?

Also reviewing the investment in GBs worldwide in 2007 was US \$ 0.81bn and until 2015, US \$ 65.90bn was reported and if the growth trend in the inter-years is carefully reviewed, it has gone up (IBRD, 2015).

The methodology used to achieve the objective of this article is to compare the performance of BV with the use of CETES as a proxy variable, due to the lack of information about the behavior of GBs in the market.

For the comparative study between GBs and CETES, the yields and the Sharpe ratio were considered based on data from the period between 2015 and 2019.

According to the results obtained, it can be seen that GBs in Mexico are no more attractive than CETES. However investors do not run the risk of having a loss on investment.

The relevance of the investment is to support the financing of green projects.

Theoretical Framework

Nature of the bonds

According to Van Horne and Wachowicz (2012), bonds are defined as fixed-income debt instruments paid by an issuer (hence the name Payable) at a certain future date, which is often referred to as the maturity date. On this date the issuer agrees to pay the principal of the bond and the buyer recovers its investment. The buyer of the bond obtains periodic payments generated by the interest and charges at the end the nominal value of the interest; that is, on the due date that can be from less than a year to a period of more than five years.

Financial transactions are carried out on the stock exchanges, either directly or through brokerage firms registered with such exchanges. The public or private institutions issuing the instruments, come to these spaces to make them available to investors. This initial transaction between the issuer and the investor is known as the primary market. Subsequently, the instruments are bought and sold among investors in the stock market, often referred to as the secondary market (García, 2014).

Fixed income paid by the bonds has two conditions, the first of which refers to the periodicity of payments, which are usually quarterly or half-yearly, and secondly, is defined by the interest that will have to be paid in each of the intermediate dates and previously agreed (quarterly or semiannually). (De Gregorio, 2007).

The investor expects a return on the capital invested in the bonds purchased and the yield depends on the interest rate that the instrument will pay.

The types of bonds according to the issuers are:

- Bonds of public issuers, these are offered by the state, country, territory, city, local government or their agencies and are tax free.
- Private issuer bonds are offered by private companies, independent government agencies.

Normally, public issuers have to pay lower returns to investors than private sector issuers. This is due to a better solvency and therefore a lower risk than public issuers compared to private issuers. (Ross, Westerfield and Jordan, 2014).

This research focuses on the GBs that are issued by Nacional Financiera (NAFIN), a Mexican government agency.

Green bonds

Green Bonus Concept

GBs are debt securities that are issued to generate capital in order to sustain environmental projects or related to climate change, this makes the difference between the bonds common to the GBs. In addition to evaluating the standard financial characteristics such as maturity, coupon, price and credit quality of the issuer, investors also value the specific environmental objective of the projects to be financed with the bonds (IBRD, 2015). There is no variation between standard bonds and GBs, for example: they have the same pricing use the same resource for the issuer, apply on equal terms. The only distinguishing feature is that the BV generates a positive result in the environment (Initiative Climate Bonds, 2016).

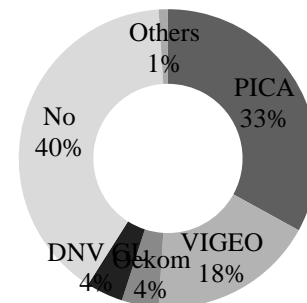
The main investors worldwide are in Europe, Japan and the American continent. In Europe, pension funds and insurance companies invested. In the United States, companies with an environmental focus. With the passage of time the diversification of investors has grown as a function of the increase in the amount of emissions. In addition, it can be observed that investors spread their purchase through the media to acquire adepts in the market as recognition for having an environmental awareness (greenwashing) (IBRD, 2015)

The issuers may be private companies, government enterprises or a hybrid or public-private entity (Econometria consultants, 2016), in addition to multilateral banks such as the African Development Bank (AfDB), the European Investment Bank (EIB), the International Bank for Reconstruction and Development (IBRD) and the International Finance Corporation (IFC), among others. Multilateral banks were the first to issue bonds for the financing of the GBs.

Issuers have developed their processes to allow GBs to adapt to their business profiles. Investors in turn expect to obtain the information needed to evaluate GBs. The market is governed by information provided by issuers, second opinions and academic comments, investment advisors, auditors, technical experts, the media and non-governmental organizations eg CICERO, Climate Bonds Initiative, DetNorskeVeritas, Norway (DNV) Oekom, Sustainalytics and Vigeo (IBRD, 2015).

These NGOs set criteria for evaluating green projects so that they are those financed with GBs and that investors are assured that their investment is serious and contributes to environmental protection.

Figure 1 shows the participation of NGOs in the evaluation of VHL, with CICERO standing out with 33%, followed by VIGEO with 18%. In a minimum percentage Oekom and DNV GL with 4%. 40% indicates that there is no revision of the projects to offer them.



Graphic 1 Percentage of review of second opinions on Green Bonus offers by NGOs

Source: *Climate Bonds Initiative (2015)*

The GBs were only initially generated by international organizations in 2007 and already in 2008 formally started the issuance of GBs in Europe (IBRD, 2015). It is possible to say that Mexico took its first step in 2015 (NAFIN, 2015).

Types of Green Bonds

Table 1 shows the classification of different types of GBs that Bloomberg New Energy Finance does.

Type	Definition
Corporate self-labeling	Bonds issued by corporations and explicitly labeled as green
ABS Green	Actively backed securities whose cash flows come from a portfolio of underlying receivables such as loans and leases. Accounts receivable are associated with green projects (eg renewable energy, energy efficiency, etc.).
Supranational / International	Bonds issued by supranational or international organizations such as multilateral banks, development banks and export credit agencies.
government	Bonds issued by national, regional or local governments to finance green projects. This includes, for example, US municipal bonds.
Project Bonds	Bonds backed by cash bonds from an underlying renewable energy project or project portfolio.

Table 1 Types of Green Bonds by Bloomberg New Energy Finance

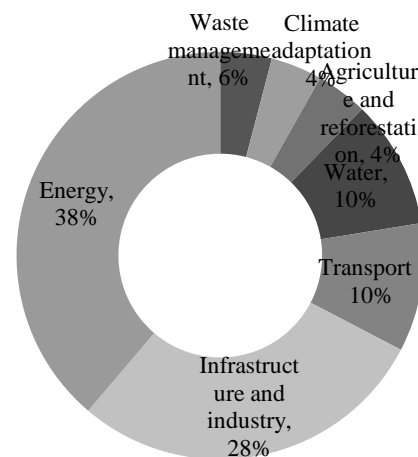
Source: *Bloomberg Finance L.P (2014)*

The role of GBs is to support projects for mitigation and adaptation of climate measures, some of which are mentioned below: (World Bank Group, 2013).

- Regeneration of power plants and transmission facilities to reduce greenhouse gases (GHG).
- Projects of solar and wind installations.
- Appropriation of new technologies to reduce GHG emissions.
- Energy efficiency in transport using fuel that reduces GHG.
- Waste management reducing the emission of polluting gases, as well as the construction of buildings and houses with energy efficiency.

- Reforestation projects that impact on the reduction of carbon emissions.
- Greater protection in food security by cultivating stress-resistant products, which would delay deforestation.
- Implementation of sustainable treatments of green areas.

Some of the examples of green projects are autonomous photovoltaic solar systems, which make use of alternative energy. Systems that make use of fossil fuel power in some countries already pay for this extra generation of energy with GBs that is discounted according to the current regulations in order to continue to finance projects that contribute to reduce the effects of climate change (Figuerola- Cuello, Pardo-García, and Díaz-Rodríguez, 2017). It is also possible to mention architectural constructions for multifamily housing designed with bioclimatic strategies: rainwater recycling, use of sunlight and natural ventilation (Castiblanco-Salcedo, 2017), which can be done in the same way with investment of GBs.



Graphic 2 Use of Green Bond funds worldwide

Source: *Climate Bonds Initiative (2015)*

Graphic 2 shows that funds obtained through GBs are used mainly in seven sectors: climate adaptation (4%); agriculture and reforestation (4%); waste management (6%); transport (10%); water (10%). The sectors that receive the largest amount of funds are industrial infrastructure with 28% (projects that focus on energy efficiency where investment is made in research and development for the replacement of machinery and equipment) and energy with 38% (energy sources for industry) (Climate Change Information Center, 2015).

Green Bonus Launch

The European Investment Bank (EIB) issued the first climate-oriented bonus in the form of a structured product in 2007 (IBRD, 2015).

The first green bond was issued in 2008 by the IBRD in partnership with Banco Scandinavia (SEB) for SEK 2,325 billion, which had a maturity of six years, with an annual amortizable interest rate of 3.4 %, more than Swedish government rates, with an annual yield of 3.15% (World Bank Group, 2013).

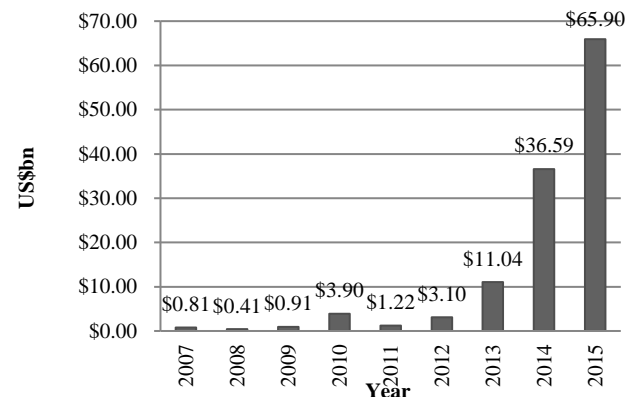
According to the World Bank (2007) for the issuance of the first BV, the following was considered (IBRD, 2015):

- It was a specific demand from the Scandinavian pension funds that had the objective of sustaining projects concerning the protection of the environment through a fixed income product. In coincidence with investors interested in investing in sustainable and responsible issues.
- Support was given to the IBRD's strategy of implementing innovation in the financing of climate change initiatives.

- With regard to the concentration of projects related to climate change, GBs helped raise awareness in the financial community about climate change.

International and national bond market

The world market has grown since 2007 that issued the first EIB bond channeled to environmental protection issues in the amount of US \$ 0.81bn to US \$ 65.90bn in 2015, as seen in Graphic 3. Global investment in the GBs market that has been realized from 2007 to 2015, simply in this last year represents 53.19% of its totality. From 2012 to 2014 has tripled growth. In 2015, almost doubled, but the trend of this market as shown in Graphic 3 continues to rise.



Graphic 3 Growth of the Green Bond market

Source: own elaboration with information obtained from Climate Bonds Initiative (2015)

The Paris Agreement, which entered into force on 4 November 2016, is transforming the world economy in order to mitigate the effects of climate change, seeking financial strategies to meet the objectives set by the 195 countries that signed it since December 2015 (Carlino, Netto, Cabrera and Serra, 2017).

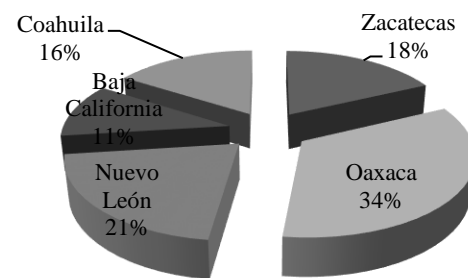
An essential feature of the Agreement is climate finance. The Division of Capital Markets and Financial Institutions (IFD / CMF) of the Inter-American Development Bank (IDB) in conjunction with the Latin American Association of Financial Institutions for Development (ALIDE) announces the National Development Banks (BND) opportunities and challenges in financing green projects that are presented today; BNDs can contribute to exploring the growing potential of the GBs market as they are global assets that drive a climate future in GHG reduction (Carlino, et al., 2017).

In Mexico, the BMV in 2015 outsourced a financing initiative with GBs in alliance with the Mexican Carbon Platform, MexiCO2. Also, NAFIN made a placement of GBs for 500 million dollars (Sanders, 2016).

On October 29, 2015, NAFIN issued the first BV in the amount of US \$ 500 billion with a five-year maturity and a yield of 3.41% per annum, which meant a spread of 190 bps on the five-year US Treasury bond and 56 bps on the bond denominated in dollars to the equivalent term issued by the Federal Government (UMS), a differential that became an increase in the demand of GBs for a value of 2,500 million dollars. More than 100 investors from Asia, Europe, the United States and Latin America participated. This BV is supported by Sustainalytics B. V. who evaluated the instrument for the alignment of BV Principles. This BV will finance nine wind farms in Oaxaca, Nuevo Leon and Baja California and is certified by Climate Standard (NAFIN, 2015).

By government provision the only institution to place GBs in the stock market in Mexico is the Bank of Mexico (BM). NAFIN requested the BM to issue GBs to finance several power generation projects. According to the IBRD (2015) for the development of green markets, it is necessary to create environmental policies and strategies in the public and private sector. As well as carrying out the feasibility analyzes in the execution of projects and how it can increase the profitability of the execution of the same ones. On the other hand, there are nongovernmental organizations (NGOs) that NAFIN as the first Latin American development bank to issue GBs, becomes a strategic bank for the fulfillment of environmental projects of the Federal Government in Mexico (NAFIN, 2015).

The balance of NAFIN's portfolio as of September 30, 2016 is US \$ 332.1 mm and is distributed in five states of the country with different participations, directly related to the amount of individual projects, as can be seen in Graphic 4 (NAFIN, 2016).



Graphic 4 Green Portfolio by Geographic Sector
US \$ 332.1mm

Source: NAFIN (2016)

On August 31, 2016, NAFIN issued a BV in 2,000 million pesos to seven years of performance with a coupon of 6.05%, which becomes the first coupon issued in Mexican pesos (NAFIN, 2016).

In December 2016, the government of Mexico City issued a BV in 1 billion pesos over a period of five years and was 2.5 times over defendant. With an interbank interest rate of 42 basis points. This bonus will finance about 15 projects in the Mexico City, such as the expansion of the metrobus, water collectors, pumping and storage plants. This release made the government of the cd. of Mexico as the first subnational and Latin American organism to issue this type of instrument. (Rodriguez, 2016). Carlino et al. (2017) mention that by November of this year, with the boost of the Agreement, Mexico is preparing a cap and trade pilot considering that by 2018 the national emissions trading market will be constituted.

Methodology

The approach of the problem arises in knowing what is the profitability that the investors would have to bet in Mexican GBs, of which the research question is derived how attractive are the GBs, considering their performance and performance against CETES?

The objective is to compare the performance and performance of the Mexican GBs listed on the Mexican Stock Exchange (BMV) with the Federation Treasury Certificates (CETES).

The proposed hypotheses are to identify the following:

H0: GBs are more attractive than CETES in Mexico.

H1: GBs are no more attractive than CETES in Mexico.

The research design is structured in three sections:

First, a comparison of predicted inflation versus the performance of GBs is performed. With data provided by INEGI (2016) from 2001 to 2016, a forecast is made to compare it with the annualized performance of GBs from 2015 to 2019. Forecasted inflation was calculated using the double exponential smoothing method, which corrects the error of the linear regression with which the behavior of inflation is initially calculated.

Second, we compare the performance of CETES over a five-year horizon versus the performance of GBs. With information obtained from INEGI (2016) and BM (2016).

It was decided to make a comparison of the Mexican GBs only with CETES because the two instruments are highly comparable because they have the same type of issuer (Mexican governmental institution) and therefore show similar risk profiles that attract similar types of investors. Consequently, the present study does not consider a comparison of GBs with other investment instruments of private issuers (stocks or corporate bonds, among others) because they represent very different alternatives.

Finally, the performance of the GBs is determined by comparing the results obtained from the annualized performance using the Sharpe ratio. The Sharpe ratio or Sharpe indicator is a value that relates the profitability of one instrument per unit of risk. It has an inversely proportional variation, that is, the greater the result, the lower the risk.

Results

In order to determine whether GBs are a more attractive investment than CETES, it is necessary to perform an analysis of the yields they offer in the same or similar terms.

CETES are instruments with fixed maturities at 28, 91, 182 and 365 days established by the Bank of Mexico and the GBs have been issued with five-year maturities. The demand of the latter, after its first issue, has raised the possibility of making new issues with longer terms, which reach even thirty years.

The Mexican government through the Bank of Mexico issues instruments that describe maturities ranging from 28 days to 30 years. The term is specified at the time of its acquisition, provided that it is established within the stated basic terms that can be multiples of 28, 91 or 182 days. Government securities denominated in local currency are typically considered risk-free by private investors as they are backed by government credit (Álvarez and Santaella, s.f.). Government instruments use the 28-day CETES reference rate as the interest rate.

For the comparative analysis of performance and performance of GBs, the behavior of CETES with annualized maturity has been selected, relating them to annual inflation in order to show a performance above this indicator.

Comparison of predicted inflation with the performance of Green Bonds

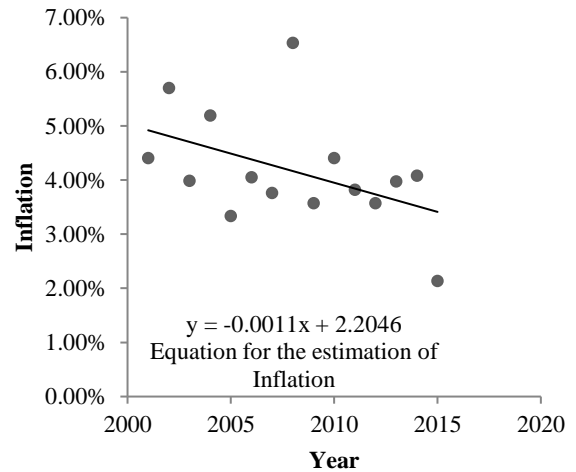
The first data reported are shown below:

Year	2001	2002	2003	2004	2005	2006	2007	2008
Real Inflation %	4.40 %	5.70 %	3.98 %	5.19 %	3.33 %	4.05 %	3.76 %	6.53 %
Year	2009	2010	2011	2012	2013	2014	2015	2016
Real Inflation %	3.57 %	4.40 %	3.82 %	3.57 %	3.97 %	4.08 %	2.13 %	3.36 %

Table 2 Annual inflation
Source: INEGI (2016)

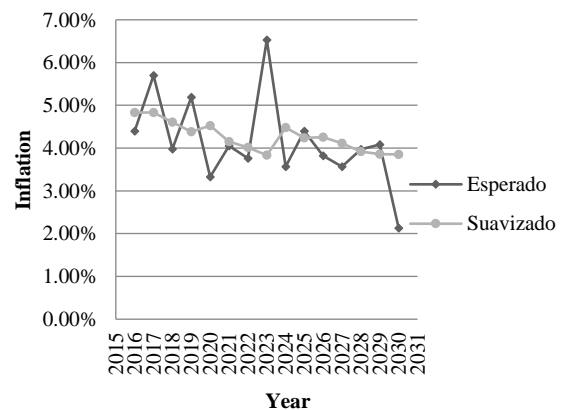
Table 2 shows the annual behavior of inflation during the period from 2001 to 2016. Inflation in previous years was very irregular and erratic, little useful for establishing trends.

The behavior can be seen in Graphic 5:



Graphic 5 Annual inflation
Source: own elaboration with data of INEGI (2016)

The linear equation that represents this trend is useful to establish a trend in the short term and would show a constant downward, reason why it was decided to use the method of double exponential smoothing, whose results are shown in Graphic 6:



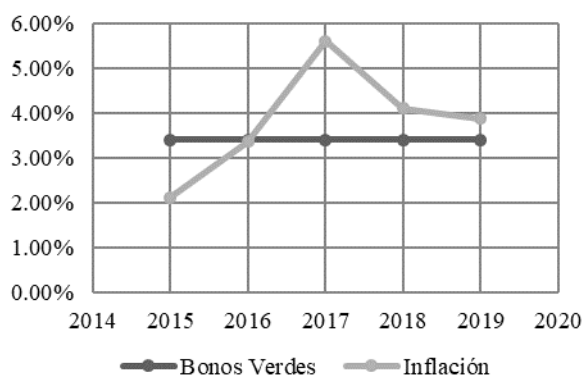
Graphic 6 Annual inflation
Source: own elaboration with data obtained from INEGI (2016)

Comparing both Graphics we can see that Graphic 6 shows in red color the expected inflation for the period 2016 to 2019 values more representative of a real behavior. The values in blue, would be the result of a simple smoothing. The tables of analysis of comparative behavior presented below have been adjusted to the validity of the instruments studied. The GBs were issued with a term of five years and the analyzes presented have been calculated for a period equal to the term of the bonds. The inflation considered to compare yields have been calculated for the same time span, Table 3.

Year	Green Bond	Inflation
2015	3.41%	2.13%
2016	3.41%	3.36%
2017	3.41%	5.60%
2018	3.41%	4.11%
2019	3.41%	3.88%

Table 3 Annualized Green Bond Performance Vs Inflation.

Source: own elaboration with data of INEGI (2016) and BM (2016)



Graphic 7 Comparative of the performance of Green Bonds Inflation Vs Inflation

Source: own elaboration with the data of Table 3

Graphic 7 represents the update of the relationship between GBs performance and inflation.

International pressures on the economy change the relationship between the two indicators, showing that after the second year the expected yields were no longer an additional attraction.

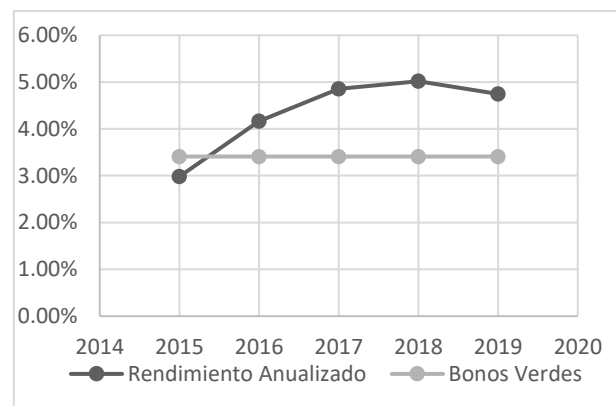
Comparison of CETES versus Green Bonds

Table 4 shows the performance of the GBs as constants, since in their emission a fixed rate of yield was established.

Year	Expected Inflation	Green Bonds	Performance
2015	2.983%	3.410%	
2016	4.166%	3.410%	2.178%
2017	6.08635%	3.410%	- 2.198%
2018	6.24781%	3.410%	- 2.805%
2019	5.97988%	3.410%	- 3.667%

Table 4 Annualized CETES Performance Vs Green Bonds

Source: own elaboration with data of INEGI (2017) and BM (2016)



Graphic 8 Comparison of the annualized performance of CETES Vs Green Bonds.

Source: own elaboration with the data of Table 4

To make comparisons of both yields, the reinvestment of CETES should be considered in order to equate the terms of the investment between the two instruments. It can be seen that, depending on the reinvestment, the acquisition of CETES, Graphic 8.

Performance Green Bonds

The consistency of this analysis is calculated using the Sharpe ratio, which shows the performance of debt instruments.

To calculate the performance the following mathematical expressions have been used:

$$PR_C = R_C - R_F \quad (1)$$

Where:

- PR_C = Portfolio risk premium.
- R_C = Profitability of the portfolio at the time of its offer in the primary market.
- R_F = Risk-free return = weighted rate.

The following expression is the most widely used performance of debt instruments and is known as Sharpe's (2010) ratio, where σ_C is the standard deviation of portfolio performance and S_C 's performance¹.

$$S_C = \frac{R_C - R_f}{\sigma_C} = \frac{PR_C}{\sigma_C} \quad (2)$$

The Sharpe ratio, as already mentioned, is an indicator that provides us with information on the profitability of debt instruments per unit of risk.

Conclusions and final reflections

The present article had the following research objective: To compare the performance and performance of Mexican GBs listed on the BMV with CETES.

For this reason three types of analysis were made. First, a comparison of the predicted inflation versus the performance of GBs was made. Second, we compared the performance of CETES over a five-year horizon versus the performance of GBs. And finally, the performance of the GBs was determined by comparing the results obtained from the annualized performance using the Sharpe ratio.

Solving the hypothesis of this research work, we understand that GBs are not more attractive to investors than CETES over a five-year horizon. The financial attractiveness of the GBs in Mexico is that the profits they generate are deductible for investors; that is, the buyer has an additional profit when deducting taxes from what he gets. The sustainable attractiveness of investment in GBs is based on the funding of green projects.

As well as developed in this article the green market is in development phase. So increasing the diversity of investors, with high probability would increase the variety of bonds that are offered; bonds with different issuers that have a greater risk, but with higher yields, bonds in currencies of different countries and bonds related to green projects. The greater the variety, the greater the possibilities of GBs that would increase private capital raising to support investments for climate change projects.

References

Álvarez, C. y Santaella, J. (s.f.). Instrumentos libres de riesgo. Recuperado el 03 de marzo de 2017 de http://www.banxico.org.mx/elib/mercado-valores-gub/OEBPS/Text/i.html#_ftnref5

¹It is convenient to clarify that performance and performance are usually interpreted as yields. The difference is the correction applied when considering the standard deviation.

BIRF, Banco Internacional de Reconstrucción y Fomento. ¿Qué son los bonos verdes?. Recuperado el 10 de abril de 2016 de <http://treasury.worldbank.org/greenbonds>.

Bloomberg Finance L.P. (2014). Green Bonds Market outlook 2014. *Bloomberg New Energy Finance*.

BM, Banco de México. (s.f). Recuperado el 09 de noviembre de 2016 de <http://www.banxico.org.mx/sistema-financiero/material-educativo/basico/preguntas-frecuentes-del-sist.html>.

Carlino, H., Netto, M., Cabrera, M. M. y Serra, L. (2017). El papel central del financiamiento en el Acuerdo de París y las oportunidades para los bancos de desarrollo. Recuperado el 29 de agosto de 2017 de Banco Interamericano de Desarrollo:

<https://publications.iadb.org/bitstream/handle/11319/8143/El-papel-central-del-financiamiento-en-el-Acuerdo-de-Paris-y-las-oportunidades-para-los-bancos-nacionales-de-desarrollo.pdf?sequence=1&isAllowed=y>

Castiblanco-Salcedo, S. (2017). Habitat XXI [Vivienda + Comercio]. *Universidad Católica de Colombia*, pp. 1-35.

Climate Bonds Initiative. (2015). Recuperado el 07 de noviembre de 2016 de <https://www.climatebonds.net/>.

De Gregorio, José. (2007). *Macroeconomía. Teoría y Política*. México: Pearson.

Econometría consultores. (2016) *Climate & Development Knowledge Network*. Recuperado el 04 de mayo de 2016 de <http://www.finanzasdelclima.co/Presentaciones/bonos-verdes-como-mecanismo-de-financiamiento-climatico.pdf>.

Figuroa-Cuello, A., Pardo-García, A. y Díaz-Rodríguez, J. (2017). Sistema control supervisor de clientes con acceso remoto para sistemas solares. *Rev. Investig. Desarro. Innov*, Vol 7(2), pp. 367-378.

Garay Barahona, Luz Estrella, e Ivonne Patricia Ticas Avalos. (2013). *Finanzas verdes: una alternativa de financiamiento para proyectos de inversión pública*. San Salvador.

García, V. (2014) *Introducción a las finanzas*. México: Patria.

Grupo del Banco Mundial (2013). Recuperado el 05 de mayo de 2016 de <http://go.worldbank.org/SCBP56FCV0>.

INEGI, Instituto Nacional de Estadística y Geografía. Índices de precios. (2016) Recuperado el 9 de diciembre de 2016 de <http://www.inegi.org.mx/sistemas/indiceprecios/Estructura.aspx?idEstructura=112000200040&T=%C3%8Dndices%20de%20Precios%20al%20Consumidor&ST=Inflaci%C3%B3n>.

Initiative Climate Bonds. (2016). Recuperado el 04 de mayo de 2016 de <https://www.climatebonds.net/market/explainin-g-green-bonds>.

NAFIN, Nacional Financiera. (2015). Recuperado el 04 de mayo de 2016 de http://www.nafin.com/portalnf/content/sobre-nafinsa/sala-de-prensa/boletin_043_015.html

NAFIN, Nacional Financiera. (2016). *Nafin's annual green bond report*. Recuperado el 04 de Enero de 2017 de <http://www.nafin.com/portalnf/files/pdf/2016/pi-sofinanciero/Green%20Bond%20Report%20nov%202016.pdf>

Ross, S., Westerfield, W. y Jordan, B. (2014). *Fundamentos de Finanzas Corporativas*. Mc Graw Hill Interamericana

Sanders, Nadia. (2016). Recuperado el 05 de mayo de 2016 de <http://www.marcomares.com.mx/lanza-bmv-iniciativa-de-financiamiento-con-bonos-verdes/>.

Sharpe Source, William F. (2010) The CAPM is alive and well: a review and synthesis. *European Financial Management* Vol 16 (1), pp. 43-71.

Van Horne, J. , y J. Wachowicz. (2012). *Fundamentos de administración financiera*. Prentice Hall.

Indicators of quality in the service in the private health enterprise

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Abstract

The present research work was based on the need to identify indicators adjacent to the quality of services provided in private hospitals, one of the main objectives of the research was to establish the indicators that determine the operation of service providers in a methodological approach was used in a mixed study with a descriptive approach that provided both qualitative and quantitative data, the unit of analysis investigated was the nursing hospital of a private hospital, the sample of 100 frequencies or users of the service was determined of nursing over a population of 1000 using market study software whose sampling error was 1.89%. Among the relevant findings of the investigation it was possible to determine that the empathy, the speed in the service and the knowledge and skills of the service providers are the indicators that identify the users and therefore satisfy their needs

Indicators, Quality and Service

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Introduction

For years quality has been present in our lives, the concept of quality emerged as a way to improve the manufacturing conditions and the search for a standardization of a process in order to generate products and / or services containing a series of characteristics according to the demands of an increasingly changing society. Over time, the concept has transcended and varied according to disciplinary areas, for example, it is stressed that quality is indispensable for organizations and that they are competitive in a given market.

Falconi (2004) conceptualizes quality as the management of routine, with man as the center of the process to obtain a cultural change. Crosby (2005, p.23) says that "quality is measured by the cost of quality, which is the expense occasioned by failure to meet the requirements"; Achieving quality depends on top management and where members of the organization understand a philosophy to fulfill the purposes.

It is estimated that this word "quality" is conceived as a focus on the subject of administration as noted above, however, after observing the definitions in this conceptualization, theorists exhort customer satisfaction throughout the word and cover technological aspects, costs, management styles and organizational philosophies, in order to achieve this goal is called quality, for it is used as a methodology to overcome the absence of it.

Consequently, in the hospital services approach, the quality in them becomes more and more important, since the users distinguish, through hospital processes and procedures, the quality and service granted, their satisfaction depends then on their perception as a result of cognitive processes during their stay in them.

The research expresses an assumption that allows to consider the variable of quality in the service, then, it is assumed that indicators of empathy, speed and knowledge and skills that focused on a coherent administrative model offer satisfaction to the customer or user of the service of nursing in the hospital and / or private company.

In this sense, a theoretical reference is presented that supports the research base, also presents the objective of the investigation and finally the results and conclusions about the same activity.

Interrogation and research objective

Once the research idea, the theoretical framework, methodology and collection techniques were conceived, the following research question was proposed: What are the indicators that the clients identify to obtain quality in the service?

As a result, the following objectives were determined: Identify the indicators to obtain quality in the service.

Conceptualization

Luft and Hunt (as cited in Jiménez 2004) define quality as "the degree to which health care processes increase the likelihood that the quality of care will be improved, of desired outcomes by patients and reduces the likelihood of unwanted outcomes, according to the state of medical knowledge. "

Parasuraman et al. (1985) suggested five dimensions: tangible, external factors such as physical ease, equipment and the appearance of employees; reliability, the promise fulfillment factor to the patient; the capacity of response, the attitude of the medical workers who care and provide an immediate service to the patient; the patient's confidence in the capacity, qualification and attitude of the employees; and finally, the empathy, attentions and considerations for each patient.

In terms of quality as a service offered by an organization and / or economic entity, it has been previously established as a group of factors that tends to have a significant effect on the satisfaction and retention of clients and users (Taylor and Baker, 1994, Spreng and Mackoy, 1996 and Zeithaml et al., 1996).

Therefore, the quality of the service is a set of objectives that are achieved by satisfying customers who, in turn, will recommend to the company or organization, thanks to the level of familiarity that exists between the user and the next, what will which increases the reputation of an organization (Tschohl, 2006, p.23).

Consequently, in order to provide service quality, regardless of the business direction, it is necessary to follow a guide established with regulations emanating from the business philosophy, as well as the governmental regulations and decentralized associations of accreditation and / or certification of processes and procedures.

Theoretical Framework

Quality has been defined in several ways as value (Abbott, 1955, Feigenbaum, 1951), compliance with specifications (Gilmore, 1974; Levitt, 1972), conformity with required requirements (Crosby, 1979) for the use of the product (Juran, 1974, 1988), the search for not lost by the customer (Taguchi, cited in Ross 1989), and the knowledge and / or surpassing of customer expectations (Grōroroos, 1983; Parasuraman, Zeithaml and Berry, 1985).

Deming (2003) (as quoted in Cheng, Li and Luo, 2014) considered that "quality can only be defined by the degree of customer satisfaction and quality is multidimensional, so the quality of any product or service can not defined by a single characteristic".

As for the service, "this is the production of a satisfactory shopping experience" (Geneva and Arana, 1999, p.19). Therefore, the buyer becomes a customer of the service and quality with the experience, the same happens in the private hospital services, in this way the perception plays a fundamental role in the acquisition of the product or service since it is generated by the operation and marketing of the company or organization.

Therefore in the pursuit of an exceptional service, the energy and strength that every economic entity needs to maintain itself in levels of productivity is the service, Tschohl (2001).

In order to offer data about the organization per se, it is necessary to detect the administrative theories on which the research is based. In this sense, it is argued that, because an investigation is applied to an economic entity, one of the relevant theories is organization theory , what is the Theory of Organization?

In particular Hodge, Anthony and Wales (2001, p.17) subscribe that "theory is the explanation of a phenomenon, being constituted by principles that affirm the relations observed in relation to the phenomenon".

Organization Theory is a set of concepts, principles and hypotheses that tries to explain the interaction between the different organizational components, from this develops the descriptive theory which intends to specify the nature of the relations between the subsystems of the organization and the prescriptive or normative theory suggests to managers what they should do in the company in terms of efficiency, benefits, job satisfaction, among others, Hodge, Anthony and Wales (2001, p.17).

The Theory of Organization and Theory of Administration are concepts closely related since the manager of a company so that it can be effective must understand the organization, consequently the theory of the organization serves as a basis for the proper administration of it.

At the same time, within this great theory, it is of significance to focus on a systems approach that by its edges are within the object of study in the present investigation.

The theory or approach of systems is a basic theory in the physical sciences. This theory distinguishes open and closed systems, we mean by closed systems those that are self-preserving and do not receive energy or external resources, that is, do not need interaction with the environment, one of the most relevant advances in the studies of organizations is that these they are not and can not be closed systems as they depend on the environment, instead open systems can by importing energy in the form of physical, human and financial resources to avoid entropy or attrition and in this way go ahead for profit or not, as the case may be, Münch (2007, p. 86) and Hodge, Anthony and Wales (2001, p.14).

Brief introduction of the scenario studied

The place of intervention was a company of the turn of hospital services and that the investigation omitted the name or company name by decision of the organization.

This organization is classified as a medium-sized company since it has approximately 86 workers in the different departments listed below:

Administrative offices, which include the following areas: management, accounting, human resources, credit and collection, laboratory, pharmacy, shopping, public relations, IT services, reception, maintenance, general services, laundry and cafeteria.

The foundation of the Hospital was made possible by the joint effort of a group of medical partners of the project and a group of entrepreneurs who, without more interest than the benefit of the community, accepted to be partners of this hospital unit; being officially founded in 1987.

Methodology

For the investigation a methodology was determined that was pertinent with the variable investigated, as well as the characteristics of the unit of analysis where it was intervened, for which a mixed study with a descriptive approach was used.

In this sense, the viability of this approach or study is that they represent a set of systematic, empirical and critical research processes and involve the collection and analysis of quantitative and qualitative data.

In turn, they are a methodological combination of quantitative and qualitative methods, where instruments of interpretive data collection are combined.

In addition, the technique of non-participatory observation was used. The unit of analysis involved was the nursing department, which is conformed as follows, "see figure 6.1".

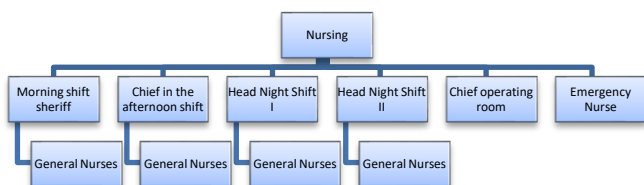


Figure 1 Nursing department

Construction of research indicators

The construction of the indicators of the quality variable in the service was based on the non-participant observation and access to the specialized literature, which well supports this research article.

Based on the above, it is argued that the indicators to offer the rejection or acceptance of the hypothesis are empathy, knowledge and skills, speed and satisfaction that are specified below in figure 6.2.



Figure 2 Indicators of the quality variable in the service

Instrument applied to research

In scientific research there are many methodologies and tools for obtaining data and information, in the present research was used the questionnaire type survey with a Likert technique.

Therefore, a questionnaire was created in which an attitude or opinion was measured where a continuum of values was formed in relation to positive or negative opinion, as well as an intermediate point.

This questionnaire was created based on the SERVQUAL model whose objective is to understand how customers or users of a service perceive the quality of a service (Punnakitikashem, Buavaraporn, Maluesri and Leelartapin, 2012). That is why this survey had 22 items, 18 that offered answers to the four dimensions of the quality variable in the service and four more items of information of the customer or user of the service, "see table 6.1".

Speed	Empathy	Knowledge and skills	Satisfaction
Ítems 1-3	Ítems 4-7	Ítems 8-11	Ítems 12-14

Table 1 Items developed in survey

Based on these items, a Cronbach alpha coefficient of 0.8112 was obtained.

In this sense, it was necessary to point out that for the collection of data the following requirements of the users of the nursing service were needed:

- To be a user of the private hospital service.
- Have been attended by the nursing staff in their different areas, hospital, emergency room and operating room.
- Have completed treatment and / or assistance within the private hospital.

Population and sample

For purposes of statistical research it is important to emphasize the concepts of population and sample, then we have that population is a set of individuals or objects of interest or measures that is obtained from all individuals or objects of interest (Lind, Marchal and Wathen, 2012, page 7).

As for the sample, it is "a subgroup of the universe or population from which the data are collected and which must be representative of it" Hernández et al. (2014, p. 173).

In this sense, the survey that was applied to the users of the hospital service according to the nursing department specifically, was a probabilistic sample because the visiting population of the hospital had the same possibility of being elected, that is to say, it was a sample to convenience that allowed to describe indicators of the service received.

Once the required information from the surveys was obtained from the population samples, the integration of the collected data was used within the Dyane version 4.0 system which is a software for applied research.

The Dyane version 4.0 program is designed to facilitate research techniques through its practical application, this software performs this process by grouping a set of tasks that show below:

1. Design of the research with the definition of the study variables.
2. Capture, record, edit and process data.
3. Analysis of data using uni or multivariate statistical techniques. (Santesmases, 2009, p.29).

Proportions	They have the attribute p= 0.99 They do not have the attribute q= 0.01
Confidence interval	95.50%
Finite population	Population size= 1000
	Sampling error (%)= 1.89
	Sample size= 100

Table 2 Sampling error and sample size

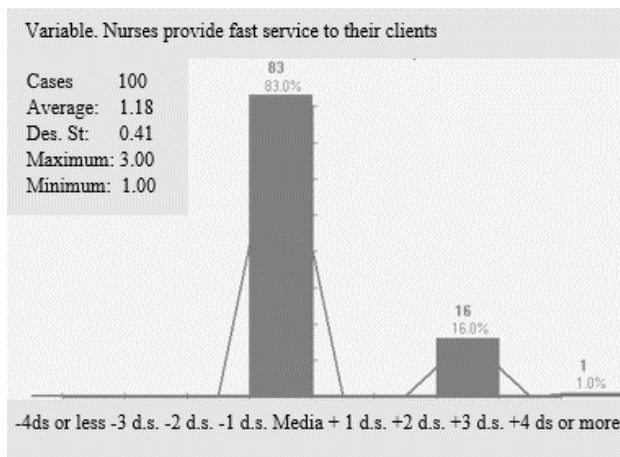
It is detailed that of a population of 1000 that determines 100%, the probabilistic sample of this instrument is 100 which means that 100 people were interviewed in which the sampling error was of 1.89%.

In addition, the statistical techniques that support the study in its quantitative base were basic statistics, arithmetic mean, maximum and minimum ranges, standard deviation and simple tabulation.

Results

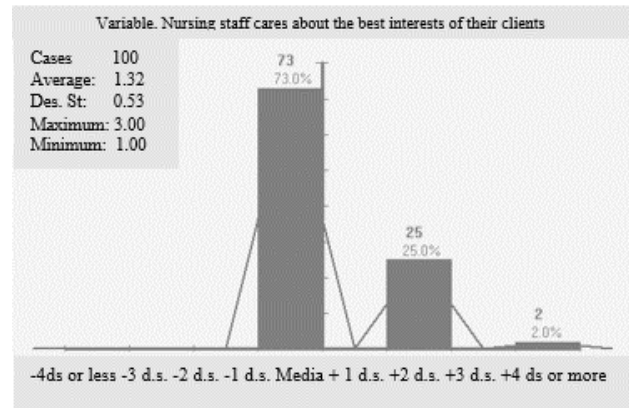
The data collection was based on a questionnaire survey with a Likert technique in which it showed possible responses from a totally agree to a totally disagree, being broken down as follows in the following codes, code 1: totally agree, code 2: agree, code 3: neither agree nor disagree, code 4: disagree and code 5: strongly disagree; which allowed access to a quantification of the data and to be able to describe them in this way as well as qualitatively.

Consequently, the frequency histograms or polygons of some survey relevance items are then.



Graphic 1 Fast service to customers

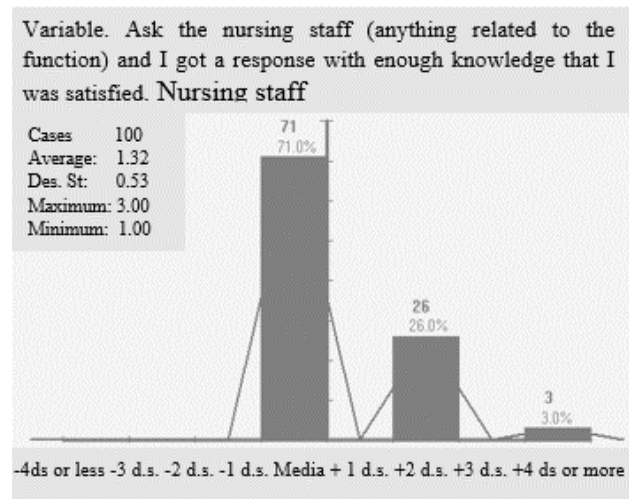
Graph 1 reveals a standard deviation of 0.41 and an arithmetic mean of 1.18, which means that 83% considered it to be in complete agreement that the service is fast, 16% was shown only according to item and only 1% I do not agree or disagree.



Graphic 2 Concern of nurses by their clients

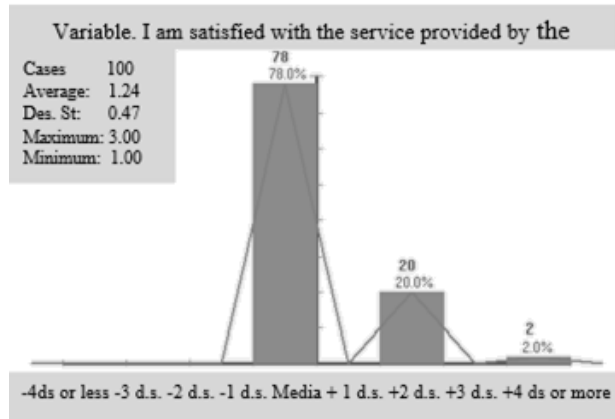
Graph 2 demonstrates a standard deviation of 0.50 and an arithmetic mean of 1.29, this also called frequency polygon teaches that the answers on the item are to the right and this means that there is a majority agreement towards the affirmation and null percentages on the denial.

In other words, 73% of the respondents had a "total agreement", 25% answered the "agreed" answer and only 2% did not agree or disagree.



Graphic 3 Responses with sufficient knowledge on the part of the nursing staff

Graph 3 shows a standard deviation of 0.53 and an arithmetic mean of 1.32, so that 71% held a "totally agree" about obtaining a satisfactory response from the nursing staff, 26% said they were "Agree" with the statement or item, only 3% remained undecided and marked "neither agree nor disagree".



Graphic 4 Customer satisfaction for the service rendered

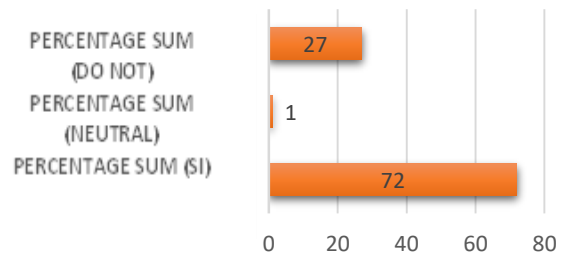
Graph 4 shows a standard deviation of 0.47 and an arithmetic mean of 1.24, therefore, 78% of the respondents and respondents maintained a "totally agree" to the item that says "I am satisfied with service provided by the nursing staff, "while 20% maintained a concordance by" agreeing ", in this sense only 2% remained neutral when choosing" neither agree nor disagree ", while codes 4 and 5 were not answered by respondents.

When looking at the previous graphs, on the survey used, the task was to conglomerate the results to offer a response to the objective, in this sense, an arbitrary and determined value was assigned.

After these values were assigned to conglomerate the items and define if the indicators established in the beginning are those that identify the client for their satisfaction after having received care by the nursing staff, then we have the following:

To identify the indicator of speed, the following graph of the totals of items 1 to 3 of the survey was obtained.

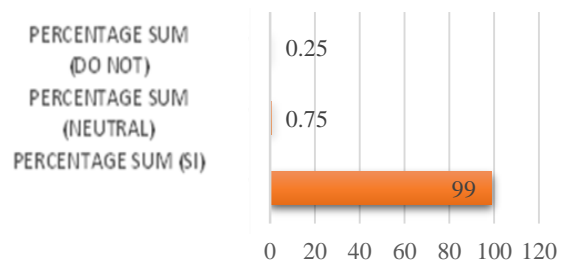
Speed



Graphic 5 Speed indicator

Graph 5 shows that nurses offer a fast service to their users with 72%, 27% indicate that they do not offer it and only 1% remained in their neutral response. Consequently, the following graph shows the indicator of empathy.

Empathy

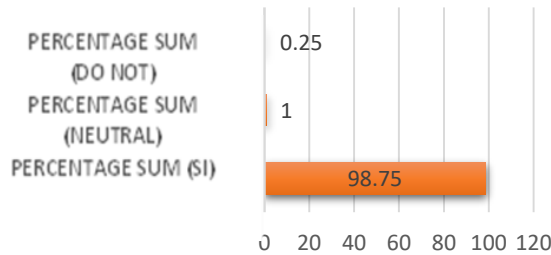


Graphic 6 Empathy Indicator

Graph 6 shows that 99% of the respondents indicated that the nursing staff attends to their users with empathy, that is, they have an affective participation with the reality of the users and the current situation that afflicts them as a disease, a wound or a medical procedure, in turn 0.25% of users stressed that they do not attend them with empathy and only 0.75% was maintained with a neutral response.

Therefore, the graph of knowledge and skills is also shown below.

Knowledge and skills

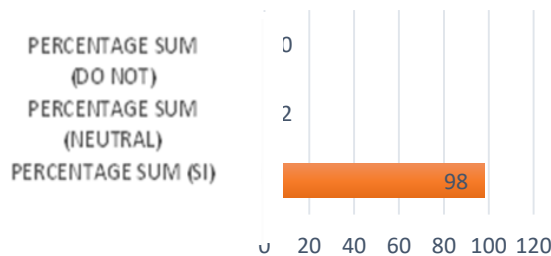


Graph 7 Indicator of knowledge and skills

Graph 7 reveals that nursing staff brings together knowledge and skills in 98.75%, according to users, to provide quality service, only 0.25% said they did not meet them and only 1% stayed with their response neutral.

Finally, the following graph reveals the degree of satisfaction of users of the nursing service of a private company.

Satisfaction

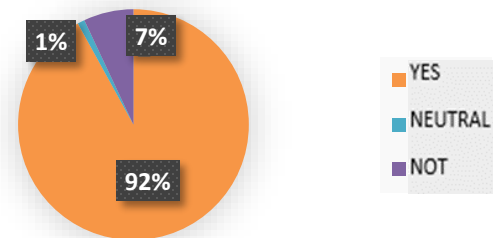


Graph 8 Satisfaction indicator

Graph 8 reveals that 98% of the users of the nursing service claimed to be satisfied with the service received from nurses during their stay in the emergency room, operating room and hospital, only 2% stayed with their response neutral and it should be noted that no frequency or respondent (a) was not satisfied.

In short, once the overall percentages were obtained on the items of the survey, the following data were obtained from the indicators, which allowed us to answer the question about the subject and the objective previously described in this article.

Quality in the service



Graph 9 Total quality of service results

Then graph 9 reveals that 92% of the service users indicate that if there is quality in the service offered by the nursing department and its staff, 7% said that there is no quality in the service and only 1% was not neither agree nor disagree with the item.

Conclusions

Once concluded the global interpretation on the four indicators of quality in the service, it is concluded that:

1.- It answers the specific question of the variable quality in the service that says What are the indicators that the customers identify to obtain quality in the service? And to the research objective, since the four indicators of this variable are those that the users of the service identify as factors to generate quality, these are speed, empathy, knowledge and skills and satisfaction with 92%.

2.- The hypothesis or assumption is accepted once the indicators and the percentages of each of them have been identified, which offers a user satisfaction over the nursing service.

3. Even if the indicator of speed is generous in percentage, it is prudent to review the company's administrative protocols and provide information to the nursing staff for their adequacy.

4.- Specifically this private hospital services company is characterized by being an open system since the interaction with the nursing service is free, once channeled to the corresponding area (hospitalization, emergency and / or operating room). Hence it pays to the theory of the organization and in particular to the systems approach.

5.- Regarding the non-participatory observation, it is concluded that the service user, regardless of his / her health status, receives an attentive attention to the protocols of the nursing and, therefore, identify the indicators described previously.

6.- It is suggested to the company to consider new investigations and to be able to recognize other type of indicators in the service; in turn formalize the department of quality of the same one that allows to professionalize the service to the user and to stop doing it empirically.

References

Arias, G. F. (2001). *Introducción a la metodología de la investigación en ciencias de la administración y del comportamiento* (Sexta ed.). Trillas.

Cheng, H., Li, D., & Luo, L. (15 de Mayo de 2014). The Chinese perception of quality: model building and analysis based on consumers' perception. *Journal of Chinese Management*, *III*(1). doi:10.1186/s40527-014-0003-7

Falconi, C. V. (2004). *Gestión de la rutina del trabajo* (Octava ed.). Sao Paulo, Brasil: INDG Tecnología y Servicios Ltda.

Hernández, S. R., Fernández, C. C., & Baptista, L. P. (2014). *Metodología de la investigación*. MacGraw-Hill.

Hodge, B. J., Anthony, W. P., & Gales, L. (2001). *Teoría de la organización: Un enfoque estratégico* (Quinta ed.). Madrid, España: Pearson.

Jiménez, P. R. (2004). Indicadores de calidad y eficiencia de los servicios hospitalarios. Una mirada actual. *Revista Cubana de Salud Pública*, *30*(1), 17-36. Obtenido de <http://www.redalyc.org/articulo.oa?id=21430104>

Lee, D., & Kim, K. (25 de Enero de 2017). Assessing healthcare service quality: a comparative study of patient treatment types. *International Journal of Quality Innovation*. doi:10.1186/s40887-016-0010-5

Lind, D. A., Marchal, W. G., & Wathen, S. A. (2012). *Estadística aplicada a los negocios y la economía* (Decimoquinta ed.). Distrito Federal, México: MacGraw-Hill.

Münch, G. L. (2007). *Administración: Escuelas, proceso administrativo, áreas funcionales y desarrollo emprendedor* (Primera ed.). Naucalpan de Juárez, Edo. de México, México: Pearson Educación. Recuperado el 13 de Abril de 2016

Münch, L., & Ángeles, E. (2009). *Métodos y técnicas de investigación*. Distrito Federal: Trillas.

Punnakitikashem, P., Buavaraporn, N., Maluesri, P., & Leelartapin, K. (2012). Health Care Service Quality: Case Example of a Hospital with Lean Implementation. *POMS 23rd Annual Conference, Chicago, Illinois, U.S.A.* Obtenido de <https://www.pomsmeetings.org/confpapers/025/025-1232.pdf>

Robbins, S. P., & DeCenzo, D. A. (2009). *Fundamentos de administración: Conceptos esenciales y aplicaciones*. México: Pearson.

Rojas, S. R. (1990). *El proceso de la investigación científica* (Cuarta ed.). Trillas.

Santesmases, M. M. (2009). *DYANE versión 4. Diseño y análisis de encuestas en investigación social y de mercados*. Madrid, España: Pirámide.

Tschohl, J. (2001). *Servicio al cliente: El arma secreta de la empresa que alcanza la excelencia* (Cuarta ed.). Pax México.

Vera, J., & Trujillo, A. (Septiembre de 2016). El efecto de la calidad del servicio en la satisfacción del derechohabiente en instituciones públicas de salud en México. *Contaduría y Administración*, 21.
doi:<http://dx.doi.org/10.1016/j.cya.2016.07.003>

The digital economy and the value of the virtual in the labor market of Mexico

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Abstract

The objective of this article is to analyze the ecosystem in which the digital economy is developed to recognize the general aspects that make the value of the virtual in the labor market in Mexico a reality, besides answering the question ¿The digital economy is a model that generates value to the labor market of Mexico ?, which will allow to analyze and verify the effects of technological change in the labor market and their relationship. The hypothetical approach is that Internet connectivity is the essential value that makes the difference between the traditional economy and the digital economy; followed by the institutional value that promotes the connection to the Internet for purposes of interlocation between the economy and the organization or users. The research uses a qualitative methodology of descriptive and explanatory type, developing the theoretical analysis that allowed documenting the impact of technological change in the labor market reaching to demonstrate that ICT changed the work patterns and characteristics of the labor market, from a digital ecosystem based on technological platforms and institutional platforms with social and economic impact. Analysis of the results reveals that the digital economy has no limits; By virtue of the ubiquity characteristic of ICTs, however, we also observe some factors of "immaterial labor", which determine the limits of the traditional labor market, leading to rethinking the term of work.

Digital economy, Connectivity strategy, ICT, Labor market, Immaterial work

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Introduction

It starts from the idea of recognizing that the digital economy is also called economy of the internet and that in its main characteristic is the incorporation to the internet of the techniques of production and satisfaction of needs. The digital economy is divided into several sectors: 1. digital goods and services, 2. mixed digital goods and services, and 3. ICT-intensive goods and services.

For the OECD (2016: 4-5), "the digital economy shows how countries and partner economies leverage Information and Communication Technologies and the Internet to meet the goals of their public policies"; through comparative data, provides policymakers with information about regulatory practices and policy options in order to maximize the potential of the digital economy as an engine of innovation and inclusive growth.

So too, ECLAC. (2013) recognizes that the digital economy is a crucial force in driving structural change, advancing the reduction of inequality and strengthening the social inclusion so much needed by the countries of the region. In this sense, the digital economy offers an opportunity to promote innovation and inclusive growth, but it poses some challenges, such as increasing confidence in it, which is a permanent value of prime importance that must be preserved and promoted.

From this framework, ECLAC (2013: 9) considers that "the digital economy is made up of telecommunications infrastructure, ICT industries (software, hardware and ICT services) and the network of economic and social activities facilitated by the Internet, cloud computing and mobile, social and remote sensor networks."

As described, the digital economy facilitates the processes of buying and selling, in an ecosystem that is supported in both technological platforms and institutional platforms.

A partir de este marco, la CEPAL (2013: 9) considera que "la economía digital está compuesta por infraestructura de telecomunicaciones, industrias TIC (software, hardware y servicios TIC) y la red de actividades económicas y sociales facilitada por Internet, cloud computing y mobile, redes de sensores sociales y remotos ". Como se describe, la economía digital facilita los procesos de compra y venta, en un ecosistema que se apoya tanto en plataformas tecnológicas como en plataformas institucionales.

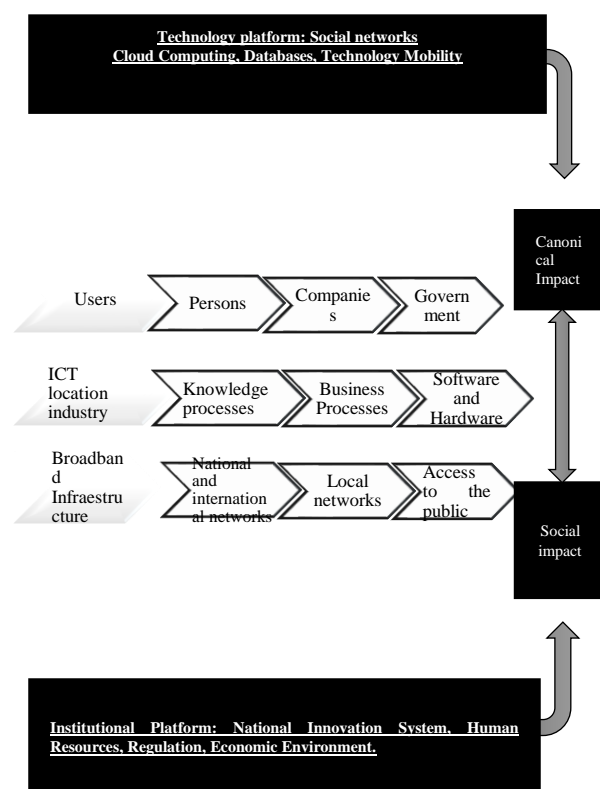


Figure 1 Ecosystem of the digital economy

Source: Own elaboration with information from Sabbagh et. To the. (2012)

As can be seen, the development and deployment of the digital economy takes place in an ecosystem characterized by the increasing and accelerated convergence between different ICTs, which is concretized in communication networks (networks and services, fixed-mobile networks), hardware (3G and 4G multimedia mobiles), processing services (cloud computing) and web technologies (Web 2.0).

In this sense, it is interesting to carry out an analysis that prevails the connectivity as a benefit of the use of ICT in the labor activities. Therefore, to make use of the benefits of digitalization in the economy, connectivity components are necessary, since ICTs in the economy are the digital future that offers the necessary conditions to build both the economy in general and the market digital labor that are driven by the growth of digital commerce.

Thus, as the digital economy and the labor market develop, from intangible resources, in the exploitation of ideas rather than material things, to give way to e-commerce, online services and without a doubt, the labor market with digital perspective.

In this sense, the objective is to analyze the ecosystem under which the digital economy is developed to recognize the general aspects that make visible the value of the virtual in the labor market of Mexico, in addition to answering the question ¿The digital economy is a model that generates value to the labor market of Mexico ?, which promotes the analysis of the impact of technological change in the labor market and its relation with the digital economy.

The hypothetical approach of which it is part is that the connectivity in Internet, is the essential value that makes the difference between the traditional economy and the digital economy; followed by the institutional value that promotes the connection to the Internet for purposes of interlocution between the economy and the organization or users, which is why the digital ecosystem starts from institutional proposals based on technological proposals.

Derived from these methodological components, the specific objectives are to identify the impact of technological change in the labor market to verify the relationship between the use of ICTs with the digital economy and the labor market, as well as to distinguish the central technological factors that give value to the new labor structures in Mexico.

Problems linking the digital economy to the labor market

Observing the digital reality that is lived in the jobs is contrasted with theoretical aspects expressed from the arguments of Expósito (2017), documenting that information and communication technologies in Mexico and their relationship with the digital economy and the market. In addition, it is evident that the specific job positions are linked to digital profiles and that there is an increase in the extinction of trades in which there is no use of ICT, with low added value and low wages for objectives. These are some of the facts that are observed in the process of development with the digital transformation, facts that hide another reality adhered: the loss of trades or labor activities, at the hands of the use of ICT and artificial intelligence.

Another important reference documenting perceived reality is a joint study by Citibank and Oxford University, pointing out that at the international level, 35% of jobs are in danger of being replaced by machines in the United Kingdom, a percentage that rises to 47% in the United States, 57% in all OECD countries and 77% in China. In this group of countries, Expósito (2017) mentions that in the next ten years, jobs will be lost with technology, in which some cases such as operators, supermarket cashiers, documentalists, dispatchers, administrators. This problem is related to the performance of the government, since it is presumed that they are not working at the same speed that emerges, develops and applies ICT.

Another negative aspect that affects both the digital economy and the labor market is analyzed by Gonzales (2016), who says that digitization in the labor market represents "the greatest threat" for all the population that lacks Internet access and of the world's population (57%), equivalent to 4 billion people, has no access to the Internet, and three-quarters of them are concentrated in 20 nations, according to the Global Commission on Governance on the Internet (GCIG).

In another vein, Tabares (2016) mentions aspects related to the digital economy and the labor market, mentions that service intermediation platforms that establish filters and a system of recommendations as insurers of service quality, as well as their adequacy to the needs of the end user, do not promote any kind of social benefit or coverage to the thousands of users who perform their work activities in this digital platform. However, they promote labor flexibility and equal opportunity but not social protection.

For his part, Lagunés (2016) points out that the digital economy is becoming a priority for governments around the world; as the Internet and other ICTs are changing the way information is exchanged and products and services are offered.

Despite this adverse scenario in the digital economy, the growth and potential of the digital economy in the labor market must not be overlooked and, without a doubt, connectivity is the primary value to develop labor activities and impact on the economy digital.

In this sense, it is recognized that the digital economy in Mexico and other OECD countries has allowed us to share experiences and ideas about the imperative need for workers to develop digital skills, global connectivity, economic competition and openness Internet to develop work activities. In this regard, Sosa (2016), records that the Mexican digital market in the last 6 years went from 26 billion to about 60 billion dollars.

As can be seen, this growth is due to the fact that there are increasingly better conditions for technological entrepreneurship, from the development of infrastructure, greater market and access to capital; as well as structural changes that are going to accelerate the growth with better ecosystems of online payment, greater connectivity and speed of Internet of each time better quality.

Investigation methodology

To develop the empirical and theoretical analysis of the context, we used the qualitative methodology.

This alternative allows to develop concepts and theoretical understandings in an inductive way, starting from the empirical information to verify the assumption that is posed and thus give answer to our research questions that consist in What aspects generate the value of the virtual in the labor market of Mexico? Is the digital economy a model that generates value to the Mexican labor market?

Under this methodological strategy, it will be possible to see the digital economic scenario and the users (as workers), from a broader perspective, which implies first to recognize that without connectivity; simply the digital economy would not exist, which leads to the reflection that the value of the virtual lies in the connectivity and access to the internet to give permanent dynamization of the economy, thanks to the technological change that is lived, impacting on economic and social life of the users, creating a digitally enterprising life and in constant restructuring.

To test the above hypothetical approach, we first make an empirical analysis of facts that reveal the technological developments that affect the economy, which leads to the adoption of new patterns of change in the economy and the labor market. Subsequently, to understand the development of connectivity strategies and the value of being connected, the theoretical discussion is made, based on the arguments of López and Saladrigas (2016) in relating that in the relationship of the digital economy with the traditional economy, it is emphasized that connectivity is the value that makes the difference between one and the other; ie the internet connection, is the value that allows the interlocation between the economy and the organization or users (for this case will be the workers).

Thus, according to Tabares (2016), organizations, individuals and government have witnessed the creation, development and establishment of large corporations that have colonized the digital environment. For some thirty years to date, the digital economy has not stopped growing based on the expansion of business opportunities offered by the combination of the internet and globalization.

The design of the research corresponds to a non-experimental design with an explanatory and descriptive cut, according to what Castañeda, et.al. (2002: 122), "the design of the explanatory studies requires a specialized knowledge", which for the case is of the ICT and its relation with digital economy and the labor market, which represents a study of facts related to the use ICTs and the economy, as well as their link with the labor market; hence, the role of the dependent variable (RV) is derived. For the case of this study, we consider 2 dependent variables: Digital Economy and Labor Market, which corresponds to the interest to know the impact of ICT as an independent variable on the dependent variables. When the variables are operationalized, the position of the independent and dependent variable is considered to be merely situational, which means that we can exchange their roles

Literature Review: empirical and theoretical discussion

Studying the use of ICTs and their relation in the digital economy and the labor market, no doubt made us observe the theoretical basis on which this research work is based. Its basis is the theory of biased technological change proposed by Bekman et al. (1998). This theory is based on the increase of economic inequality and is followed by diverse thinkers and researchers of technological bias.

Bound and Johnson (1992) and Katz and Murphy (1992) put the first stone in a study carried out in the United States during the period of 1974, and to propose the theory of biased technological change, in relation to inequality in the labor market. 1987, identifying that the average salary of graduates of professional careers with skills and competences in the use of ICT, increased more than that of people who did not have a professional career.

In this sense, Krueger (1993) argues that the use of the computer in the workplace is the key element as ICT skills that determines the contracting conditions and wage level of a worker. Hence, it coincides with that of Bekman, Bound and Machin (1998), in arguing with solid evidence that the biased technological change that occurred in the 1980s in the United States became widespread in all developed countries; and as far as we can see, the underdeveloped countries as well. They show that all industries increased the number of skilled workers in technological skills, and report that a number of developing countries recorded wage increases as a benefit to the technological competencies of their workers.

Thus, Bekman et. to the. (1998) argue that the main cause of this labor gap is the digital divide; that is to say, the displacement of labor demand is due to the technological change that diminishes the labor force, saves the labor but increases the wage, affirmation that is supported empirically when finding a close relation between the demand of qualified work and the financial investment in computer equipment, as well as in research and development activities.

As explained by several authors, this fact would be associated with the adoption of technologies that favored the use of educated and competent workers in the use and access of ICTs.

In this sense, Acemuglu (2000) follows Bekman, Bound and Machin (1998), noting that the increase in technological inequality; experienced in some developed economies during the eighties, is attributed to the use of intensive technologies in skilled labor.

Similarly, Atkinson (2003) argues that the increase in technological inequality would have been generated by factors, such as technological change and globalization, which have favored the remuneration of skilled workers in technological skills, which employment and the digital labor market.

In addition, the consultation of various scientific documents establishes that technological changes in the economy depend not only on chance, but also on companies and governments, which in recent times have strengthened their investments in this area, virtue, of the reduction of the costs that generate the use of the TIC, that quite possibly is the most significant economic indicator of the technological change.

García Irigoyen (2016: 87) also points out that "drastic drops in the price of the internet and computers have led to ICT adoption and use by more people than previously developed inventions." Also, Castillo and Lechuga (2005: 38), point out that if ICT advances slow down, productivity would be affected in two respects: the growth rate in (ICT) producing industries would fall and the ICT investment rate in the whole economy would be lower and slower.

An indicator of the impact of the Internet on the economy is the low cost of information that will constitute one of the main inputs; that is, the supply curve shifts to the right to a higher production point but at a lower price, noting that the most important thing in the digital economy is not the change to high technology, but the way in which efficiency is improved of the different sectors of the economy, having as empirical evidence that the strong investment in ICT generates a greater growth in the productivity of industry, commerce and the labor market.

On the other hand, Sabbagh et. to the. (2012) and Krull (2016) indicate that the ecosystem of the digital economy consists of three main components that, according to their degree of development and complementation, determine their level of maturity in each country. These components are 1. End users, 2. The ICT applications industry and 3. Broadband network infrastructure.

For Katz (2015: 5), the concept of the digital ecosystem defines a new industrial context and of economic and social impact resulting from the massive adoption of digital information and communication technologies. The study of the digital ecosystem involves three dimensions: new ways of producing information and content, different social behaviors related to the use and consumption of goods, and a more important economic and social impact than information and communication technologies in isolation.

All of this leads to economic and social impacts that distinguish the value of connectivity, as shown in Figure 1. An essential mechanism for generating services and applications for users (individuals, companies and government) is the ICT hardware, software and applications industry, which also includes services that facilitate these technologies.

For this reason, the software and hardware industry represents the foundation under which management of the network infrastructure, the electronics industry and the assembly of equipment is forged.

Based on the information considered by ECLAC (2013), which gives value to virtuality in the services provided by ICTs, the business process industry and analytical or knowledge processes stand out. Business processes include, on the one hand, horizontal applications such as financial, accounting and human resources services and, on the other hand, vertical business processes associated with specific activities such as financial, public sector, manufacturing, commerce, telecommunications, transport and health. Knowledge processes refer to activities of complexity, with emphasis on analytical, design, engineering and technological research and development services.

Another important element that offers value of virtuality, are the end users (individuals, companies and government) that need the level of use and access of digital applications, depending on their demand for services and digital applications. In this sense, individuals become more competitive and improve their quality of life, companies improve the efficiency of administrative and productive processes; and government increase efficiency in the provision of public services and transparency; for this reason, it is crucial that users are able to use ICTs, virtual services and digital applications in a productive way, highlighting electronic commerce in its various modalities, shopping and internet sales, and access to public services and communication via internet.

Under this model, it is proposed that the ecosystem of the digital economy generates impacts in the economic and social spheres from its gestation until its maturity, observing that it begins, are considered positive effects on productivity, economic growth and employment; Likewise, during its consolidation phase, the positive impacts on education, health, access to information and public services are highlighted; but already in its consolidated stage, the positive impacts occur in the fiscal transparency and the greater citizen participation.

Modification of labor structures by the digital economy

The true digital revolution is changing the social and economic structures we have traditionally known, and is undoubtedly the most profound process of change that humanity has experienced, and also the fastest. In the last decade we have seen not only the exponential growth of the internet and e-commerce, but also the explosion of social networks, smartphones and tablets; and the appearance of millions of new applications and services that have changed not only how we relate and communicate but also how we buy and sell, work or study.

Castillo and Lechuga (2005; 58), show that in the economy, "the greatest gains are derived from ICTs (internet and computers)." These gains in technologies tend to spread all over the planet, because there are all kinds of devices connected to the internet. This connectivity is what we access at any time and from anywhere, at increasingly reduced prices. In spite of the confusion that could generate the speed with which all these technological changes have occurred, in the next years it is assumed that these transformations will continue to accelerate, which means that the digital revolution is in an initial stage.

The digital revolution leads to a series of changes in the labor market, which leads the imaginary that a day not far away, a document like this, be written by a machine or a robot. In this sense, according to Exposito (2017), it is clear that there is no reference to facts of science fiction, prestigious media such as The Washington Post or The New York Times and the Associated Press already use robots to elaborate information related to statistical data created from mathematical processes.

With this, it is shown that the communication tools provided by the technology make the change continuous; so, professional profiles must adapt to the requirements of a evolving digital market. Tabares (2016), coincides with the idea of the "digital pro-common". It is another perspective to this labor paradigm of capitalism that has allowed the development of diverse social initiatives in the Web like Wikipedia or LinkedIn like the greater communities and networks of professionals in the world.

For Katz (2015), studies on the digital ecosystems of both companies and the labor market indicate that "for ICT investment to be effective, it must be accompanied by skills training for workers and employers, as well as greater investment designed to integrate ICT in business models and processes. Hence, based on what was analyzed in Cave and Flores Roux (2017: 57), it is noted that the digital revolution has had an impact on production, transaction and consumption by reducing costs, bringing services closer to consumers both young people and creating new categories of goods and services. It has also dramatically increased communication between people ranging from a simple voice call to a video call, text messages and even now the development of large social and professional networks.

Delivering personal data and making payments over the internet will require an act of value. Cave and Flores Roux (2017: 59) reveal that it is important for both the public and private sectors to appreciate this feature, with government actions to be at the forefront in terms of cyber security and setting a good example by paying attention and care in its maintenance; given that, first and foremost, both workers and consumers should feel protected, so that if a product or service does not meet expectations, suppliers are forced to respond and reward customers quickly and through simple mechanisms.

Hence, broadband connectivity is a seductive strategy for investors, not only because of their potential for performance, but also because venture capital investment has little correlation with labor markets because their investment horizons in employment tends to decline, (Sosa, 2016). So, whether a company that is engaged in online loans for working capital, electronic payments, digital advertising platform, e-commerce, Marketplace for different services, market intelligence based on big data and analytics; everything indicates that the coming years could be vital for the growth of the labor market and employment in Mexico, ECLAC (2014).

For the development of the digital economy and employment, it is advisable to train workers in the use of ICT, since technologies do not necessarily mean progress; offers opportunities that also imply new problems. According to López and Salandrigas (2016), it would create a scenario in which Information Technologies were being used for labor purposes (as a means and not as an end in itself) and with the aim of enhancing labor development of the regions of a country.

Through the use and implementation of ICTs, economic, social and labor aspects can be strengthened, as well as promoting socialization in historically excluded groups based on knowledge, learning and empowerment of ICTs, such as ICTs in actions of learning of university students (Islas and Delgado, 2016: 116).

In order to have educated workers, students are required to include ICT in their educational practices so that, through them, they can exponentially increase their ability to create and produce content and information. In this sense, Islas and Delgado (2016: 118) says that connectivism emerges as an alternative framework to learning theories and reveals new opportunities to employees and employers. On the other hand, Tello (2017) mentions that it is desirable to reach a knowledge society where the inclusion of individuals in the labor market by the generation of knowledge is total, that knowledge societies are sources of development for workers.

It is clear that these assertions lead us to analyze the role of the digital divide and the cognitive gap in the labor market as causes of the labor exclusion of companies and individuals in the use of information and communication technologies in Mexico, opening with this reflection a possible line of research. Tello (2017), refers to the argument that the digital divide is probably one of the first concepts to start thinking about the economic and social impact of ICT.

Cave and Flores (2017) also point out that ICTs are changing how people, households, businesses and governments communicate, produce, consume, work, transfer information, interact with each other and carry out transactions. With the applications and collateral benefits of ICT in the digital economy and the labor market, this explosion and digital revolution continues in innovation unlimited for employment.

For the past decade, Tello (2007) mentions that a new form of labor exclusion, known as the "digital divide", is now visible, capable of widening the gap between regions and countries (international digital divide) and citizen groups of a society (domestic digital divide) that refers to employers and employees. On the other hand, the cognitive gap reveals the potential for exclusion that can be found in knowledge societies, when their development is limited to promoting a knowledge economy.

Hence Tello (2007) says that since then it has been perceived that ICTs produce differences in the labor and development opportunities of populations, so that a distance will be established between those who have and those who do not have access to and emphasizes that they should not be marginalized in the societies of information and knowledge.

It is clear that for Tello (2007), the knowledge divide points to a society where knowledge begins to be part of the domain of only one segment of society, while the majorities are excluded from it, which makes reference to the existence of a pronounced cognitive gap that can generate a scenario of conflicts and greater inequality in the labor market. Cave y Flores (2017) also says that according to metrics constructed by several authors on the digitization of the information society, Mexico's position is not privileged in the world context.

This is true, says Katz et al. (2016), both for digital economy measurements published by the World Bank and the World Economic Forum, which record significant progress in the last five years, but these have not been sufficient to change the relative position of the country. For its part, Cave and Flores (2017) mentions that the lack in this dimension motivated a radical reform at the constitutional level, with changes in the educational reform.

The digital economy and the value of the virtual

In order to analyze the value of the virtual in the digital economy, we refer to Lopez and Saladrigas (2016: 71), who discuss how to reduce the "digital divide" (technological and knowledge) among people using ICT and those who do not have access or do not know how to use them, among which the participation of workers stands out. Their arguments are based on a paradigm in which all the labor, social, political processes, of the war, and of the economy, happen to be affected by the capacity of process and distribute information of ubiquitous form.

The ubiquity character gives value to the activities carried out with the use of ICT. Already described by López and Saladrigas (2016), whose fundamental idea grows before the digital survival of adapting processes to the use of ICT. However, Islas and Delgadillo (2016) emphasize something that is perceived daily and means that educational institutions seem to be closed to this evolution, since they are far from meeting the requirements of globalization in terms of digital economy, and far of access to the value of the ubiquity of the internet of things.

Against this background, Lagunés (2016) states that the member countries of the Organization for Economic Co-operation and Development (OECD) have met in Mexico to discuss the design and implementation of digital policies that foster innovation, growth and social prosperity to impact on a more productive labor market.

Hence, this would boost the digital economy, implying not only the liberation of obvious trade barriers, but also amplification in the flow of commercial data across borders; technology certifications and policies that do not distort international competition; fostering local ICT products in public sector procurement and widespread accentuations of intellectual property. These and other forms of liberalization would be ICT-focused, enabling it to disinhibit digital commerce, fostering innovation and accelerating economic growth for companies, customers, suppliers and workers around the world.

It is clear that our society is involved in a generous process of transformation. A transformation that, although unplanned, has a positive impact on the way individuals are organized, how they work, how they relate, and how they learn. As a result, we realize that the division and differentiation between the world of study and the world of work is no longer comprehensive.

Results and accuracy of the study of the question of the value of being connected

Among the aspects that are accentuated when considering the value of being connected, are the strengths and opportunities offered by the internet. With ICTs destined to be the main tool of growth in the following decades, many people are proposing that a developing economy like the Mexican one, reach greater access to the use of the TIC.

Since the OECD pronouncements (2016), it has been stated that ICTs can provide growth to developing economies; However, although poor countries have very little capacity to access telecommunications and computers, and the most pessimistic think that the use of the Internet can widen the gap between rich and poor, the studies analyzed, emphasize that in the economies in development is the only way to sustain growth is to increase the opportunity for access to technologies to achieve better methods of organization and employment.

Considering that poor countries undertake economic activities, with much less capital per worker, their development has a wide field of opportunity for rapid growth, buying technology and reproducing production methods in similar successful economies, which may allow grow faster than developed economies. Here the question is how to spread technology in poor countries. The answer is through the use of the internet and telecommunications, as they narrow geographic barriers and globally disseminate knowledge faster than previous technological revolutions. In this sense, countries like Mexico must take the advantages of applying ICT in all labor, professional, educational, economic processes, among others.

A tangible value is highlighted by the indicator of the impact of the internet on the economy, which represents low cost of information that is constituted in one of the main inputs; that is, what represents the supply curve that moves to the right to a higher production point but at a lower cost.

Based on this idea, the methodologically pointed out by Armas Morales (2016: 11) regarding the form of technological disruption that give value to being connected, which means the change of the traditional business models, by other models of businesses that use ICTs and platforms with digital applications to offer goods and services with advantages and benefits to both suppliers and consumers.

Similarly, a fresher referent on the value of being connected is Katz (2015), who points out that the path of ICT leads to a more efficient economy, a greater competitiveness of the country and a decrease in unemployment. This marks the step of the countries that with their own strategies of route towards the digital economy, bet by the industrialization and the innovation, creating value permanently.

Also, you can see aspects that signify the value of being connected related to accelerate the digital transformation in economic sectors away from technology, such as the agricultural sector; and other aspects that represent the value of being connected as the generation and development of human capital suitable for the digital economy, which means putting forward appropriate motor projects to boost the economy. In this sense, any economy wishing to compete globally must have a multipurpose digital agenda at the base of its growth and development strategy. It should contain local investments in key areas such as education and training in science, technology, engineering, mathematics and ICT infrastructure development through the expansion of broad-based banking and other means of spreading the digital economy. Faced with the greater importance of capital in the digital economy and the impetus of a fourth industrial revolution, the problem of massive industrial unemployment, which could be shattered by what we know as a "welfare state", continues to emerge for Tabares (2016).

It is clear that skills in the use of ICT are essential for a successful digitalization of the economy, so they rethink Cave and Flowers Roux (2017) regarding that one of the most efficient ways to create digital skills is establishing the need of the digital services that generate value and in that sense the strategies of connectivity could be a solution to a greater competitiveness for the labor market.

Cloud computing as a connectivity strategy

Among digital services that generate value, cloud computing is observed and in particular "The Cloud" or "The Cloud", which are handled in different contexts, commonly to refer to a linked number of stored information resources and interconnected information processes and accessed by users remotely through a communications network.

Users of a cloud service, whether they are service developers or end users, typically require less specific knowledge about technology, management, and security than traditional services.

However, for Boes, et. to the. (2017: 132), it is highlighted that both cloudworking and crowdsourcing are the conclusive and determinant strategy of the relationship between the digital economy and the labor market and thus pose a "revolution in the world of work". In their studies they deal with these developments and their relevance to work and society, giving rise to the emergence of a global "information space" for work that allows companies to extend the scope of their production of value, much more beyond its formal limits; as well as the integration of forms of work.

The novelty of this type of labor strategies (cloudworking, and crowdsourcing) that are backed by Cloud computing as a strategy of connectivity, is that they come to colonize the space of technological information, allowing people to strive to do the work inside and outside of the mutually interchangeable formal boundaries of the company, on the basis of computerized and industrialized production structures, and to take advantage of this interaction between the interior and the exterior. For its part, Boes, et. to the. (2017) argue that this represents areas of opportunity for users not specialized in the use of technologies, which allows a significant reduction of labor costs thanks to the resulting economies of scale.

Big data and the value of social interaction

Also Big Data is a new prototype for business intelligence. For ECLAC (2014), Big Data is based on the 3 "sees" of volume, variety and speed, to which some need to add value and truthfulness. Its origin goes back to the needs of some companies like Google or Facebook as the most notable to order and take advantage of the immense amount of data that people upload each day, which makes possible the social interaction in the Big Data that is represented by networks social.

Hence social media generate more information on a day than what all humanity has accumulated for centuries. Interpreting correctly and understanding this volume of information requires a whole new generation of technologies and techniques, among which the Big Data field stands out. Social networking and social-purpose business software (e-mail, chat, WhatsApp) have forged social branching by two important aspects: 1. By the connectivity that allows communication between people who use social networks, and 2. By the information that people share and exchange, highlighting with this, the importance of connectivity as an essential value of social impact.

For social exchange, social media is the turning point for Big Data; given that Big Data deviates from archaic methods by applying ways of capturing information, storing it, and processing it in truly gigantic amounts of data, which is precisely the kind of data that emerges from today's social media ecosystems like Facebook and other digital platforms through which they buy and sell goods and services.

This can be seen in Gleeson (2016: 77), platforms based on social media such as Facebook and Twitter are increasingly used around the world as a way to capture and develop work in a wider audience and get their attention on online activist campaigns on various social issues, which represents a form of digital work for activists, implying a way of undertaking contemporary online work as a form of digital work and examining the effects of this workforce on activists involved in these groups.

The Big Data in the labor market represents a connectivity strategy and shows the value of being connected by offering new trends and employment opportunities to workers as internet users and as agents of the digital company that remains hanging on socially virtual media.

This connectivity strategy aims to reveal propensities of use to know what will happen before it happens and so, to get ahead of the conversation and see where it goes. However, Big Data is still a specialized niche of technologies and techniques that fundamentally makes new assumptions in managing and understanding the knowledge contained in huge amounts of data. It is moving to the central domains of information technology. With this development, the world is becoming more and more social.

It is clear that social media and Big Data in the immediate future will increase their influence through different applications.

These applications of Big Data that connects to social networks, will be as much of end consumers as business. Analytical applications that are part of social networks and that offer up to the last information exchange report.

Coincident with this idea, Hurwitz, et. to the. (2013), admit that large data is becoming one of the most important technological trends that has the potential to change the way organizations use information to improve the experience and transform their business models, considering that the models are changing the way data can be used in a variety of ways, allowing data to be scrutinized, queried, reviewing the most prominent trends, and visually displaying information of a different type simply because of the inherent speed of the strategies of Big Data, for which there will be much work. Hence, the dissemination of Big Data between internal data and external data of an organization, as well as the organization of information, would enable sources of employment.

From the virtual to the physical

At the moment of analyzing the connectivity that represents a value, we find that the Internet reduces barriers to entry to the markets, since it is cheaper to place a business online than opening a traditional store or office, also makes it easier for consumers compare prices, which increases competition.

Also, the simple fact of making a purchase via internet, requires a simple procedure in which through a digital platform, the product is observed in an image (with digital characteristics), the purchase and sale of the product is agreed upon, if it is paid online and subsequently the supplier sends the product to the buyer to his home, and thus an object that was virtual (display image for sale), could be converted into the physical item that was acquired.

In this way, it is considered that there must be a perfect balance of information so that young people face the labor market using their imagination, having as support the cyberspace as well as the physical world and that it does not become a primary necessity to be immersed in the ICT, since the correct use implies a moderate use and above all have criteria to differentiate the type of information that is useful, information that does not serve.

Conclusions and final reflections

By way of reflection, it is understood that like any other communications network, the essence of the internet is in creating and strengthening connections between people. Adapting people, businesses and government to networked culture and giving customers the ability to interact with each other and with the company itself, with workers and other organizations that can build more relationships with customers, suppliers, workers and businessmen.

Although the latent threat of the displacement of workers in the labor market, due to the increasing use of ICTs in the economy, it is also observed that connectivity expresses an intangible value that is developed from a digital ecosystem based on technological platforms and institutional platforms.

Mexico continues with a significant backlog in connectivity.

The investment rates in connectivity in broadband networks and the capacity for digital innovation in Mexico are still limited to the challenges that show a rapid digitization process, which based on information from the Ministry of Economy (2017) has mobilized close to 36 billion dollars to GDP for the next 10 years, in addition to the creation of a thousand direct jobs.

Behind this dynamic, there is a relevant component of public policies that seeks to boost the country's digital transformation process, as well as substantial initiatives that enrich the different stages of the Internet value chain; since ICTs, like all general-purpose technologies, have effects throughout the supply chain and across all economic production chains.

Likewise, the internet economy and the labor market are subject to rapid technological advances and network economies, which means being subject to a digital ecosystem that shows patterns of development of immaterial labor activities (social impact of the digital ecosystem), as well as income generation that cease to be static in the short term economic impact of the digital ecosystem), and require a technological process (technological platforms of the digital ecosystem) and an institutional process (institutional platforms of the digital ecosystem) that focuses on initiatives of public policies that respond flexibly to maximize the employment opportunities that appear in these processes.

In consequence; it is essential for the country to advance in the identification of the factors that condition its digital capacity from a digital ecosystem in the labor context, with the general purpose of a greater creation of jobs that potentiate the value in the digital economy.

In this regard, we refer to the need to guarantee the growing flow of investments in technological infrastructures that will allow the development of digital ecosystems, in addition to the requirements to promote and develop innovation and competition through public policies that are flexible, compensatory and oriented to the protection of workers from virtual environments.

This digital revolution is undoubtedly the most important period of economic, social and technological transformation since the industrial revolution. But there is a fundamental difference between these events: the massive and diversified adoption of information technology and connectivity and the digitization of the economy has taken place in an extraordinarily short period of time no longer than ten years.

High-speed Internet connectivity represents the fundamental value in the labor market and in the economy in general. Innovative digital technology, commerce and services are the driving force behind the digital economy that is changing the world. Social networks, cloud computing, big data, mobile technologies, and the Internet of things are at the core of the transformation of our way of living and working, which has also changed economic cycles and faded geographical borders, giving a character of flexibility and ubiquity to labor processes and structures.

Therefore, it would be imperative to make public policy proposals related to connectivity. For example, it is necessary to extend the coverage of networks and greater use of mobile data. The guidelines should be outlined to legally and economically undertake the different elements of the digital ecosystem; this will reduce the risk of job inactivity, job confusion, paralysis and even contradiction in the development of the labor market in Mexico.

Confidence should be created to develop an employment market based on connectivity, but rather a regulatory framework should be developed on a number of important issues such as digital confidentiality, cyber security, anti-fraud measures, worker and consumer protection, simplification processes and rules, as well as the reduction of barriers to use and appropriation of ICTs in the economy and the labor market. Therefore, generating the digital skills and appropriation of the use of ICT is fundamental for the existence of demand and labor supply from an interconnected environment.

In conclusion, this research is an approximation that allows to understand the impact of recent changes in the digital economy and the digital ecosystem in the labor market. Finally, we consider that at this moment, we have contemplated the theoretical frame of reference to approach the study of virtuality in Mexico to later define the impact of digital transformations in Mexico and answer other approaches: How have users reacted to products and digital services in the face of these changes in the economy? To what extent has the digital ecosystem been developed to meet economic and social needs? These would be subjects to be developed in the following investigations.

References

- Acemoglu, D. (2000), Technical change, inequality, and the labor market, *Journal of Economic-Literature*, Vol. 40, Núm.1, pp. 7-72.
- Armas Morales, C.E., (2016), El negocio de las “apps” de taxis y la economía colaborativa: ¿relaciones no laborales o laborales, según los términos contractuales que lo sustentan (caso Perú)? , *Neumann Business Review*, Vol. 2, Núm 2, pp 9-25.
- Atkinson, A. (2003), *Income Inequality in OECD Countries: Data and Explanations*, CESifo Economic Studies, Vol. 49, Núm. 4, pp. 479-513.
- Bekman Ely, Bound John, y Machin Stephen (1998), *Implications of Skill-Biased Technological Change: International Evidence*. *The Quarterly Journal of Economics*, Vol. 113, Núm. 4, pp. 1245-1279.
- Boes, A., Kämpf, T., Langes, B., Lühr, T., Ziegler, A. (2017), *Cloud & crowd: New challenges for labour in the digital society*, *Journal TripleC*, Vol. 15, Núm. 1, pp. 132-147.
- Bound, J., y Johnson, G. (1992), *Changes in the Structure of Wages during the 1980s: An Evaluation of Alternative Explanations*, *American Economic Review*, Vol. 82, Núm. 3 (junio), pp. 371-392.
- Castañeda J.J., De la Torre L., M.O, Moran R.J.M., Lara, R.L.P., (2002), *Metodología de la investigación*, México, Editorial Mc Graw Hill.
- Castillo Soto, M. y Lechuga Montenegro, J. (2005), *Las Tecnologías de la Información y la Nueva Economía*, en Lechuga Montenegro (2005) *Reflexiones acerca de la era de la información (New Economics)*, México, Universidad Autónoma Metropolitana,
- Cave, M. y Flores Roux, E. (2017), *Posibles Beneficios de la Economía Digital para México*, pág. 3-65, recuperado de la página web http://ceeg.mx/new/wp-content/uploads/2017/01/Posibles-Beneficios-de-la-Economi%CC%81a-Digital-para-Me%CC%81xico_2017.01.27.pdf, consultado el día 6 marzo de 2017
- CEPAL (2013), *Economía digital para el cambio estructural y la igualdad*, Santiago de Chile, Naciones Unidas.

CEPAL (2014), Big data and open data as sustainability tools A working paper prepared by the Economic Commission for Latin America and the Caribbean, Santiago de Chile, Naciones Unidas.

Duffy, B.E. (2016), The romance of work: Gender and aspirational labour in the digital culture industries, *International Journal of Cultural Studies*, Vol. 19, Núm.4, pp. 441-457.

Expósito, J. (27 de enero de 2017), Una transformación digital también en el mercado de trabajo, *Diario Expansión*, recuperado de la página web: <http://www.expansion.com/especiales/30aniversario/tecnologiainnovacion/2017/01/27/5889f940268e3e3d6a8b4590.html>, consultado el día 30 de marzo de 2017.

García Irigoyen, E.M. (2016), Economía Social Innovación Tecnológica: Experiencias de Éxito en Entornos de Precariedad, *Journal of Technology Management & Innovation*, vol. 11, pp 86-92.

García, Sánchez, M.R., Reyes A., J., Antúnez S., T., Godínez Alarcón. G., Silva G., A., (2016), Reforma laboral en México, ¿Solución a la justicia social?, Vol. 5, Núm. 9, s.p., recuperado de la página web: <https://www.ricsh.org.mx/index.php/RICSH/article/view/74/385>, consultado el día 17 de marzo de 2017.

Gleeson, J. (2016), (Not) working 9-5': The consequences of contemporary Australian-based online feminist campaigns as digital labour, *Journal Media International Australia*, Vol. 161, Núm.1, pp. 77-85.

González, G., S., (23 de abril de 2016), Economía digital promueve el auge de empresas 'unicornio', recuperado de la página web: <http://www.jornada.unam.mx/ultimas/2016/04/23/economia-digital-promueve-el-auge-de-empresas-unicornio>, consultado el día 14 de marzo de 2017.

Graham, M., Hjorth, I., Lehdonvirta, V. (2017), Digital labour and development: impacts of global digital labour platforms and the gig economy on worker livelihoods, *Transfer*, Vol. 23, Núm. 2, pp. 135-162.

Hurwitz, J., Nugent A., Halper, F., and Kaufman, M. (2013), *Big Data for Dummies. A Wiley Brand*, Canada, Ed. John Wiley & Sons, Inc

Islas Torres, C. y Delgadillo Franco, O. (2016), La inclusión de TIC por estudiantes universitarios: una mirada desde el conectivismo, *Revista Apertura*, Vol. 8, Núm. 2, pp. 116-129.

Katz Raúl (2015), *El ecosistema y la economía digital en América Latina*, España, Ed. Ariel y Fundación Telefónica,

Katz, L., y Murphy, K. (1992), Changes in Relative Wages, 1963-1987: Supply and Demand Factors, *Quarterly Journal of Economics*, Vol. 107, Núm. 1, pp. 35-78.

Krueger, A. B. (1993), How Computers Have Changed the Wage Structure: Evidence from Microdata, 1984-1989, *Quarterly Journal of Economics*, Vol. 108, Núm. 1, (Febrero), pp. 33-60.

Krull S. (2016), *El cambio tecnológico y el nuevo contexto del empleo*, *Tendencias generales en América Latina*, Santiago de Chile, Comisión Económica para América Latina y el Caribe.

Lagunes, A., (23 de junio de 2016), *Las nuevas fronteras de la economía digital*, s.v., s.n., s.p., Recuperado de la página web: <http://www.elfinanciero.com/opinion/las-nuevas-fronteras-de-la-economia-digital.html>, consultado el día 13 de marzo de 2017.

López L., Ma. E. y Saladrigas M., (2016), Las TIC. Un nuevo escenario para el desarrollo local de las comunidades, *Revista Opción*, Vol. 32, Núm. 10, pp. 71-94.

Luna Arredondo, P. (2017), *México saliendo de la zona de confort*, s.v., s.n., s.p., recuperado de la página web: <http://eleconomista.com.mx/columnas/columna-especial-valores/2017/01/02/mexico-saliendo-zona-confort> , consultado el día 27 de marzo de 2017.

OCDE (2016), *Perspectivas de la OCDE sobre la economía digital 2015*, México, Ed. Microsoft México, S de R.L. de C.V.

Palos Sánchez, P.R. (2016), Aproximación a los factores clave del retorno de la inversión en formación E-learning, *3 C Empresa: Investigación y pensamiento crítico*, Vol. 5, Núm. 4, pp. 12-31.

Sabbagh, K.; Friedrich, R.; El-Darwiche, B.; Singh, M.; Ganediwalla S. y Katz R. (2012), Maximizing the impact of digitization, *The Global Information Technology Report 2012: Living in a Hyperconnected World*, Soumitra Dutta y Benat Bilbao-Osorio (eds.), INSEAD (The Business School of the World), World Economic Forum.

Sosa, A., (2016), *La Economía Digital: una gran oportunidad para inversionistas y empresas mexicanas*, recuperado de la página web: <http://crowdie.mx/la-economia-digital-una-gran-oportunidad-para-inversionistas-mexicanos/>, consultado el día 14 de marzo de 2017.

Tabares, R., (2016), *¿La Economía Digital Promueve la Desigualdad?*, recuperado de la web: <http://sociologos.com/2016/06/26/la-economia-digital-promueve-la-desigualdad/>, consultado el día 22 de marzo de 2017.

Tello, Edgar (2007), *Las tecnologías de la información y comunicaciones (TIC) y la brecha digital: su impacto en la sociedad de México*, *Revista de Universidad y Sociedad del Conocimiento (RUSC)*, Vol. 4, Núm. 2. UOC. [Fecha de consulta: 31 de marzo de 2017]. Recuperado de la página web: <http://www.uoc.edu/rusc/4/2/dt/esp/tello.pdf> ISSN 1698-580X.

The use of smartphones to enhance language learning

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Abstract

The advancement of mobile technology and the growing population owning a smartphone have caused smartphones to be language-learning tools that are equipped with sound multimedia function. This fact has promoted the conduction of research and projects about language learning and mobile technology (Lee, Hsu & Shih, 2014). The findings presented in this mixed methods research are part of a study investigating students' perceptions regarding the use of smartphones to enhance English language learning at a public university in East Mexico. Data reveals that there is great acceptance of smartphones for English language learning at this Mexican public institution. Participants in this research answered that they generally use smartphones for school work, social networks, communication, entertainment and business. They also indicated that by recording a conversation between a doctor and a patient with their smartphone, they mainly learnt how to pronounce some English words, new vocabulary in English and how to use their smartphone for an educational purpose.

EFL, mobile learning, smartphone

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Introduction

Nowadays the advancement of mobile technology has promoted the use of smartphones as language-learning tools in many parts of the world. For this reason, many learning materials have been designed in the form of Podcast, widget, and APPs and are being used in some language courses. Smartphones also support the amount of learning that takes place naturally in settings outside the classroom which causes learners to be more responsible for their learning experience because they do not only inactively receive information provided by a teacher, but they also make decisions in their learning process. Therefore, mobiles make learning become “personalized, learner-centred, situated, collaborative, global, and lifelong” (Valk, Rashid & Elder, 2010, p. 121).

The present research aimed at discovering students’ perceptions regarding the use of smartphones to enhance English language learning at a public university in East Mexico. Data shows that the majority of participants in this study have a positive attitude towards the use of smartphones in their English class.

Literature review

The advancement of mobile technology and the growing population owning a smartphone have caused smartphones to be language-learning tools that are equipped with sound multimedia function.

This fact has motivated the conduction of some research and projects about language learning and mobile technology. Some researchers have made their subjects to develop language teaching programs through cell phones, to learn vocabulary and English idioms by using their cell phones, to take quizzes, and to submit surveys.

That was also possible because Apps for language learning are accessible for learners to study autonomously any time and everywhere. Facer in 2004 stated that most teachers and students in the U.K. had taken mobile technology as a familiar part in their daily lives (as cited in Lee, Hsu & Shih, 2014). Due to the fact that information technology is useful for language learning, students’ success may depend on their openness to use a mobile device for language learning. Agnes Kukulska-Hulme and Shield in 2008 claimed that mobile learning is normally expected to involve mobile phones, palmtop computers, and other mobile handhelds (as cited in Lee, Hsu & Shih, 2014). This confirms the present trend of the application of mobile devices to support language learning.

A smartphone is defined as a mobile phone that is able to perform many of the functions of a computer, typically having a relatively large screen and an operating system capable of running general-purpose applications (Lee, Hsu & Shih, 2014). Due to the trends in mobile learning, many learning materials have been designed in the form of Podcast, widget, and APPs, while others contain the features of interactions and communication to increase the efficiency of language learning by using mobile devices.

Cho (2009) studied the advantages and limitations of mobile language learning. She presented broadly used mobile applications for language learning, categorized them based on language skills and outlined major characteristics of their content and functions. Yang (2012) analyzed and evaluated ELT (English Language Teaching smart-phone applications).

This study categorizes different types of ELT mobile applications based on the target users' age and learning area. The research results showed that a majority of ELT applications were concentrated in vocabulary and activities set were simple and had to be more varied. Park (2013) researched on the effect of a smart-phone vocabulary application on Korean university students' vocabulary learning. The study discovered that the competitive game-based application was successful at vocabulary learning. H. S. Kim (2013) also conducted research on mobile applications for developing university students' listening skills. The study revealed that using applications was discovered to be effective and useful.

Mobile learning (mLearning), on the other hand, benefits those who cannot physically attend learning institutions due to work restrictions, home activities, or other demands on their time. MLearning makes education more available because it allows learners to study according to their own schedule. MLearning, as Visser and West (2005) propose, may also improve those situations where cost is a significant obstacle to learning. For those distant areas where environmental and infrastructure challenges impede other learning modalities, mLearning offers great opportunities. Furthermore, mobile technology is much less expensive than other technologies like personal computers that are necessary for eLearning.

MLearning allows a method of educational delivery that could be more cost-effective than eLearning methods, not to mention that the universality of mobile phones means that many people are already familiar with mobile phone applications (Motlik, 2008). Consequently, mLearning increases the access to quality education materials by means of reduced cost and better-quality flexibility as it also develops the efficiency and effectiveness of education administration.

Some experts suggest that mLearning is more than an extension of traditional practices of education. They advocate that mLearning promotes alternative learning procedures and instructional methods that the theories of new learning recognize as effective for learning. Exponents of new learning claim that mobiles help to design materials for personalized learning because designers of these materials take into consideration the difference and diversity in the way learning occurs. In this way, as Kukulska and Traxler (2007) state, mLearning also promotes authentic learning as it involves real-world problems and projects relevant to the learner.

Mobiles also support the amount of learning that takes place naturally in settings outside the classroom and the usual environment of home and office. Hence, mLearning promotes a change in the learning process as learners take more responsibility for their learning experience as they do not only passively receive information provided by an instructor. In traditional environments of education the goal is generally the transfer of knowledge from teacher to student whereas mLearning allows students to actively participate in the learning process to make it a process. Furthermore, mobiles allow collaborative learning and continued conversation despite physical location. In this way, mobiles make learning become "personalized, learner-centred, situated, collaborative, global, and lifelong" (Valk, Rashid & Elder, 2010, p. 121).

Smartphones are tools that promote Self Access Language Learning (SALL). According to Gardner & Miller (1999), SALL is "an approach to learning where the focus is on the promotion of learner autonomy by moving students away from dependence on the teacher and towards independence in managing one's own learning" (as cited in Barrs, 2011, p. 229).

Smartphones allow students to have mobile and independent access to materials and resources. Furthermore, nowadays, smartphones are regularly being brought to classes as a support in language learning. Through Barrs' (2011) own experience with a smartphone, this author has come to "recognise their potential language-learning applications such as their usefulness as voice recorders, the ability to photograph and store digital pictures of board work, and the proliferation in specific language learning applications" (p.229). This author also claims that in a study that he developed, it appeared that in his classes smartphones "had the best potential to become a normalised language learning technology, both inside and outside the classroom." This normalisation would promote language-learning activities that could be achieved beyond the classroom. All this would surely foster learner autonomy.

Research shows that in many countries and among certain people in Canada and the United States, the smartphone is often a person's unique communication and computing platform. Moreover, smartphones are generally familiar and easy to use, personal, private and carried everywhere. They represent a natural environment for speaking and listening, equipped with microphone, speakers, and special speech processing hardware and software network connected; fully-capable computing devices, and becoming global. In this way, smartphones should be regarded by ESL and EFL teachers, as really valuable materials to be brought and used in class so as to facilitate English language learning as they were considered in this study (Zilber, 2013).

Furthermore, smartphones tend to be connected to the Internet, which helps students to do different tasks easily. By using their smartphone, students can check emails, surf the web and communicate through social networks.

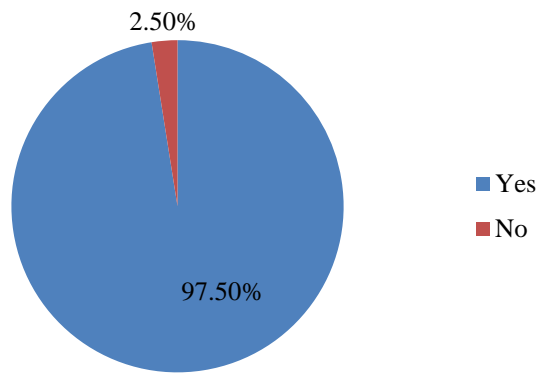
However, there are also many students who access on-line teaching materials, do teamwork and share knowledge and information by using their smartphone. This shows that smartphones can be excellent learning tools for students (Anshari, Almunawar, Shahrill, Wicaksono & Huda 2017).

Finally, using innovations in the classroom, such as smartphones, can help the teaching and learning process, make the process of communication easier, enhance creativity, imagination, vision and other language skills among learners. Learning in general becomes more convenient especially with modern smartphones that have up-to-date hardware and software, which makes them as helpful learning tools as computers (Shahbaz & Khan 2017).

Methods

The findings presented here are part of a study investigating students' perceptions regarding the use of smartphones to enhance English language learning. The study reported here used a mixed-method approach to gather data. A mixed methods research study involves the use of quantitative and qualitative methods as elements of a research design or a research program. Both methods were combined in this research so as to better approach the research question (Poce and Pagán 2015).

40 students of two basic English courses (MEIF 203 and 209) at the Language Center Xalapa of the University of Veracruz, Mexico were asked to write, practice, role-play and record a simulated conversation in English between a doctor and a patient. The student participants used a smartphone to look new vocabulary, phrases, pronunciation of words and model conversations up in online dictionaries, to communicate with their partner and to record the conversation that was carried out by the students. Then, the learners were asked to answer an online questionnaire that was designed using Google Docs and which contained 31 questions in total. 14 of these questions were open and 17 were closed. The questionnaire was developed based on the research question and research objective. Some authors have stated that standardized questions in a questionnaire provide the best results because they tend to be interpreted in one way by participants. Furthermore, the design of the questions is extremely important because there is generally only one opportunity of collecting data when carrying out research. (Zahran, Mad & Jusoh 2016).



Graphic 1 Online questionnaire

The answers to the closed questions were analyzed statistically whereas the answers to the open questions were read (and re-read) to find the more relevant participants' opinions.

Findings

In this section, the findings of the study are described. They are introduced with a question from the questionnaire used in the research, and then they are followed by a description and an interpretation.

1. Do you use smartphones? *

Yes

No

2. How long do you spend on smartphones daily? *

3. What do you usually use your smartphones for? You can have more than one answer in this question. *

School work (e.g. reading books, blogs)

Communication (e.g. e-mail, chatrooms)

Entertainment

Social Networks (e.g. twitter, Facebook)

Business use

Other uses?

Yes

No

Which ones?

4. Where do you usually use your smartphones? You can have more than one answer in this question. *

School

Home

Work place

Transportation

Other places?

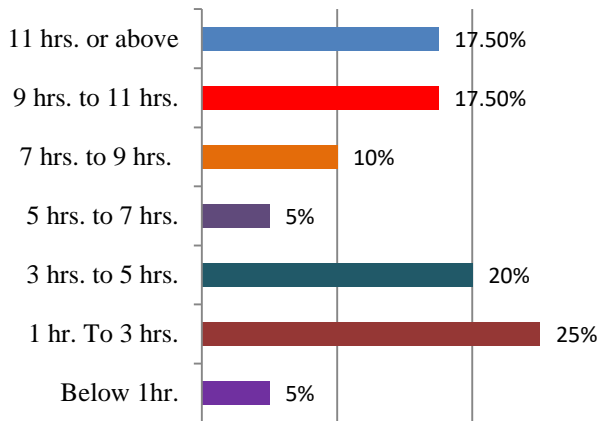
Yes

No

Table 1 Use of smartphones

Do you use smartphones?

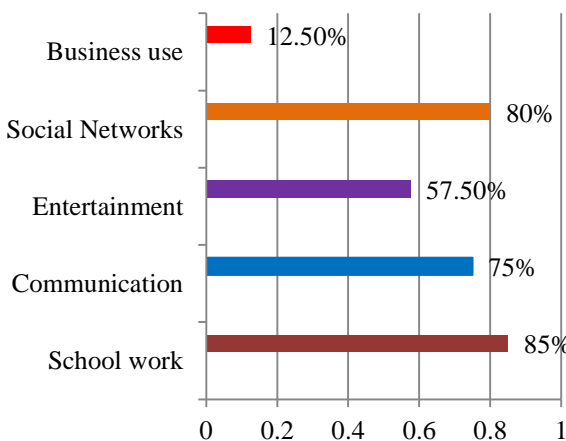
As we can see, almost all the students (97.50%) answered that they use smartphones, which may be because all of them are digital natives. All of them were born after 1980.



Graphic 2 Time spent on smartphones

How long do you spend on smartphones daily?

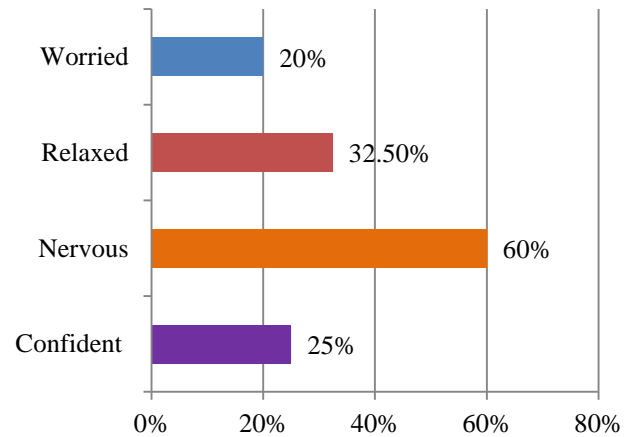
When the students were asked the period of time they spend on smartphones every day, a fairly large majority (25%) answered that they spend on these phones from 1 hour to 3 hours daily. Another large majority (20%) answered that they use their smartphone from 3 to 5 hours daily. As we can see the students in this research do not seem to use their smartphone for a long time daily, which may be because most of them take classes in morning, afternoon and evening shifts.



Graphic 3 Use of smartphones

What do you usually use your smartphone for?

Regarding what the students normally use their smartphone for, the majority (85%) answered that they use it for school work, which suggests that they use it out of class taking into account their answer in the previous chart. In this question, the students were able to choose more than one answer and we can see that another vast majority (80%) answered that they use their smartphone for social networking (e.g. twitter, Facebook). These two answers suggest that the students in this research use their smartphone mainly for doing activities related to school and for being in touch and sharing information with other people.



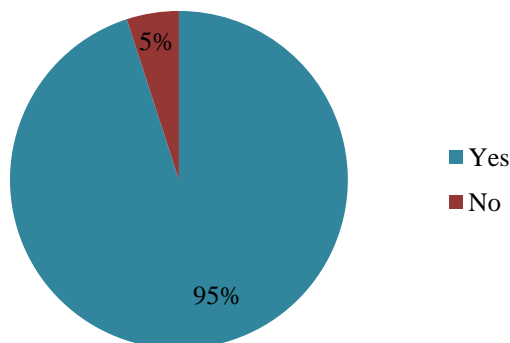
Graphic 4 Feelings when recording conversation

How did you feel when you recorded a video of a conversation between a doctor and a patient in English with your smartphone?

When the students were asked how they felt when they recorded a video of a conversation between a doctor and a patient in English with their smartphone, a relative majority (60%) answered that they felt nervous.

Although in chart 1 most of the learners responded that they use smartphones, it can be seen that in this question most of the learners answered that they felt nervous when using it for an activity in their English class. This implies that students should use their smartphones to be recorded while speaking English, which may lower their anxiety level when speaking English in front of other people.

A large number of students (90%) answered that they learned how to pronounce some English words when they recorded a conversation between a doctor and a patient with their smartphone. Some students also answered that they learned new vocabulary in English (65%), how to use their smartphone for an educational purpose (45%) as well as new structures in English (42.50%).



Graphic 5 Smartphones and English learning Do you think that smartphones are helpful for learning English?

Finally, when the students were asked if they thought that smartphones are useful tools for learning English, the majority of them (95%) gave an affirmative answer.

When the learners were asked why, some of them answered: “because with some applications from the phone we can investigate any doubt you have” (Student E); “because there are applications for learning English” (Student F); “because we practice what has been learned” (Student G); “because we have an easy way to get information” (Student H); “because they have access to information anywhere” (Student I); “because it helps us better understand English with translators and dictionaries” (Student J). The previous information suggests that the participants in this research have a positive attitude towards the use of smartphones as tools for learning English.

Conclusion

In conclusion, we can say that the majority of the students in this research are familiar with smartphones. Most of them also use their smartphones up to three hours a day and they use it mainly for schoolwork. When the student participants were asked how they felt when they recorded a video of a conversation between a doctor and a patient in English with their smartphone, the majority of them answered that they felt nervous. However, when they were asked if they thought that it was useful to record a video of a conversation between a doctor and a patient with their smartphone, most of the students gave an affirmative answer and they also gave their reason(s) why they thought so. Such reasons supported the use of smartphones for learning English.

The data presented in this study suggest that the participants in this research regard smartphones as useful tools for learning a foreign language and therefore teachers should promote the use of such tools in their classes.

Since nowadays the majority of students all over the world are digital natives, it is urgent that teachers incorporate technology in their classes and one way of integrating technology in class is by promoting the use of smartphones for learning a language or any other content. Thus, teachers in the 21st century should learn to use smartphones and encourage their students to use them for educational purposes.

References

- Anshari, M., Almunawar, M. N., Shahrill, M., Wicaksono, D. K., & Huda, M. (2017). Smartphones usage in the classrooms: Learning aid or interference?. *Education and Information Technologies*, 1-17.
- Barrs, Keith (2011). Mobility in learning: The feasibility of encouraging language learning on smartphones. *Studies in Self-Access Learning Journal*, vol. 2, num. 3, 228-233.
- Cho, Seikyung (2009). Smart-phones used for foreign language learning. *Multimedia-Assisted Language Learning*, vol. 12, num. 3, 211-228.
- Kim, Hea-Suk (2013). Emerging mobile apps to improve English listening skills. *Multimedia-Assisted Language Learning*, vol. 16, num. 2, 11-30.
- Kukulka-Hulme, Agnes, & Traxler, John (2007). Designing for mobile and wireless learning. In Helen Beetham & Rhona Sharpe (Eds.), *Rethinking pedagogy for a digital age: Designing and delivering e-learning* (pp. 180-192). London: Routledge.
- Lee, Chunyi; Keng-Chih Hsu; & Ru-Chu Shih. (2014). Effects of Implementing C&U-Message through Smartphones on English Grammar Learning for College Students. *The Online Journal of Distance Education and e-Learning*, vol. 2, num. 1, 13-19. Retrieved from <http://www.tojdel.net/pdf/v02i01/v02i01-03.pdf>
- Motlik, Scott (2008). Mobile learning in developing nations. *International Review of Research in Open and Distance Learning*, vol. 9, num. 2. Retrieved from <http://www.irrodl.org/index.php/irrodl/article/view/564/1071>
- Park, J. Y. (2013). A study on the effect of smartphone application along with types of learning on university students' vocabulary ability and learning attitudes. (Master's thesis, Ewha Woman's University, Seoul) Retrieved from <http://www.riss.kr.access.korea.ac.kr/link?id=T13080150>
- Shahbaz, M., & Khan, R. M. I. (2017). USE OF MOBILE IMMERSION IN FOREIGN LANGUAGE TEACHING TO ENHANCE TARGET LANGUAGE VOCABULARY LEARNING. *MIER Journal of Educational Studies, Trends and Practices*, 7(1).
- Valk, John-Harmen; Ahmed T. Rashid; & Laurent Elder. (2010). Using Mobile Phones to Improve Educational Outcomes: An Analysis of Evidence from Asia. *International Review of Research in Open and Distance Learning*, vol. 11, num. 1, 117-140. Retrieved from <http://www.irrodl.org/index.php/irrodl/article/view/794/1507>
- Visser, Lya; & West, Paul (2005). The promise of m-learning for distance education in South Africa and other developing nations. In Yusra Laila Visser, Lya Visser, Michael Simonson, & Ray Amirault (Eds.), *Trends and issues in distance education: International perspectives* (pp. 117-129). Greenwich, CT.: Information Age Publishing.
- Yang, S. S. (2012). Analysis and evaluation of ELT smartphone applications. *Korean Journal of Applied Linguistics*, 28(1), 297-320.

Zilber, Julie. (2013). SMARTPHONE APPS FOR ESL: Finding the Wheat Amidst the Chaff. CONTACT Magazine, vol 39, num. 1, 15-21. Retrived from http://www.teslontario.net/uploads/pinterest/contactarticles/Apps_Zilber.pdf

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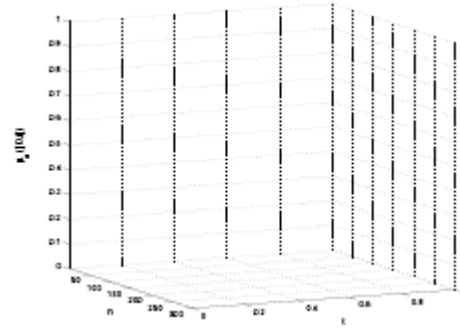
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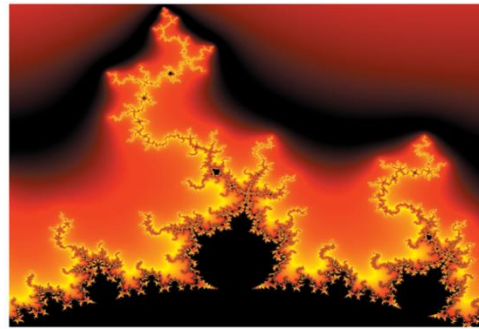


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