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Presentation

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

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

In Number 1st presented an article *Hybrid Electropedaleo-Solar Car* by ARELLANO-YAÑEZ, Ricardo & LOPEZ-REYES, Fernando Octavio, in the next Section an article *Economic evaluation of the Saladette tomato production project under greenhouse conditions* by RAMÍREZ-BARAJAS, Alejandro, CARMONA-GARCÍA, Nélida, ACOSTA-NAVARRETE, Susana and GUTIÉRREZ-TRIGUEROS, Lilian with adscription in the Universidad Tecnológica del Suroeste de Guanajuato, in the next Section an article *Strategic opportunities for the economic development of the Municipality of Izúcar de Matamoros: Economic Development of the Mixteca Region, first stage* PALMA-BERMEJO, Yetzabel, GUERRERO-MENTADO, Sonia, GUERRERO-MENTADO, Nubia, ROMERO-JIMÉNEZ, Enrique with adscription in the Universidad Tecnológica de Izúcar de Matamoros, in the next Section an article *Screwdriver redesign* by FIGUEROA-MELCHOR, Ulises, KIDO-MIRANDA, Juan, ANAYA-SILVAR, Javier and RODRIGUEZ-BUCIO, Norma.

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Hybrid Electropedaleo-Solar Car

ARELLANO-YAÑEZ, Ricardo*† & LOPEZ-REYES, Fernando Octavio

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Abstract

The hybrid Vehicle combine the electric car system with a mechanic system driven, given a versatility vehicle with three operation modes, one is through an electrical system using a main battery, the next mode is using the mechanical driven based on a bicycle system and the third mode is combined using the electrical system and the mechanical driven. In the electrical system is included a solar charger system to an auxiliary battery, it provides the enough energy to load the second battery until the vehicle is parked or it is moving, getting with that more use of the vehicle on the electric system. Another function is that the battery charge system can be using a common electrical outlet with 110 ACV. Achieve learning of power systems based on alternative energy, involving students in projects where the theoretical concepts are applied in the generation of a functional prototype. The objective has been achieved through the development of projects done in labs and classrooms, also seek participation in local and extramural events specifying competition in order to test and overcome the knowledge acquired.

Hybrid, Solar, Vehicle

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* Correspondence to Author (email: ricardo.arellano@utna.edu.mx)
† Researcher contributing first author.

Introduction

One problem with solar vehicles is their deficiency on cloudy days as well as for use at night.

A solar vehicle depends directly on the solar panels therefore it is not possible to consider the use of solar energy alone.

A hybrid vehicle provides the solution of use and efficiency to a solar vehicle, when using another system of alternative impulse combined with the electrical part.

Solar vehicles are an alternative of self-sustaining vehicles capable of moving people, using clean energy, such as solar energy.

However its deficiency by the cloudy days or at night can be compensated realizing the suitable combinations to obtain a hybrid auto with capacity to be driven by mechanical energy and even to be able to recharge auxiliary batteries in order to increase its versatility.

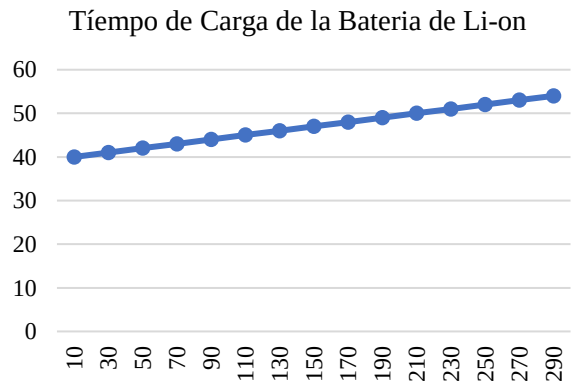
The vehicle UTNA Solar 1, is a solar hybrid vehicle with characteristics of electric auto and mechanical impulse that is with an electric system of motor to batteries and of a transmission of chain with pedaleo.

It achieves its greater efficiency when combining both characteristics, can be moved with the electric motor and at the same time pedal assisting both systems, causing the engine to give part of the impulse and the pedalear complements this impulse making a pedaling more comfortable and minimizing the effort of the motor Extending the payload of the battery.

In addition, the vehicle UTNA Solar 1 can be driven by any of the impulse systems, you can choose to move it with the electric system or just pedal.

The electrical system relies on two Li-on batteries from 48 volts to 30 amps, one of which is connected to the electrical impulse system by activating a 1500 Watt (2HP) motor, leaving the other battery as an auxiliary to be charged by the Solar system, having a battery exchange system for when the main is discharged using the charged auxiliary battery and allowing the discharged battery can be charged by the solar system or failing that with a home outlet without special features. If there is the case of both batteries discharged you can use the pedaling and move the car.

Charging the Li-on battery takes an average of 3 to 4 hours



Graphic 1 Charging Li-ion battery

The use of the vehicle UTNA Solar 1 has a performance of approximately 20 to 25 km of travel by a charged battery and at an average speed of 20 to 25 km / h

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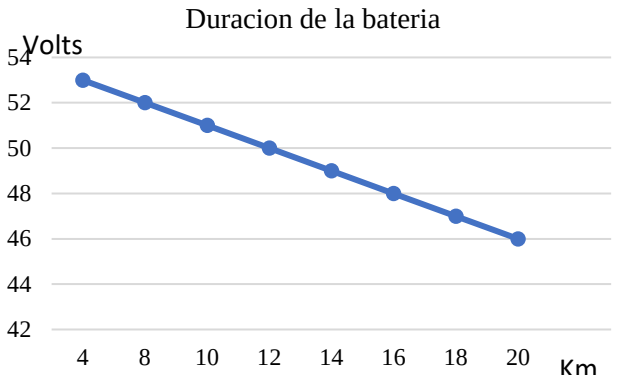
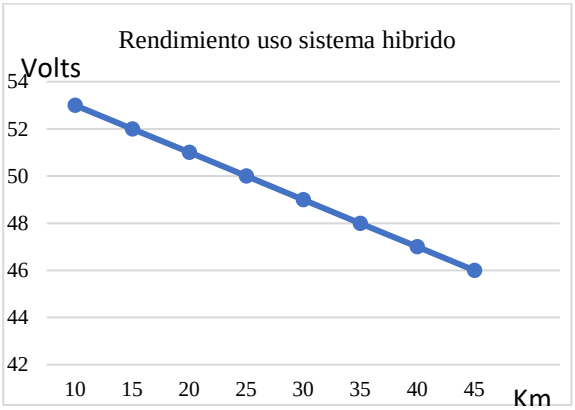


Graphic 2 Battery performance (voltage vs. distance traveled)

It improves the performance making use of the hybrid system which means pedaling and electrical system up to 45 km while maintaining an average speed of 20 to 25 km / h.



Graphic 3 Performance with hybrid system (voltage vs Km of course)

Increasing the speed decreases the yield of distance traveled to an average of 15 to 20 km with a battery charge and when the exchange of battery charged by the solar system can be added on average another 15 to 20 km, ie with 2 battery charges you can have a total of up to 60 km of travel, this would be an ideal for a medium-sized city. The vehicle complements its use considering in the last case, pedaling without the electrical system.

It is also important to note that the vehicle lighting system such as directional lights, high and night lighting, is provided by an automotive type alternator that is also charged with the solar system. It is important to mention that the number of passengers is one person each trip. The vehicle, if not used 60km a day, can be used at night if one of the two batteries is kept in an electric system, pedaling or hybrid. The vehicle can be charged overnight in a 110 VAC household type electric outlet and use the next day in any of its modes. Also the vehicle will be charged, while there is sunlight and it is even parked.

Figure 1 UTNA vehicle Solar 1

Methodology

The vehicle was made based on home-type solar systems proposing that the solar battery charger be included in the vehicle, also proposed the electric motor system for electric bicycles to create an electric-mechanical hybrid system.

Results

The result obtained is an electric-mechanical hybrid vehicle, which takes advantage of sunlight to charge the batteries that provide the electric power to the engine. Having the versatility of the mechanical impulse by pedaling, electrical and hybrid system.

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Aknowledgement

The support given before, during and after the development of this vehicle, as well as the financing of the same to the Technological University of Aguascalientes by its corresponding authorities is appreciated

Conclusions

A favorable result is obtained according to the proposed one, being this hybrid electric-mechanical vehicle, giving direction to the development of new prototypes, thinking in the academic development as well as to take them to compete for greater learning and achievement of the competition in the Participating students and teachers.

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Economic evaluation of the Saladette tomato production project under greenhouse conditions

RAMÍREZ-BARAJAS, Alejandro*†, CARMONA-GARCÍA, Nélida, ACOSTA-NAVARRETE, Susana and GUTIÉRREZ-TRIGUEROS, Lilian

Universidad Tecnológica del Suroeste de Guanajuato

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Abstract

According to the Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food (SAGARPA) today in Mexico there are around 20,000 hectares under protected agriculture. Of these, approximately 12,000 are greenhouse and the other 8,000 correspond to mesh shade and macrotunnel among other structures. The main crops grown under protected agriculture are tomato (70%), peppers (16%) and cucumber (10%). As the tomato is concerned, Mexico is in the tenth producers worldwide with an annual output of 3 million tons; this being the third most exported product in the country making it the world's largest exporter with a figure of 1.5 million tons per year, ie 50% of total production. In this research the results in the main indicators of profitability of a project saladette tomato production under greenhouse conditions on a planning horizon is five years.

Tomato, Greenhouse, Investment

Citation: RAMÍREZ-BARAJAS, Alejandro, CARMONA-GARCÍA, Nélida, ACOSTA-NAVARRETE, Susana and GUTIÉRREZ-TRIGUEROS, Lilian. Economic evaluation of the Saladette tomato production project under greenhouse conditions. ECORFAN Journal-Republic of Paraguay. 2016, 2-2: 5-9.

Correspondence to Author (email: aramirez@utsoe.edu.mx)
† Researcher contributing first author.

Introduction

The United Nations Food and Agriculture Organization (FAO) mentions that the global area of tomato production increased by 25% in the last decade. The most notable growth was in the People's Republic of China, which increased by 142%. Due to the increase in demand, world tomato exports have increased by 59%. Leading such exports are the countries of Spain, Mexico and the Netherlands.

According to SAGARPA, in 2008, 2.26 million tons of tomatoes were produced in Mexico, the main producer being the state of Sinaloa whose production represented 35% of the national total, 3.8 times higher than that produced by the second place, Baja California, with 9%. The states of Michoacán, San Luis Potosí and Jalisco continue to be listed with 8%, 6% and 5%, respectively. Among the types and / or varieties of tomato are mainly the ball, saladette or guajillo and cherry tomatoes, very sensitive to extreme climatic conditions, which determine their annual cycle and type of variety.

For the National Coordinator of Foundations Produce, AC (COFUPRO), protected agriculture in Mexico has taken a big boom in recent years, going from little more than 800 hectares in 2000 to 10,810 hectares in June 2009 at a rate of Average annual growth of 25% and almost one thousand percent during this same period of time, making the activity the most dynamic and fastest growing in the country within the agricultural sector. According to the Network of Technological Innovation in Protected Agriculture A.C., there are 300 hectares of protected area in the state of Guanajuato. According to the national trend, half of the area belongs to producers of 5,000 meters or more, while the remaining half belongs to small producers where most of them have been supported by state and federal subsidy programs.

For the purpose of financial appraisal of an investment project, economic profitability measures the ability of a company's assets to generate value, regardless of how they were financed and tax issues. An economic profitability may indicate: excess of investments in relation to turnover; Inefficiency in the development of procurement functions; Production and distribution; Or an inappropriate steering style.

Method description

The quantitative paradigm was used, applying the evaluation of an investment project through the operational analysis of a production project of tomato saladette under greenhouse conditions. For the evaluation of the project, traditional methods such as the internal rate of return, net present value, as well as the cost-benefit ratio were used. (García and Romero, 2009)

The formula for calculating NPV (Baca, 2006)

$$VAN = \sum_{t=1}^{n} \frac{Vt}{(1+k)^t} - \mathrm{I}_0 \qquad (1)$$

Where:

Vt = Cash flows of each period t

I0 = Initial disbursement of the investment

N = Number of periods considered

K = Interest rate

The formula for calculating the IRR (Baca, 2006) is:

$$VAN = \sum_{t=1}^{n} \frac{\mathrm{Ft}}{(1+\mathrm{TIR})^t} - \mathrm{I} = 0 \qquad (2)$$

Where:

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Ft = Cash flow in period t
N = Number of project periods
I = Initial investment

For the beginning of the work a collaboration agreement was established between students and professors of the Business Development career and the Sustainable and Protected Agriculture career, both of the Southwest Technological University of Guanajuato. The monitoring, recording and processing of information was carried out from January 2015 to June 2016. The project operations, those generating costs, generating income and control of tomato production were documented. Compiled the necessary information, the financial evaluation was applied considering a planning horizon of five years.

Results

The results obtained from the financial evaluation apply to the design of a technological package by the Technological University of the Southwest of Guanajuato that considers the installation of a greenhouse, it is worth mentioning that a test greenhouse of 700 m2 was used with an irrigation system By dripping, with capacity of 2000 plants of tomato saladette, placed in 8 rows with the use of a variety of fertilization.

Figure 1 Greenhouse

The fixed investment budget considered for the project size amounts to $ 208,877.90. Contemplating in this investment the cost of equipment and facilities for both the production and marketing of tomato saladette. Table 1 shows the cost of the equipment and the working capital required for the execution of the project. It should be mentioned that the cost of the Greenhouse considers the economic support provided by the Agency for Services to the Marketing and Development of Agricultural Markets (ASERCA).

Fixed investment budget			
Concept	Quantity	Unit cost	Total
Pruning shears	2	$168.00	$336.00
Boxes	100	$60.00	$6,000.00
25 kg scale	1	$1,041.90	$1,041.90
Greenhouse of 700 m2	1	$171,500.00	$171,500.00
Irrigation system for greenhouse of 700 m2	1	$30,000.00	$30,000.00
Total inversión			$208,877.90

Table 1 Fixed investment budget *Source: Own*

The information on projected income statements is shown in Table 2. Note the gradual increase in the profit for the year.

Statements of projected results			
Concept	Year 1	Year 2	Year 3
Sales	$118,605.60	$124,535.88	$130,762.67
Production cost	$59,302.80	$62,267.94	$65,381.34
Depreciation	$41,775.58	$41,775.58	$41,775.58
Financial expenses	$0.00	$0.00	$0.00
Total spends	$101,078.38	$104,043.52	$107,156.92
Utility before tax	$17,527.22	$20,492.36	$23,605.75
Tax	$4,907.62	$5,737.86	$6,609.61
Net profit	$12,619.60	$14,754.50	$16,996.14
Accumulated utility	$12,619.60	$27,374.10	$44,370.24

Table 2 Statement of projected results for a projection horizon of five years *Source: Own*

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Statements of projected results		
Concept	Year 4	Year 5
Sales	$137,300.81	$144,165.85
Production cost	$68,650.40	$72,082.92
Depreciation	$41,775.58	$41,775.58
Financial expenses	$0.00	$0.00
Total spends	$110,425.98	$113,858.50
Utility before tax	$26,874.83	$30,307.35
Tax	$7,524.95	$8,486.06
Net profit	$19,349.88	$21,821.29
Accumulated utility	$63,720.12	$85,541.41

Table 2 Statement of projected results for a projection horizon of five years (cont.) *Source: Own*

Table 3 shows the projected cash flows. The cash flow of year 0 (zero) should be understood as the cash flow corresponding to the year in which the management and obtaining of the financing for the project is carried out and its application in the obtaining of fixed investment necessary for the implementation of the same.

Note the positive cash flows obtained since year 1 of the project.

Cash flow			
Concept	Year 0	Year 1	Year 2
Initial balance of cash	$208,877.90	$0.00	$17,527.22
Operating inputs:			
Sales income	$0.00	$118,605.60	$124,535.88
Cash available	$208,877.90	$118,605.60	$142,063.10
Departures of operation			
Production cost	$0.00	$59,302.80	$62,267.94
Total departures of operation	$0.00	$59,302.80	$62,267.94
Extraordinary departures			
Investment in assets	$208,877.90	$0.00	$0.00
Total outputs	$208,877.90	$59,302.80	$62,267.94
Outstanding or missing cash	$0.00	$59,302.80	$79,795.16
Financing required	$0.00	$0.00	$0.00
Payments to capital (assets fixed)	$0.00	$41,775.58	$41,775.58
Payments of interest	$0.00	$0.00	$0.00
Inputs or financial outlets	$0.00	$41,775.58	$41,775.58
Final balance of cash	$0.00	$17,527.22	$38,019.58

Table 3 Projected Cash Flows *Source: Own*

Cash flow			
Concept	Year 3	Year 4	Year 5
Initial balance of cash	$38,019.58	$61,625.33	$88,500.16
Operating inputs:			
Sales income	$130,762.67	$137,300.81	$144,165.85
Cash available	$168,782.25	$198,926.14	$232,666.01
Departures of operation			
Production cost	$65,381.34	$68,650.40	$72,082.92
Total departures of operation	$65,381.34	$68,650.40	$72,082.92
Extraordinary departures			
Investment in assets	$0.00	$0.00	$0.00
Total outputs	$65,381.34	$68,650.40	$72,082.92
Outstanding or missing cash	$103,400.91	$130,275.74	$160,583.09
Financing required	$0.00	$0.00	$0.00
Payments to capital (assets fixed)	$41,775.58	$41,775.58	$41,775.58
Payments of interest	$0.00	$0.00	$0.00
Inputs or financial outlets	$41,775.58	$41,775.58	$41,775.58
Final balance of cash	$61,625.33	$88,500.16	$118,807.51

Table 3 Projected Cash Flows (cont.) *Source: Own*

Table 4 presents the results obtained in the main profitability indicators of the project. A minimum acceptable rate of return (TREMA) of 15% was considered for the purposes of the financial evaluation.

With this benchmark, an Internal Rate of Return (TIR) of 16.52% was obtained. As for the break-even point, the result obtained is justified by the absence of fixed costs in the project.

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Summary of profitability indicators	
Acceptable minimum rate of return trema	15%
Internal rate of return irr	16.52%
Economic break-even point	$2.00
Term of recovery of the investment	4 años
Net present value npv	$216,729.50
Cost benefit relation	2

Table 4 Financial evaluation of the project *Source: Own*

Conclusions

The production area of tomato saladette greenhouse in Mexico is still very small, although as it has been shown, it is increasing year by year. The profitability demonstrated by the economic evaluation of the project that is the subject of this research turns the production of tomato saladette into greenhouse conditions into a viable economic alternative for farmers.

This could improve the conditions of farmer since according to the Economic Commission for Latin America (ECLAC) in Mexico there are 4 million 331 thousand households dedicated to agricultural production and of these half live in extreme poverty, so conduct a research, Allows to learn new knowledge in different areas, so that this process allows solving a problem or expanding knowledge, having already the opportunity to develop a different production of open skies, such as harvesting in greenhouse. It is very important to evaluate its advantages and disadvantages of this process.

The lack of knowledge about the existence of economic support provided to the agroindustrial sector, has caused that the farmers do not include technology in their methods of production of tomato saladette.

Therefore, based on the results presented on the profitability and recovery period of the investment of this project, it is considered necessary to increase the information of the benefits of the governmental support programs towards the sector.

For the financial evaluation of this project a production in a semi-automated greenhouse was considered. The expenses were considered in the amount of fixed investment, considering the machinery and equipment that could be used in the process. Therefore it is open the possibility of evaluating this project in different levels of tecnification and with different products and by-products derived from the tomato saladette

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Strategic opportunities for the economic development of the Municipality of Izúcar de Matamoros: Economic Development of the Mixteca Region, first stage

PALMA-BERMEJO, Yetzabel*†, GUERRERO-MENTADO, Sonia, GUERRERO-MENTADO, Nubia and ROMERO-JIMÉNEZ, Enrique

Universidad Tecnológica de Izúcar de Matamoros

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Abstract

According to various theories regarding the economic development of micro, small and medium enterprises (MSME's), which are related to the competitiveness of the different markets in the region, the Economic Cooperation and Development (OECD), reiterates that many countries and regions are working to achieve the level of competitiveness that allows them to adapt to globalization, which has caused a lot of statements in the profit and business sectors, which are considered three important factors such as innovation, science and technology, in terms of development reached in different geographical areas activities with low production costs. Today, MSMEs, must deal with the current economic model that affects various aspects such as political, economic, financial, monetary, educational, cultural, social and environmental. Importantly, the financial and trade aspects, should establish strategies to increase the technological potential and to enable greater productivity, improving the cost benefit of micro, small and medium business of the Mixteca region of Izúcar de Matamoros, contributing to regional economic development.

Development, economic, company, region.

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* Correspondence to Author (email: Yetzabelpb13@hotmail.com)
† Researcher contributing first author.

Introduction

This project focuses on the identification and analysis of the strategic opportunities for the economic development of the Municipality of Izúcar de Matamoros and the Mixteca region, in a first stage. Initially, the business areas of micro, small and medium-sized enterprises are defined for the determination of the productive-competitive field of the lucrative and business sector; for this, we start from theories of development and economic growth, location, industrial sector, market area, central places, regional science, circular and cumulative causality, balanced growth and spatial development, among others.

It should be noted that economic models have requirements that must be considered for the development effects of the region as Haldenwang points out; Engage in intermediation functions, improve wages and increase employment, discuss modern infrastructure, improve regional economic structure, promote strategic sectors in specific ways, strategically generate structural change, mobilize endogenous resources, facilitate political participation, boost regional investment, Improve the quality of localization at the regional level, generate positive externalities, promote convergence of regions, facilitate the development of backward regions, reduce production costs, create economies of scale, and cushion the social and ecological impact of structural change. (Haldenwang, 2000).

In the Mixteca region of Izúcar de Matamoros, the MyPyme's group has as a challenge the detonation and innovation in the economic development of the companies' competences, under the modality of clusters; for this, viable and profitable opportunities must be identified for the generation of sources of worthy employment, which contribute to improving the economy.

According to the different models and theories, it is important to consider those productive factors and their respective level of productivity, which affect the economy of the region and contribute to economic growth, contributing to the rational use of natural resources, And capital, as well as investment in innovation, technology and human capital, which are extremely important in decision-making for the economic cycle of agglomerations. The economic development of the region will depend on the circumstances of the globalization of the economy of which it forms part, as well as on the internationalization of capital, with the objective of reducing costs and conquering local markets.

According to Hiernaux, globalization has brought with it the emergence of new forms of work organization and the development of new technologies: microelectronics, biotechnology, telecommunications, computers, etc., as well as the use of new materials Doubt the basic foundations of regional development analysis. The development of communications has relativized the principle of distance, key to territorial differentiation, and in the world today does not have the same validity. It is the same as the principle of contiguity, indispensable for the integration of regions and still valid for the formation of regions and economic blocs, but not decisive for the organization of production in the globalized economy. (Hiernaux)

Economic model

They are hypothetico-deductive systems that differ from theories in three respects. First, models have a narrower domain (or class of reference) than theories; Secondly, models are highly idealized (simplified) representations of reality; and third, unlike theories, models may not contain laws. (Bunge, 1982)

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The author historian Eric Van Young defines the region as "a geographical space larger than a locality, but smaller than a national state, with a boundary determined by the effective range of some system whose parts interact more between them with the system external". The author Van Young, says that "regions are hypotheses to prove more than assumed facts."

Regional Science is the synthesized (integrative) analysis of politics, economics, sociology, cultural and psychological factors that influence the development of a significant region or system of regions. It is the study of the development of space-time of a society and its population in all its social, economic, political and psychological dimension. (Isard, 1973)

Another of the region's concepts is that of quasi-state in order to break the relationship of domination and dependence, and carry out territorial political decentralization, as a true legal, political, administrative and social construction of the regions. To achieve this goal, it is necessary to set up a political project that subordinates particular interests to the collective interest.

In addition, the region acts as a quasi-enterprise in which some of the great company practices are applied, in terms of defining products and markets, financing projects, human resources and competitiveness. (Boiser, 1992) Economic growth is a complex phenomenon in which, through the accumulation of more and better productive factors and their use through increasingly productive techniques, economies are able to generate a greater capacity of goods and services. It is also a dynamic process that involves a continuous change in the sectoral structure, the latter could be considered as one of the stylized facts in growth. (Kuznets, 2009)

For analysis and study purposes, a survey was conducted in different local companies registered in the National Statistical Directory of Economic Units (DENUE), updated based on the final results of the Economic Censuses 2014 and the verification of new economic units Made by INEGI in the second half of 2015, published on January 1, 2016
http://www3.inegi.org.mx/sistemas/mapa/denue/default.aspx. (INEGI, 2016)

In the region of Izucar de Matamoros, by their size companies are classified as large, medium, small and micro. Representatives of 90 companies, micro and small in the services and trade sectors, were interviewed; 66% of the companies correspond to the commercial sector and 24% to the services sector, as shown in the following Graphic 1.

Graphic 1 Companies surveyed: 90, Own elaboration

Derived from the result of the survey will be given to companies the situational diagnosis in which it is, so that in turn a work program is established in which, through consulting and training, areas of opportunity can be eliminated and in the future Not very distant this is paid at the regional level.

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Screwdriver redesign

FIGUEROA-MELCHOR, Ulises*†, KIDO-MIRANDA, Juan, ANAYA-SILVAR, Javier and RODRIGUEZ-BUCIO, Norma

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Abstract

In the world of the industry you have sought the best ways to get the customer a good product without it being affected, as in the case of bottles closed by crown caps, with the intention that the product arrives intact to the consumer, the desire to achieve this objective has been shelved several times ergonomic design. What we thought is to do a redesign of the screw-on cap in the area that the consumer takes to rotate the same, with the redesign what is sought is that anyone who wants to open a bottle it succeeds regardless of whether it is a person with problems joint caused by diseases, old age, even healthy people who are difficult to apply enough force. The elliptical shape allows a better grip without the need to completely close the hand to exert force facilitating everyone who can open a bottle with screw-on cap. Provide people with hands to open a bottle with screw-on cap is closed. By using everyday materials for the prototype. You want to significantly improve the speed with which a bottle or container that has a screw-on cap, due to ergonomic design that allows better support in hand is uncovered. People with little force because of their age can not achieve unclog independently a bottle with screw-on cap or people with hand problems due to diseases such as rheumatoid arthritis that affects 90% of the cases at hand, they lose strength in hands, is why we thinking about redesigning the screw-on cap to apply less force needed to rotate, focusing on the support points of the index and ring fingers. It has added an extension to the design of the screw-on cap elliptically to achieve redesign resulting in an uncovered more quickly and with less effort, allowing older adults and children open a bottle in a short time and with less effort.

Screw cap, ergonomics, polypropylene, bottles, arthritis

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* Correspondence to Author (email: Ulisesk01@gmail.com)
† Researcher contributing first author.

Introduction

With the creation of the PET bottle and the creation of various bottles containing beverages or medicines, the need for a lid to keep the contents in the container was created, the cap was designed which was made of polypropylene, a plastic more resistant than PET , Which allowed the bottle to be opened by just turning, the problem arose when some people could not turn it on due to their advanced age or problems caused by diseases such as rheumatoid arthritis, which in most cases affects the Hands, this makes people need help to open a bottle or jar that has a screwdriver integrated, depending on someone to help.

We have redesigned the cap to be considered as an option that integrates the bottles, because its design will allow people with problems in the hands, whether of little or great gravity, can easily open a bottle while maintaining its independence (Stellman). A comparison of the conventional corkscrew make your design in circular which causes it to slip into the hands.

The design of the circular cap should be respected to maintain optimum sealing of the bottle and prevent the liquid from being spilled, adding two extensions at both ends in the form of a half-inch ellipse and the same polypropylene material. Due to the current circular design of the cap, people with little strength in the hands cannot turn it and therefore cannot open the bottle quickly and with little effort, in Mexico the number of people with joint problems increase each Year, diseases such as rheumatoid arthritis increase in adults as people in their juvenile stage, considering this has been proposed the redesign of the cap to make it easier to open a bottle that has integrated one of this, even in jars that have integrated taparrosca To keep the contents closed in a hermetic manner.

Considering that the number of people with hand problems increases each year, the need for a redesign of the caparrosca is expected, this proposal is expected to be considered by some bottlers in the country.

Development of sections and sections of the article with subsequent numbering

Need to redesign the screw cap

A person who cannot easily open a bottle that is closed by a screwdriver is a daily problem for thousands of people, due to their young age or advanced adulthood.

A worrying problem in Mexico is the number of people who have their hands affected due to diseases such as rheumatoid arthritis, which affects in most cases the hands of the patient, in 2015 alone the numbers of people affected by this disease was Of one million six hundred thousand people that the ages go of the 20 to 50 years.

"Rheumatoid arthritis, considered a systematic inflammatory disease, results in other serious conditions that even cause death and more than 80 percent of patients show depression and anxiety, which is detrimental to their recovery" (González, 2015)

Clogs used in daily life

The large production of PET bottles has also required a large number of screwdrivers to be able to keep the bottle closed and its contents intact (PLASTIMAR, 2009), the conventional screw cap is made of polypropylene, Heat has a circular shape and what allows it to fit with the PET bottle is the screw that has both the cap and the bottle as shown in figure 2.

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They were designed with the main purpose of keeping their contents intact until the bottle was opened, but its circular design only makes it difficult to open a bottle not only to people with problems in their hands but also to healthy people too.

Redesign of the screwdriver

It was observed the need to redesign the conventional cork that is in most bottles containing beverages to perform this.

The design was carried out to carry out the prototype of the modified corkscrew, focusing on the points of support of the hand where It could be made to rotate in a natural way and with the least possible effort, the prototype was added extensions in the original cap to achieve a figure close to an ellipse as seen in figure 3.

In this way lengthening the size of the cap The gripping point is greater by rotating it in two ways, placing it between the index finger and annular or in a conventional manner with the simple force of the fingers without having to close them to form a fist, since many people do not have the capacity to Flexing them for joint problems, with this the proposed design can be achieved an ergonomic plug that keeps the consumer in a more comfortable state when using a bottle with corkscrew

Inclusion of Graphs, Figures and Tables-Editable

Figure 1 Screw caps used in PET bottles

Figure 2 Taparrosca redesigned to achieve its ergonomics

Results

We obtained a screwdriver that allowed us to open the bottles with less effort however the material with which the prototype was made was not very resistant because it was made with plasticine hardened with lacquer, with the correct material that would be polypropylene would have been more resistant achieving The objective and in addition to reducing its fragility.

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Conclusions

The result with the redesign of the cap was favorable because it allows to facilitate uncovering a bottle, the uses of this design can be adapted to bottles or containers that contain corkscrew, in this way more people who have problems in the articulations of the hands can Performing such a simple task as uncovering a bottle or bottle, could be improved using recycled polypropylene materials because this would reduce the environmental impact, a slimmer design and performed with the proper procedure would give us a more cosmetic tap without leaving aside The purpose of the redesign.

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Figure 1 Public Policy Process

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