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# INSTITUTO TECNOLOGICO DE LEON INDUSTRIAL ENGINEERING

#### PROPOSAL

Application of the Circular Economy model to reduce costs and raw materials to genérate a positive impact on the environment

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## INDEX

Introduction	3
General objective	4
Specific objectives	4
Hypothesis	4
Development	5
Theory	6
Methodology	6
Conclusions	8
BIBLIOGRAPHIC REFERENCES	9

#### Introduction

Currently, in the face of the skill globalization and the demands of a market, the Circular Economy (CE) changes the way of looking at the waste and the way of being able to take advantage of it a greater number of times and thus, obtain an own and environmental benefit, this is what CE is about.

The CE is a sustainable economic flow with three fundamental factors, ESG (Environmental, Social and Governance). According to the UN (**United Nations**). The circular economy could reduce greenhouse gas emissions from industries by up to 40% by 2040, and an annual material cost of 25%.

On the other hand, the leather industry is very old, according to its age trends, it leads to different designs and manufacturing processes, by being an animal skin material, it is not as 100% perfect as the synthetic materials are today, this way we have a "natural"

is exposed to various factors that reduce its use with quality

product with low quality percentage. Based on this, the surplus quantity remains as a waste, discarding it without giving it any kind of usage. Both in small and large industries, they generate waste and reintegrating this waste as a part of the manufacturing process, would generate profits and contribute to the environment.

#### General objective

Design a circular economy production through the recovery, and reuse of materials from sustainable consumption adaptation techniques.

### **Specific objectives**

Perform data collection using production demands, performance history and study time.

Review the status with the measurement of productivity and the type of materials being used.

Suggest improvements by analyzing the current product's production process technique, to have a good material usage.

Perform a productivity analysis after the proposed improvements.

Preserve the materials and products value for as long as possible, and reduce as much of the waste so these are not returned to nature

#### Hypothesis

The circular economy implementation will have a positive impact both raw material savings and its costs, and an environmental impact by reducing the companies' environmental footprint compared to if such procedure is not applied.

#### Development.

This research pretends the developing and implementing of a waste generation reduction model for the companies in the footwear-leather goods sector. The circular economy in the footwearleather goods sector is still below waste reduction expectations. The traditional economy is based on consuming, using and discarding. Companies are looking for the CE option (Circular Economy) to increase profits and be able to meet the consumers demand who ask for more environmentally sustainable products.

Since by extending the products' useful life, less waste would be generated. By applying the Circular Economy, 50% less CO2 (carbon dioxide) could be reduced, since CO2 is produced in the assembly process of some components. 50% of people throw away their shoes, while 90% of these are recyclable. The improvement of manufacturing processes has been advanced in terms of how products could be recycled once they reach their useful life, there's still a part in the process that hasn't been improved. There could be an alternative in which it consists of removing the fractions of the product component and reprocessing them again to be used one more time in new leather products. But this idea has NOT turned out to be very friendly, since it is not feasible it is very difficult to disassemble each component without damaging it. The problem lies economically in a linear system that is based on creating products and then throwing them away, each manufacturing process generates its own waste. Since when creating a new product, only one thing is thought about:

\* Produce at low cost and mass produce to sell in large quantities\*

This way, thousands of waste products are generated.

This means, they're extracting raw material despite it's very aggressive with the environment. CE's new production system has advantages both for companies and society, by reusing waste reduces costs in production and a low pollution in the environment.

#### Theory

The proposal focused on the quality of being able to deal with waste, since the consumption of leather, in all ways, has had an increasing trend. By carrying out a circular economy chain approach, the waste from products could be better produced and made profitable.

#### Methodology

First, historical production data must be collected, so that the general objectives already set are followed up. In this way, we base ourselves on practice and experimentation, historical data on how much the percentage of waste is per production phase or per manufacturing product, data on the leather type will also be needed and to review its quality; in case of not having them, data collection must be done using qualitative and quantitative tools, they can be collected through interviews, surveys, field tests and probabilistic sampling. These data will be used to make the current assessment of production and its waste.

With the data obtained above, the causes of waste in the leather-footwear sector will be diagnosed, by analyzing the production technique to detect areas of opportunity. Now we proceed to reintegrate the leather scraps (material waste) by manufacturing new products or renewing products with the material excess, so the products' useful life can be extended. Also, by acquiring

raw material with the LWG (Leather Working Group - is an environmental certification with worldwide recognition to comply with international environmental regulations) certification, as well as using 100% sustainable storage material such as recycled cardboard boxes, natural adhesives, among others. Once all mentioned before has been applied, the data are collected again to evaluate the results of this implementation.

We'll need productivity metrics, such as, for example: products produced, materials used, and cost of raw material purchased. For data processing it is recommended to use Microsoft Excel for statistical reports, and for the processing of qualitative information by direct information it is recommended to use photographic material and formats to collect the information.

As a hypothetical case

If 45 pairs of shoes are manufactured and 15 kg of CO2 is emitted during its process And 85% less CO2 with the plan.

The calculation is (45prs X 15kg X 85%) = 573.75 KG of CO2 to the atmosphere

#### Conclusions

The circular economy is related to the raw material that is selected for products' integration in their manufacture, to avoid affecting the environment it's necessary to review the raw material characteristics such as, for example, the renewable or reusable materials related. Developing products based on the application of the circular economy (CE). It provides sustainability since it uses material that would be considered waste. In this way, the useful life of the raw material is extended, and it is also saved because the surplus would be used to manufacture new products, since normally these wastes are discarded without giving them any kind of use. The Circular Economy application is perfectly suited for product development by reusing waste.

#### **BIBLIOGRAPHIC REFERENCES**

Alegría Molina Pérez. (2020). Calzado y marroquineria en Mexico ICEX(2020), PP.1-12 Recuperado en 20 octubre del 2022 https://www.icex.es/icex/es/navegacion-principal/todosnuestros-servicios/informacion-de-mercados/estudios-de-mercados-y-otros-documentos-decomercio-exterior/DOC2020855705.html

Barron dorado A, Gimenez Leal G. & de Castro Vila R. Declaraciones ambientales EMAS como herramienta de medición en la transición de la industria hacia una economía circular *Revista de producción más limpia.* 369(1).pp 1-9 recuperado 25 de octubre del 2022. De https://doi.org/10.1016/j.jclepro.2022.133213

Dussel peters E. & PEREZ SANTILLAN L.(10 JUNIO, 2020) NUEVAS CONDICIONES,RETOS Y OPORTUNIDADES DE LA CADENA DEL CALZADO EN MEXICO POST-COVID 19 <u>https://www.ciceg.org/inteligencia.html</u>

Web Sites

https://www.leatherworkinggroup.com/

https://news.un.org/es/