

Application of CircularTRANS model in a service company

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Abstract

This article shows the transition process of a service company towards a Circular Economy (CE) model. The model used for this transition is the CircularTRANS model, which is designed for implementation in Small and Medium Sized Enterprises (SMEs) with limited resources.

Keywords

Circular economy, circular indicators, business models, circular transition, case study.

Introduction

In order to promote jobs, growth, and investment as well as the creation of a competitive, carbon-neutral, and resource-efficient economy, the European Commission developed an action plan in 2015 for the implementation of a Circular Economy (CE) (European Commission, 2015). The Green Deal, which came after this action plan, emphasized the need for a CE to promote the growth of lead-neutral and circular product markets, and

included a policy for "sustainable products" (European Commission, 2019). By 2050, this seeks to achieve a clean and zero-emission CE and establish Europe as the first continent to be climate neutral (European Commission, 2019). Another goal of this strategy is to help businesses move from a linear economy (LE) to a CE, as the LE has been shown to be resource-inefficient and to have negative effects on the environment and society (Sariatli, 2017).

To start with the transition from an EL to a CE Urain, Eguren and Justel (2022) have developed the CircularTRANS model. This model consists of a process where companies start with an initial diagnosis to determine their level of CE integration and end up with the establishment of an action plan to meet improvement targets and achieve more circular business models. For the application of the model, the research team recommends forming a multidisciplinary team since different internal aspects of the company will be evaluated. This means that the diagnosis is completed in less time and the answers are more accurate, achieving more precise results.

In addition, participatory and collaborative approaches, co-creation, have become popular because they encourage stakeholder participation in research and decision-making processes (Nguyen, Collins and Collins, 2024). Co-creation is known as the interaction of stakeholders with the work team (Sarasvuo, Rindell and Kovalchuk, 2022) during all phases of the project, with equality, collaboration, transparency, and continuity as basic principles (Nguyen, Collins and Collins, 2024). This is also mentioned by Van de Ven (2018) and Sharma et al. (2022) where they indicate that in order to have the stakeholders' perspective and solve problems, it is necessary to work in a participatory way.

This article presents the application of the CircularTRANS model in a dental clinic in Gasteiz, Spain, where Lurnova Environmental Consulting has accompanied them in the process, with the aim of reorienting their business model towards a more sustainable model by applying the bases of CE using the collaborative methodology between the research team and the workers at the clinic. In addition, the results and improvements obtained are shown. Finally, the conclusions obtained and the point of view offered by the clinic after applying the CircularTRANS model are presented.

Methodology

The CircularTRANS model, designed and developed by Urain, Eguren and Justel, (2022) consists of the following steps (Figure 1): i) the initial diagnosis through the completion of a diagnostic questionnaire called Industrial Circular Economy Questionnaire (ICEQ), ii) the analysis of the results obtained with ICEQ, iii) the identification of opportunities for improvement, iv) the establishment of the roadmap and v) the specification of the action plan. With the application of the model, the beginning of the transition of SMEs towards CE is achieved in a simple way.



FIGURE 1: CIRCULARTRANS MODEL

The methodology used for this case study (Figure 2) consists of the application of the CircularTRANS model (Figure 1) and the analysis of the improvements obtained by the dental clinic.

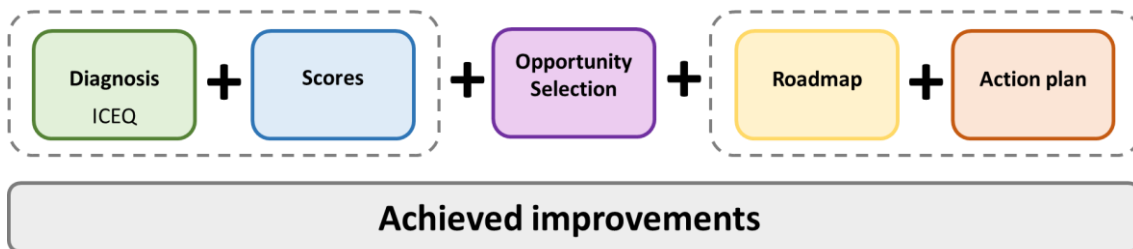


FIGURE 2: METHODOLOGY

To carry out the methodological process, the research team has helped the members of the company in aspects such as: i) resolving doubts for filling out the questionnaire, ii) analyzing the results and selecting the opportunities in line with the clinic's ideas and iii) defining different actions to implement the ideas. Throughout the process, face-to-face and online meetings have been held, which have been organized according to the needs of the clinic and the progress of the project.

Case study

Maite Urraca dental clinic (Figure 3), founded in 1988, is located in the center of Vitoria (Álava, Spain). This clinic aims to put all its knowledge and experience at the service of the patient, with individualized diagnosis and treatment (Clínica dental Urraca, 2022).

Quality and excellence are two pillars on which they base their work philosophy, in which they are aware of the field of CE in order to channel their activities working on more sustainable practices and taking into account the criteria of CE.



FIGURE 3: CLINIC DENTAL LOGO

The company showed interest in the application of the CircularTRANS model to make a transition to a CE and a first meeting was held by the research team where the following topics were discussed: i) a basic CE training and how to approach it, ii) the presentation of the CircularTRANS model explaining the process, required time and improvements that can be obtained and iii) the application of the model following the steps shown in Figure 2.

Diagnosis and Scores

Initially, and after the CE training, the clinic managers completed the ICEQ diagnostic questionnaire autonomously, although they had the support of the research team for possible doubts. Once the diagnosis had been carried out, the results obtained are shown in Figure 4, which firstly shows the general results that correspond to a score of 2 out of 5, placing the company at a basic level of application. The results of the internal processes are also shown, with the level obtained for strategic processes being 2.1 out of 5; for operational processes, 2.1 out of 5; and for support processes, 2.7 out of 5.

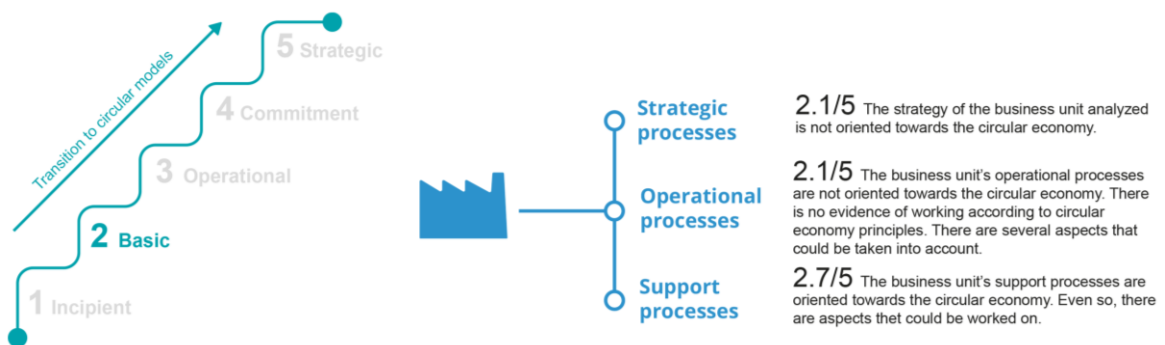


FIGURE 4: OVERALL AND INTERNAL PROCESSES RESULTS

On the other hand, with regard to the CE strategies used in Figure 5, it can be seen that the level for the regeneration strategy is 1.3 out of 5, for the strategy to extend useful life it is 2.3 out of 5, for optimizing resources it is 3.3 out of 5 and for cycle closure it is 2 out of 5.

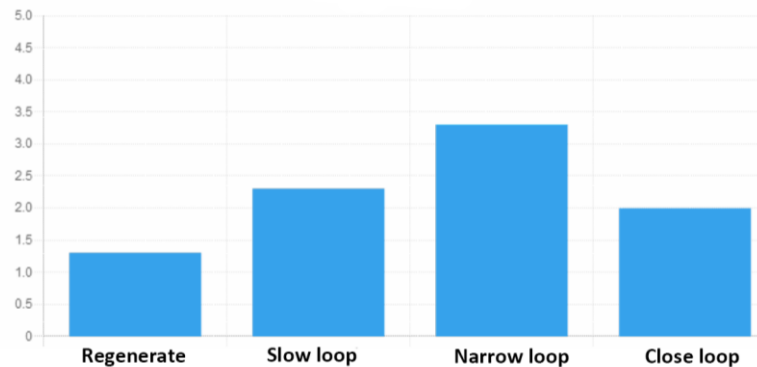


FIGURE 5: RESULTS ACCORDING TO CE STRATEGIES

From the results obtained, it can be seen that the clinic is working on some concepts that have an impact on both internal processes and CE strategies, but that there is still room for improvement in order to implement CE strategies and improve the overall level of the company.

Opportunity Selection

Based on the above results, the clinic has obtained 43 opportunities for improvement, 19 of which have been selected to continue with the process (Table 1). To screen the opportunities, the research team met with members of the clinic and identified actions to be implemented for each opportunity. In addition, Table 1 shows the CE strategies impacted by each opportunity.

TABLE 1: SELECTED OPPORTUNITIES

Opportunities	Strategies
Consider incorporating CE into the organization's strategy.	Regenerate
Consider redirecting the strategy to ensure that the useful life of the organization's offerings is extended as much as possible.	Slow loop
Assess whether offering CE solutions to end-of-life products can be strategic.	Close loop
Value increasing collaboration with other stakeholders.	Regenerate
Value increasing investment in CE initiatives.	-
Value offering recycled materials.	Close loop
Analyze how to increase the separability of materials.	Close loop
Value the use of recyclable materials/components and facilitate this task.	Close loop
Value the use of recycled materials instead of virgin material.	Narrow loop
Value the use of materials that can be compostable at the end of their life cycle.	Close loop
Assess how to communicate the steps to be followed by the customer once the product is no longer in use.	Regenerate, Slow loop, Close loop
Assess how to obtain and manage product usage information.	Regenerate, Slow loop, Close loop
Evaluate the incorporation of sustainability criteria for the selection of suppliers.	Narrow loop
Consider incorporating criteria in the purchase batches that minimize environmental impact.	Narrow loop
Assess whether any action could be taken to minimize the consumption of paper or other office consumables.	Regenerate

Opportunities	Strategies
The organization does not make any type of report on sustainable development, it could be a good option to show what the company does in this field.	-
Assess the value of internal communication efforts to raise awareness of CE and sustainable development.	Regenerate
Assess whether CE can be a selling point for products/services.	Regenerate
The staff knows what CE is. Assess how to increase their knowledge.	-

Roadmap and action plan

With the selected opportunities, a feasibility analysis was conducted according to: i) technical feasibility, ii) expected benefit and iii) resources needed, always taking into consideration the clinic's available resources. From this analysis, the members of the clinic team decided to select 16 opportunities to continue with the process (Table 2). The maturation period for each opportunity was also defined.

TABLE 2: OPPORTUNITIES TO WORK TO ACHIEVE ESTABLISHED OBJECTIVES

Opportunities	Strategies	Feasibility	Maturation period
Value increasing collaboration with other stakeholders.	Regenerate		Short
Consider increasing investment in CE initiatives.	-		Short
Analyze how to increase the separability of materials.	Close loop		Short
Consider incorporating sustainability criteria for supplier selection.	Narrow loop		Short
Consider incorporating criteria in purchasing batches that minimize environmental impact.	Narrow loop		Short
Assess whether any action could be taken to minimize the consumption of paper or other office consumables.	Regenerate		Short
Value to carry out internal communication tasks to raise awareness on CE and sustainable development.	Regenerate		Short
Assess whether CE can be a selling point for products/services.	Regenerate		Short
The staff knows what CE is. Assess how to increase their knowledge.	-		Short
Assess how to incorporate CE into the organization's strategy.	Regenerate		Short
Value the use of recyclable materials/components and facilitate such work.	Close loop		Medium
The organization does not make any type of report on sustainable development, it could be a good option to show what the company does in this field.	-		Medium
Evaluate redirecting the strategy to ensure that the useful life of the organization's offerings is maximized.	Slow loop		Long
Assess whether offering CE solutions to end-of-life products can be strategic.	Close loop		Long
Evaluate the use of recycled materials instead of virgin material.	Narrow loop		Long

Opportunities	Strategies	Feasibility	Maturation period
Assess how to communicate the steps to be followed by the customer once the product is no longer in use.	Regenerate, Slow loop, Close loop		Long

Note: : Feasible; : Half feasible; : Not feasible

It can be seen that the selected opportunities are on the one hand feasible or half feasible, and on the other hand achievable in the short/medium term, which guarantees the fulfillment of each one of them. Finally, and continuing with the process, the company defined its action plan, identifying the people responsible for the implementation of each opportunity and specifying the start and end dates.

Results

The application of the CircularTRANS model has generated positive results in different areas of the clinic's activities, of which the following stand out:

- Reduction and management of plastic through the replacement of different plastic elements with others that generate less environmental impact, saving 181kg per year.
- Savings of 89% of electricity consumed per year through the replacement of LED light bulbs and the creation of guidelines to optimize the use of energy.
- Total savings of 22,693L of water per year through the use of different technologies that allow them to optimize water usage.
- Relationship with suppliers through the use of green purchasing criteria.
- Sustainable mobility by encouraging public transport among the clinic's employees and optimizing patient travel by scheduling appointments for members of the same family on the same day and at the same time.
- Promoting waste separation and recycling.
- Reduction and management of paper thanks to digitalization.

In addition, the clinic is committed to minimizing the environmental impacts of its activities and has defined periodic environmental goals in accordance with defined guidelines:

- Always comply with legal requirements, standards, and regulations, as well as with the voluntary obligations that apply to the organization.
- Ensure that the raw materials used come from sustainable sources.
- Minimize waste generation. Reduce consumption, prioritize the use of reusable and recyclable materials, and dispose of waste appropriately and responsibly.
- Contact with other dental clinics in the area in order to unify material orders.

- Encourage the use and purchase of self-washable materials instead of single-use materials.
- Continue to train and inform other clinics, with the aim of raising awareness and setting an example in terms of sustainability. Communicate regularly and transparently about environmental performance and address environmental concerns.
- Train and raise awareness among employees and clients, conveying to them the importance of acting in an environmentally friendly manner.
- Preventing pollution by evaluating possible environmental risks at each stage of the services' delivery with the goal of creating procedures that have the least negative impact on the environment.
- Efficiency in integrated water management and reduction of the water footprint of the activities carried out in the clinic.

Finally, they will carry out the calculation of scope 1 and 2 of carbon footprint and a study to reduce the clinic's emissions.

Conclusions

There are studies where business models are analyzed with a customer vision and focused on the industrial sector (Sairanen, Aarikka-Stenroos and Kaipainen, 2024) but no studies have been identified where the service sector is considered to work on CE and a change is made in the business. Therefore, it has been found that the application of the CircularTRANS model, considering the CE criteria in companies outside the industrial sector, is valid for obtaining optimal results with simple and easy-to-apply measures that improve the level of CE integration.

In addition, the clinic has defined the CircularTRANS model as "a good tool not only to calculate, but also to have a database where we can include the measurements that we make with the periodicity that we have considered. It is a very good support tool where we can reflect the results and progress. Without the CircularTRANS model and the platform, many actions can be forgotten, and this forces users to keep track and have to review and report the information, always keeping the previously established objective in mind".

As a future line, the need has been identified to develop a model of indicators to manage CE on an ongoing basis, using the most appropriate indicators according to the company's business model.

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References

Clínica dental Urraca (2022) *Clínica Dental Urraca*. Available at: <https://clinicadentalurraca.com/> (Accessed: 15 November 2023).

European Commission (2015) *Closing the loop An EU action plan for the Circular Economy*.

European Commission (2019) *Communication from the commission to the European Parliament, the European Council, the European Economic and Social Committee and the Committee of the Regions- The European Green Deal*. Available at: https://ec.europa.eu/info/sites/info/files/european-green-deal-communication_en.pdf (Accessed: 29 November 2020).

Nguyen, N.T., Collins, A. and Collins, C.M. (2024) 'Trends and patterns in the application of co-production, co-creation, and co-design methods in studies of green spaces: A systematic review', *Environmental Science & Policy*, 152, p. 103642. Available at: <https://doi.org/10.1016/J.ENVSCI.2023.103642>.

Sairanen, M., Aarikka-Stenroos, L. and Kaipainen, J. (2024) 'Customer-perceived value in the circular economy: A multidimensional framework', *Industrial Marketing Management*, 117, pp. 321–343. Available at: <https://doi.org/10.1016/J.INDMARMAN.2024.01.006>.

Sarasvuo, S., Rindell, A. and Kovalchuk, M. (2022) 'Toward a conceptual understanding of co-creation in branding', *Journal of Business Research*, 139, pp. 543–563. Available at: <https://doi.org/10.1016/J.JBUSRES.2021.09.051>.

Sariatli, F. (2017) 'Linear Economy Versus Circular Economy: A Comparative and Analyzer Study for Optimization of Economy for Sustainability', *Visegrad Journal on Bioeconomy and Sustainable Development*, 6(1), pp. 31–34. Available at: <https://doi.org/10.1515/VJBSD-2017-0005>.

Sharma, G. *et al.* (2022) 'Cocreating forward: how researchers and managers can address wicked problems together', *Academy of Management Learning and Education*, 21(3), pp. 350–368. Available at: <https://doi.org/10.5465/AMLE.2021.0233>.



Urain, I., Eguren, J.A. and Justel, D. (2022) 'Development and validation of a tool for the integration of the circular economy in industrial companies: Case study of 30 companies', *Journal of Cleaner Production*, 370. Available at: <https://doi.org/10.1016/J.JCLEPRO.2022.133318>.

Van de Ven, A.H. (2018) 'Academic-practitioner engaged scholarship RICK section of Information & Organization', *Information and Organization*, 28(1), pp. 37–43. Available at: <https://doi.org/10.1016/J.INFOANDORG.2018.02.002>.