CHAPTER 8

Analysis of Innovation Processes in the Circular Economy in Hotel Companies, Jalisco, México

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8.1 Introduction

Belda Heriz, [1] manifested ten years ago that about 2900 million of the urban population generated 0.64 kg of solid waste, according to the *Global Review of Solid Waste Management*, 2012. The same report estimates that, by that date (2012), there had been an increase of 3 billion urban residents, generating 1.2 kg per person per day (1.3 billion tons per year), an increase of more than 91%. By 2025, there are estimated to be 4300 million urban residents, generating around 1.42 kg of MSW per

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person per day (2200 tons per year, slightly more than 6 million tons of waste every day). This is an increase of 70%.

The current fallacy lies, as was shown years later, since the beginning of the twenty-first century, the prices of raw materials have increased by 147% in real terms,

> for which, statistically, an annual investment of around $1 trillion in the natural resources generation and system conservation will be needed to meet the future demand. As the next problem on this line, we have the overexploitation and consumption of natural resources as well as the management of the waste. Based on the above it is estimated, according to an article published in the prestigious journal Nature 28 in 2013, that by extending the current socio-economic trends, by the year 2100 we will not reach the maximum peak of waste, but we will produce a whopping 11 million tonnes of urban waste per day, which would undoubtedly be a very costly economic and environmental burden. [1: 30]

The previous vision of the economy was short term, which consists of the use of predatory resources, of using and throwing away, and with the definite objective of obtaining many profits in a short time, with a capitalist approach, of linear production. Nowadays, the human consumption of natural resources isn't sustainable, if this situation continues at the same rate, we will finish all the natural resources.

The purpose of this investigation is to analyze the innovation process of the circular economy in hotel companies in Jalisco State, México. This investigation includes the hypothesis of the innovation process in the circular economy in the hotel companies is the way to attract guests by taking care of the environment and using renewable energies.

The paper is divided into seven sections, including the summary and introduction, the part of the literature review that explains the concepts of innovation from the perspective of some authors of the specialized literature and the Oslo Manual, as well as the emerging paradigms from the approach to the evolutions of propellers, especially the quintuple helix focused on eco-innovation, ecology, and sustainability, at the same time an explanation of the innovation processes of the circular economy is made. The methodological part explains that it is mixed research, a combination of qualitative and quantitative using interview and survey techniques. The results interpret the graphics and tables that were generated from the survey application. It also addresses the discussion of work as well as its conclusions.

8.2 Literature Review

8.2.1 Innovation Process

In the present century, the concept of innovation has changed drastically, since disruptive, social, business and educational innovation has been the core of many types of research. With that in mind, it is pertinent to address the issue as an evolutionary process; this section explains the following types of innovation (Table 8.1).

These ten types of innovation that refer [2] were born in agreement with the authors to strengthen companies in their development and consolidation, for instance, from the generation of the product to its destination which is for customers or final consumers, this process involves observing details that lead to the generation of the added value of the products offered, the connection with other companies or institutions to create value, the organization and alignment of human talent in the business and the sophisticated use of a superior working method in the enterprise.

The current demand for all companies is to generate innovation and this is the key to becoming able to land their way of manufacturing or producing a product or service. The ten types of innovation presented by [2] is the strength of all kinds of business in the globalization era, given this, the Organization for Economic Cooperation and Development [3] in the "Oslo Manual" identifies four types of innovation which are defined subsequently.

Table 8.1 Types of innovations

Keeley et al. [2]	*Oslo Manual OECD [3]*
1. Innovation in the business model	1. Product innovation
2. Innovation in strategic alliances	2. Process innovation
3. Innovation in the business structure	3. Marketing Innovation
4. Process innovation for business support,	4. Organizational innovation
5. Product innovation	
6. Innovation in the product system	
7. Innovation in service	
8. Innovation in the distribution channel	
9. Innovation in the product brand	
10. Innovation and customer engagement	

Source Own elaboration based on [2, 3]

1. Product innovation: the introduction of a good or service, which is new or significantly improved concerning its intended characteristics or uses. This includes significant improvements in technical specifications, components, materials, built-in software, friendly uses, or other functional features.
2. Process innovation: the implementation of a new or significantly improved production or supply method. This includes significant changes in techniques, equipment, and/or software.
3. Marketing Innovation: The implementation of a new marketing method that involves significant changes in product design or packaging, product placement, product promotion, or pricing.
4. Organizational innovation: the implementation of a new method of organization in business practices, workplace, or external relations. Also called innovation in management, basically, it perfects how the company is managed.
5. The interrelationship between types of innovation has been emerging in recent years for higher education institutions and enterprises as an economic paradigm due to changes in organizations and institutional structures that increasingly requires more explanation.

8.2.2 Emerging Economic Paradigms Using Triple, Quadruple, and Quintuple Helix

As a process of innovation in the circular economy at the international level, the linkage and collaboration between the actors of the triple helix university-industry-government is increasingly pressing for the economic development of a country and a state, the triple helix was born in the 90s by Henry Etzkowitz and his collaborators [4] precisely to strengthen this link as a strategy to generate collaborative projects, strategic projects and during these four decades has been made presence for the strengthening of the industries with the university and with the government, example we have cases Asian, European, North American and Latin American (Argentina, Mexico, Brazil and Chile), for example in Mexico many universities in the country are participating in innovation projects with National Council of Science and Technology (in Spanish Consejo Nacional de Ciencia y Tecnología) programs, other universities are participating with funds from other government institutions such as Pro Mexico, National Financial (NAFIN in Mexico), all this collaboration has been permeated together with companies whether industrial, trade or

services. Currently, more and more collaborations are being developed with companies that are carrying out activities in digital form, taking care of the environment, and at the same time, considering technological development and sustainability.

Rickne et al. [5], recognize that there is new incorporation into knowledge spin-off or start-up creation that is replaced at the center of the university's spiral and other knowledge institutions that can be generated. This incorporation is called the "quadruple helix", it is a further extension of the involvement of heterogeneous agents [6, 7]. The main focus is to regulate the interaction, linkage, and cooperation of universities with the productive sector and government agencies through strategic projects and financial resources.

The quadruple helix is a space of social life for the actors involved, a place where you can interact, make decisions, of course, you can form a group of "people" members of the propellers (university, company, and government), to generate strategic projects and work in favor of micro, small and medium-sized enterprises and consequently the formation of human capital and the transfer of scientific, technological, and innovation knowledge.

Carayannis et al. [8], mention that there is another model that takes into consideration the environment, democracy, and social innovation, the model is called "the innovation model of the Quintuple Helix" is even more comprehensive than the rest, contextualizing the quadruple helix and adding, in addition, the helix and perspective of the "natural environments of society", it should be noticed that, for the present research, the ecosystem linked to the subsystems was taken by the same idea, where it supports the formation of win–win between Ecology and Innovation, which leads to the creation of synergies between the economy and society.

This quintuple helix goes beyond sustainability or sustainable development, it can mean and imply an eco-innovation and eco-entrepreneurship [9], with that in mind, they are included in the natural environment of society and the economy, social ecology, socio-ecological transition, and social responsibility.

Therefore, [8] carry out an analysis of the Quintuple Helix that has the potential to serve as an analytical framework for sustainable development and social ecology, by conceptually relating knowledge and innovation to the environment. Authors like [10] take up this whole process of innovation of the literature on the triple, quadruple, and quintuple helix which is relevant to the public policy of a nation, from various approaches and

environments; economic, education, sociological, and ethics, that go hand in hand with sustainability.

Sustainable knowledge reflects the performance and quality of the natural environment. The Quadruple Helix also describes what sustainable development could mean and implies "eco-innovation" and "eco-entrepreneurship" in the current situation as our future in the environment.

Nowadays, the term "environment" is completely related to the theme itself, but there can exist different types of environments, going so much further, as the social and economic environment, which link with ecology. Then, the economy and politics go hand in hand in something we know as a society, and they need to be perfectly interlinked in order for the system to work correctly.

The twenty-first century is facing systematic changes, stemming from innovation in development model movements that were based on privatization and the hegemony of lucrative private enterprise, directly impacted by antisocial practices, they have returned to historical levels of inequality and poverty, in addition to the lack of adequate responses to the new social demands of the traditional enterprise, where the environmental sustainability of the business model is among the main objectives to be applied.

This model, in wanting to adhere to environmental sustainability, does not give the expected results, so currently, the need for change as a process of innovation is focusing on the social responsibility aspect, where several authors are transforming their discourses and practices by directing resources to the social and environmental problems of the world [11].

Within the previous global development paradigm, the social economy is emerging as a process of innovation, which is based on the benefits of the community and its social groups. It emerges as a third sector that performs macroeconomic and microeconomic functions that correct different imbalances and substantive economic and social problems. This sector increases the impact on economies, and contributes to a more balanced economic and social development, as world-renowned economists and intellectuals are defending, among them, the Nobel Prize winner Stiglitz, 2009, and Mintzberg, 2015, which argue that there would be a better balance in the economy, combining the three economic sectors, the public, the private capitalist, and the social economy [11].

Likewise, the community in search of improving its quality of life is emerging with the concept of social innovation as a process where authors like Etzkowitz [12] argue that growth in this type of economy and social innovation requires an active civil society, where "the Triple Helix anchored in a thriving civil society fosters the emergence of diverse sources of innovation", this social innovation is dimensioned through various eco-innovation approaches through the Triple, Quadruple and Fivefold Helix mentioned in the following sections.

8.2.3 Eco-Innovation

Vence and Pereira [13] settle that eco-innovation is any innovation aimed at reducing the environmental impact, in addition to technological change, covering as well organizational, social, and systematic innovations.

Eco-innovation is a facilitator of the circular economy, which is presented as an approach to maintaining and sharing value over time, from the perspective of eco-innovation a business model that needs to add ecological and social value and above all change the practices of the producer and the consumer, in search of reconfiguring how they interact in actions of distribution, repair, reduction, remanufacturing among others, based on eco-mobility systems, intelligent energy systems, short value chains.

The Eco-innovation observatory suggests the involvement of the restructuring of its economic, business, infrastructure, and government areas, it also enables the shift toward eco-innovation to be implemented in strategies aimed at reducing the environmental impact of resource use, the substitution of higher impact materials with lower resource productivity materials and strategies to increase services from a certain amount of products, such as delivery systems, pooling, and leasing [14].

As a result, the following types of eco-innovations to be implemented for a circular economy model are also proposed (Table 8.2).

Eco-innovation is the product of collaborative work between university-business-government, civil society, and society in general, that is to say, a multi-stakeholder and quintuple Helix effort. The European Commission has also been active in the field of environmental protection.

Table 8.2 Types of eco-innovation

Types	*Descriptions*
Product design with eco-innovation	The overall impact on the environment and material input is minimized throughout the product life cycle, allowing recovery options such as repair, maintenance, manufacturing, recycling, and cascading of components and materials
Eco-innovative processes	The use of materials, emissions, and hazardous substances are reduced, risks also and costs are saved in production processes. Advances in remanufacturing, such as replacement or repair of defective components, including product upgrading, product dismantling and recovery, materials and substances, functional recycling, zero waste production, zero emissions, and cleaner production
Eco-innovative organization	Methods and reorganization of management systems pressing to close losses and increase resource efficiency. New business models, for example, industrial symbiosis, new systems for collecting and recovering valuable resources from products to functional services (product-service systems)
Innovative eco marketing	Product and service design, placement, pricing promotion of reuse for the same purpose as bottles, appliances, and different purposes such as tires as boat fenders, eco-labeling, and green marks
Social eco-innovation	Behavior and lifestyle changes, user-driven innovation to share appliances, books, textiles, collaborative consumption floors, garden, tools, adequacy in plastic bag prohibition, smart consumption, responsible shopping
Eco-innovative systems	New systems are created with completely new functions that reduce the total impact on the environment, motivate a substantial dematerialization of the industrial society, implement smart cities, and permaculture actions

Source [14]

8.2.4 Ecology and Sustainability

"Ecology" refers to the interdisciplinary analysis of interactions between living organisms and their environment. Based on these patterns of interaction, the sum of living organisms and the non-living environment defines an "ecosystem", which is why we speak of eco-innovation and eco-entrepreneurship.

On the other hand, sustainability can be seen from two different approaches: the first, as the study of the relationship between society and its economy, for it to develop, and the other as the relationship between society and the environment, also trying to develop this area. It was the German biologist Ernst Haeckel (1834–1919) who coined the term Ecology in 1869 and defined it as "the study of the interdependence and interaction between living organisms (animals and plants) and their environment (inorganic beings)" [15].

This is where the definition "sustainable development" appears, which is a combination of the mentioned is, concluded as the optimization of the relationship of a society with its economy and at the same time with the environment in which it lives daily.

In this way, sustainable or sustainable development meets the needs of the present without compromising the capacity of future generations. Broader conceptualizations or definitions of democracy that do not limit the political system, but are interested in integrating the political system, society, and economy, in one setting or another, possible reflecting aspects of sustainable development.

Therefore, the democracy knowledge that unites the political system, society, the economy, and the environment allows the application of concepts of social ecology in a framework of sustainable development coming together with the sustainable development, It also analyzes the human activities of society between its "cultural world", including its customs and way of life, and its "material world", being everything that human kinds use and take from nature. The whole of studying social sciences and natural sciences has proved to be of great importance for social ecology.

8.2.5 Circular Economy

The changes of the circular economy are increasingly pressing for all citizens of the planet, 86% of society is concerned about the care of

the environment and it is committed to a respectful production system that does not necessarily imply a greater financial outlay, where innovation processes can help reduce the costs of the transition to the circular economy and has been proved that "green" investments can become more profitable than traditional long-term investments. Keeping that in mind and in addition, this new economic model has the potential to create new jobs [16].

This model directs the change toward the circular economy and requires the commitment of all the actors involved in the model of the fifth or five-fold propeller that was explained in the previous sections.

Based on the above-mentioned, circular economy seeks the involvement of the university area through its research projects linked to companies. In addition to the exchange of data, coordination between administrations, the scientific, technological community, economic, and social actors, obtaining the favorable synergy for the fifth helix model.

The circular economy aims to recycle, and reuse using the necessary technologies and clean energy and has a focus on the green economy and sustainability, that is, an economy based on organic and inorganic natural resources. It was born from replacing the linear economy that was to use and throw. The aim should be not only to recycle and reuse, but also to change the production forms and consumption, that is to say, increasingly use biodegradable materials that do not pollute society, in addition, companies also get involved in not using raw materials that harm the environment, as it is known that in the industrial revolution world, we have not been able to give a balance to the sustainable economy, we remain trapped in the linear economy, which, although more and more countries separate organic and inorganic wastes. Mexican culture remains very indifferent to carrying out this action.

8.3 Methodology

In the methodological design, the specialized literature for the construction of a theoretical framework to frame the research was reviewed, and the type of research that was used was mixed, which sought to identify innovation processes in the circular economy in hotel companies in Jalisco, Mexico.

This research is exploratory in a way that it sought to describe the relationship between the circular economies as a process of innovation in hotel companies. The method used is deductive, due to how the topic

was addressed since it moved from a global issue to a specific problem in the state of Jalisco. According to the information sources, this study was documentary research and field research, since data collection instruments were used, like expert interviews and a survey of hotel companies with a population of 15 of the most representative hotels inside Jalisco state, Mexico, and 3 expert interviews on the subject.

The interviews were with experts in Circular Economy (academics and researchers and tourism certification consultants) as a process of innovation in hotel companies in Jalisco.

On the other hand, it counts surveys of 15 hotel companies to determine the application of the circular economy. The sample was of convenience since they are the most representative in Jalisco in terms of providing more professional information.

8.4 Results

According to the results of the survey that was answered by 60% of the large hotel companies, followed by 20% medium, 13% small, and 7% micro, which provided information regarding innovation processes in the circular economy (Fig. 8.1).

These companies were asked 14 questions of which all the answers are reflected, although many of them are presented in graphic form and the rest in the corresponding description.

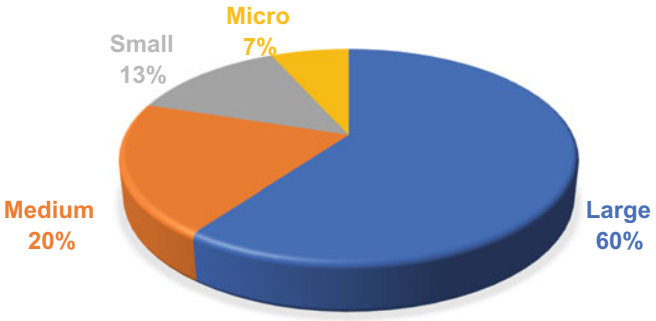

Fig. 8.1 Size of the company (*Source* Prepared by the authors)

The surveyed were first asked to point out the types of transportation being promoted in the hotel for the use of its guests for environmental care. The results showed that 100% of them use public transport, although 47% of them also indicated the use of a shared car, 13% use a bicycle and none of them use an individual vehicle or rental vehicle. According to the information presented, it is noteworthy to note that there is a higher percentage of environmental actions. In addition to that, the guest had information on some options such as moovit, waze, GDL routes, and others. Therefore, respondents pointed out others, such as Google maps.

On the other hand, respondents were asked for information regarding the types of products they use at the hotel to make this become sustainable, where they pointed out that 60% are biodegradable goods, 20% green goods and 40% of them said another type of product, although they did not specify what type (Figs. 8.2 and 8.3).

Added to the previous graph, the informants pointed out that in the department in which ecological friendly products are used: 100% in food and drinks, 87% in dry cleaners, and 27% in housekeepers, although in the laundry area, Human Resources is not as common to use sustainable products as reflected in the graph below (Fig. 8.4).

It was also requested that they indicate the products that are recycled, as well as the origin of the souvenirs. With that in mind, 100% of the respondents indicated that plastic, glass, paper, and cardboard are recycled, the only ones that are not reused are aluminum, and batteries, On the other hand, the typical souvenirs come from the local artisans, that is

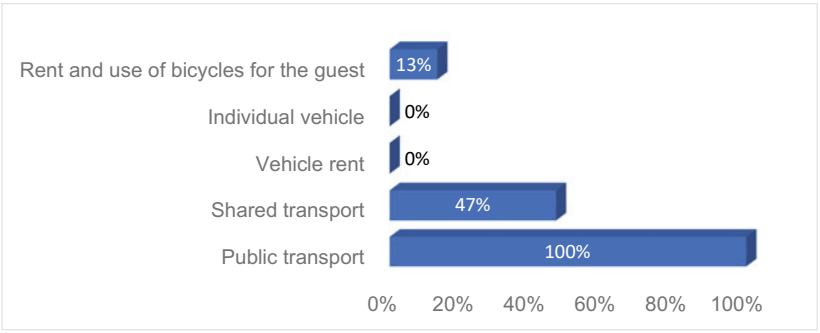

Fig. 8.2 Type of transport (*Source* Prepared by the authors)

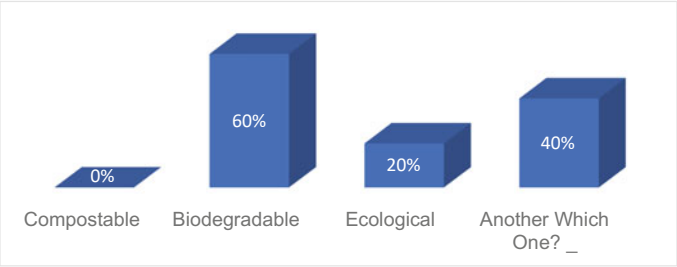

Fig. 8.3 Product used in the hotel (*Source* Prepared by the authors)

Fig. 8.4 Areas using sustainable products (*Source* Prepared by the authors)

to say, the hotel is decorated with products made in the community and not imported. The question was also whether whoever benefited economically from the products being recycled, responded that it was used in support of the community and for hotel employees.

In the area of water care, they were asked about the strategies used in the hotel, they replied that 100% was reused in sheets and towels of the guests, as well as rainwater recycling, Also the use of biodegradable products in showers in the establishment represented 60%, 20% in

express showers (5 minutes) and finally, 13% use the solar heater. In water, recycling is used to irrigate green areas and wastewater for reuse (Fig. 8.5).

About the use of types of intelligent energies for environmental care, the informants commented that 80% were switched off and on with automatic light bulbs, and only 7% mentioned that they use solar panels; they also pointed out another but did not specify which. The renewable energy used is wind and solar primarily (Table 8.3).

They were asked if they had an environmental certification, they said that 67% had Earth Check and 33% mentioned Green Key, on the other hand, if they offer environmental training to sensitize employees, tourists, and the whole community, but it turns out that only 62% train their staff and 33%, guests (Figs. 8.6 and 8.7).

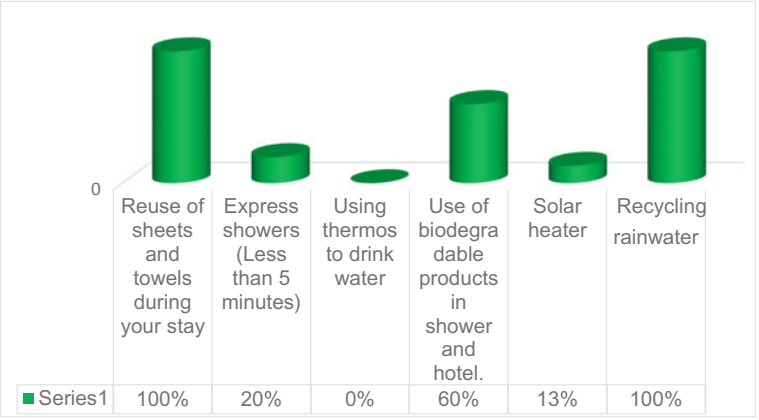

Fig. 8.5 Water care strategy (*Source* Prepared by the authors)

Table 8.3 Type of intelligent energy

Automatic switching on and off spotlights	80%
Use of solar panels	7%
Use of polarized sheets in windows	0%
Another. Which one?	67%

Source Prepared by the authors

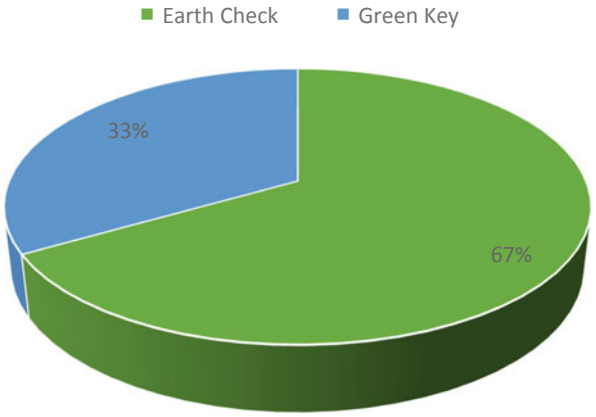

Fig. 8.6 Types of environmental certifications (*Source* Prepared by the authors)

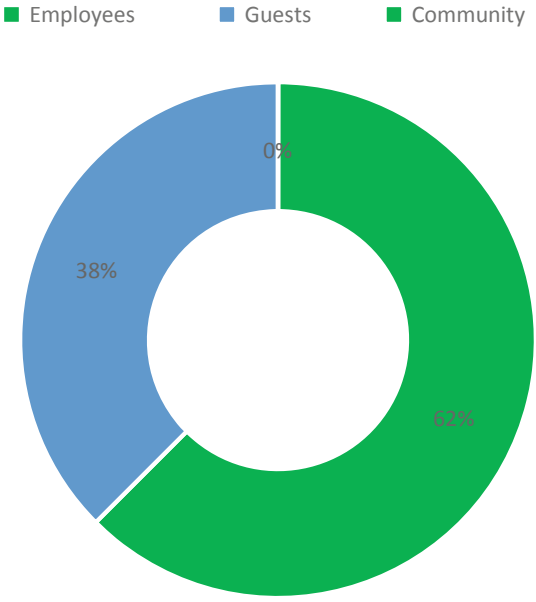

Fig. 8.7 Training in Environmental issues (*Source* Prepared by the authors)

8.4.1 Interview in Depth

Regarding the results of the in-depth interview, there is a certifying evaluation area, where the goal is to achieve the sustainable development of the company and community. These accreditations follow a methodology of certification companies that gives them the guidelines to make changes and achieve the goal.

Guests and employees are invited to participate in training and environmental education. The certifications motivate hotels to implement environmentally friendly energies, with automatic switching on and off lights, air conditioning control, heating, and some even using solar panels, as well as low-power lights in public areas. In addition, shade trees are planted.

Reuse of sheets and towels during the stay of guests, showers, bathrooms, low consumption faucets, also rainwater recycling, accumulated condensation, and residual water from kitchen sinks.

Hotels and tourism companies are in the stage of sustainable development, which allows generating new theories as is currently the circular economy but is in the beginning of these processes.

8.5 Conclusions

Analyzing the processes of innovation in the circular economy in hotel companies in Jalisco, Mexico, we can confirm that it is a fundamental issue because of the level of consumption that humanity currently makes, which is not sustainable. This type of company is a model to measure the care of the environment, since the provision of services they perform, has an impact on the nature of different areas.

The objective that was proposed was the innovation processes in the circular economy of hotel companies in the state of Jalisco, which is a way to attract guests by taking care of the environment and using smart energy, having as a result that hotel companies have practices to take care of nature, with the use of biodegradable, organic goods, consume products.

Keeley et al. [2] established that innovation consists among other aspects of the vision of generating added cost of products; Derived from this it was found that both traditional hotel establishments offer elements of environmental care through the circular economy as a value-added product, to attract tourists.

The traditional hotels at 100% promote public transport or shared car, use environmentally friendly products such as biodegradable, ecological, and organic in different percentages and the whole apply recycling strategies.

Both the companies that belong to the platform and the traditional hotels seek to increase the impact of innovation, through the development and integration of technology and the scaling of disruptive business models, through collaborative work in four areas such as waste, energy, mobility, and water.

In this research, only 7% of traditional hotels use solar panels, which is a low statistic for the power generation category. In terms of certifications, the traditional hotel industry does have them, basically focused on the care of nature. Both traditional and platform-based hotel companies are at the beginning of the circular economy, but there is a lot of technology and innovation that can continue to be implemented to make these processes possible.

References

1. H. I. Belda, "Economía circular, un nuevo modelo de producción y consumo sostenible," Tébar Flores, 2018, p. 28.
2. L. Keeley, R. Pikkel, B. Quinn and H. Walters, "Ten Types of Innovation: The Discipline of Building breakthroughs," Chicago, USA: Part two: Wiley; http://irpublicpolicy.ir/wp-content/uploads/2018/02/97395B9B4D3A41ECD88DAB0766C3386B-irpublicpolicy.pdf, 2013.
3. OCDE, "OECD Science, Technology and Industry Scoreboard 2013," 20 Abril 2013a. [Online]. http://www.keepeek.com/Digital-Asset-Management/oecd/science-and-technology/oecd-science-technology-and-industry-scoreboard-2013_sti_scoreboard-2013-en#page1.
4. H. Etzkowitz and L. Leydesdorff, "The Triple Helix—University-Industry-Government Relations: A Laboratory for Knowledge-Based Economic Development," EASST Review, pp. 14, 14–19; https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2480085, 1995.
5. A. Rickne, S. Laestadius and H. Etzkowitz, "Innovation Governance in an Open Economy," USA: Routledge; https://www.routledge.com/Innovation-Governance-in-an-Open-Economy-Shaping-Regional-Nodes-in-a-Globalized/Rickne-Laestadius-Etzkowitz/p/book/9781138792166, 2013.
6. R. Arnkil, A. Järvensivu, P. Koski and T. Piiraine, "Exploring Quadruple Helix: Outlining User-oriented Innovation Models," European Regional Development Fund and INTERREG IVC Programme, Finland; https://trepo.tuni.fi/bitstream/handle/10024/65758/978-951-44-8209-0.pdf;jsessionid=722A7EA180C2517589A38F8950347CB6?sequence=1, 2010.

7. L. Ahonen and T. Hämäläinen, "CLIQ: A Practical Approach to the Quadruple Helix," in Sustaining Innovation; Collaboration Models for a Complex World, London, Springer, p. 191; https://link.springer.com/book/10.1007%2F978-1-4614-2077-4, 2012.
8. E. Carayannis and D. Campbell, "Smart Quintuple Helix Innovation Systems; How Social Ecology and Environmental Protection are Driving Innovation, Sustainable Development and Economic Growth," Springer; https://link.springer.com/book/10.1007%2F978-3-030-01517-6, 2019.
9. E. G. Carayannis and D. F. Campbell, "Developed Democracies versus Emerging Autocracies: Arts, Democracy, and Innovation in Quadruple Helix Innovation Systems," Journal of Innovation and Entrepreneurship, pp. 1–23; https://link.springer.com/article/10.1186/s13731-014-0012-2, 2014.
10. Y. Cai and H. Etzkowitz, "Theorizing the Triple Helix Model: Past, Present, and Future," Triple Helix, p. 38; DOI: https://doi.org/10.1163/21971927-bja10003, 2020.
11. R. Chaves Ávila and J. L. Monzón Campos, "La economía social ante los paradigmas económicos emergentes:innovación social, economía colaborativa,economía circular,responsabilidad socialempresarial,economía del buen común, empresa social y economía solidaria," 2018. [Online]. Available: http://www.ciriec.uliege.be/wp-content/uploads/2019/02/WP2018-13.pdf.
12. H. Etzkowitz, "Innovation Governance: From the 'Endless Frontier' to the Triple Helix," in *Geographies of the University. Knowledge and Space*, vol. 12. Springer, Cham; https://link.springer.com/chapter/https://doi.org/10.1007/978-3-319-75593-9_8, 2018.
13. X. P. Vence, "Eco-innovación y modelos de negocio circulares como facilitadores de una economía circular," Contaduría y Administración, p. 10, 2018.
14. O. O. Ecoinovation, "Eco-is Thematic Areas and Indicators," 2016. [Online]. Available: https://ec.europa.eu/environment/ecoap/indicators/index_es.
15. K. Herrera Mendoza and E. Bravo de Nava, "Perspectiva de la ecología en la comprensión de los comportamientos ambientales," 2013. [Online]. Available: https://www.redalyc.org/pdf/737/73730059003.pdf.
16. European Commission, "Lead the Way to a Circular Economy World," 2020. [Online]. Available: https://ec.europa.eu/environment/international_issues/pdf/KH0220687ESN.pdf.