

CONSTRUCTION AND REAL ESTATE SUSTAINABILITY MANAGEMENT: COSTA RICAN PROSPECTS 2016–2021

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Abstract. Population growth has increased climate impact and it is one of the reasons for the conception of sustainable management. Sustainability management has become an integral part of the business environment and decision-making processes. It is important to mention that construction sectors represent one of the main polluters. This article introduces the path for Costa Rica in the last five years in terms of development and the increasing number of companies with green building certification. Interviewing the professionals with vast experience in the sustainable sector is the tool used to compile the current situation of Costa Rica and the journey through this path as a pioneer in Latin America and the Caribbean. The study explores the situation lived by the companies in Costa Rica to set their projects according to the regulations established by the authorities in the sustainable management field and examines the position of the governmental authorities as a barrier or a facilitator. Therefore, this article aims to contribute to the discussion about the status of sustainability management in Costa Rica in the last five years as the scope of the investigation.

Keywords: *Certification, climate change, construction, Green building, sustainability management.*

INTRODUCTION

In Latin America and the Caribbean, Costa Rica is recognised as one of the leading countries in sustainability. Costa Rica is named the 14th most Green Country in the World and second in Latin America, according to the released 2018 Global Green Economy Index (GGEI). Per Dual Citizen LLC (2018) “The performance index of the 2018 GGEI is defined by 20 underlying indicators, each contained within one of the four main dimensions of leadership and climate change, efficiency sectors, markets & investment, and the environment”. In addition, Costa Rica received a 2019 Champions of the Earth award, the UN’s highest environmental honour, for its role in the protection of nature and its commitment to ambitious policies to combat climate change (UNEP, 2019). Costa Rica’s journey to sustainability was also reinforced when the country committed to the Global Sustainable Development Goals proposed by the United Nations in 2010 and to the Paris Agreement in 2016. Both initiatives’ goal is to reduce the deadly emissions causing rapid, disastrous climate change. The current global and country commitment to climate change results in a market transformation not only for the government but also for people and companies in Costa Rica. Now, all companies

seek to have a competitive advantage that differentiates them from their competitors, and they seek continuous improvement in all their operating processes as a way of evolving in the face of this changing world.

The justification for this research is because Costa Rica is a pioneer in Latin America in promoting sustainable construction and will serve to encourage the use of more sustainable materials and technologies and the definition of eco-efficient design and construction standards. All the benefits from sustainable construction will help the country, culture, and economy to accomplish their commitments.

This research focuses on the construction sector, which is the fourth most important sector in the country and generates direct employment for many residents. “The construction GDP is forecast to decline by 8.7 %, while its recovery in 2021 will be only 1 %, which is low considering the steep 10.7 % drop that occurred in 2019,” said the union representative. According to the report published by the CCC, the Monthly Index of Economic Activity in private construction presented a decrease of 19.5 % in 2020, while in 2019 the index was 7.5 %. For its part, the IMAE of public construction decreased 13.9 % in 2020, while in the previous year the reduction was 16.7 %.” (Inanova, 2021). For this reason, it is in the national interest that companies in this sector can maintain their operations to help with the economic development, new trends in the business, through the generation of jobs, and the attraction of direct foreign investment.

Part of the benefits sought through this research is the reinforcement of sustainable practices in the construction sector. According to studies carried out, the companies need to change their objectives and align them to new tendencies, which is why it is important to work on a business model that supports sustainability management. However, the support of the government can positively affect every project taking off the barriers that sometimes are the problem when they work in a sustainability project. As previously stated, Costa Rica is committed to reducing its carbon footprint towards becoming a net-zero emitter by 2050, and with this goal, the government along with some private companies has implemented a few initiatives to promote sustainable practices, for example, the program “Blue Flag”. However, the incentives and benefits given by the Government of Costa Rica are not strong enough. Nevertheless, only a few companies have already begun to truly embrace sustainability as a work structure that leads to growth by increasing shareholder value, giving more weight to the satisfaction of other business actors, and protecting and increasing the reputation of the brand.

With the contribution of this research, we would also acknowledge the contribution of the government, Costa Rica Green Building Council, Camara Costarricense de la Construcción, and Federated College of Engineers and Architects of Costa Rica that have an important role in the development of sustainable management in the construction sector of Costa Rica. It is suitable that we use this occasion to understand their opinions and experiences consulting and developing sustainable projects and use those insights to help set the sustainability agenda for the next five years.

The problem proposed for this research is to identify the progress in the implementation of the sustainability practices in the construction and real estate development sector in Costa Rica.

To solve the problem, a general objective and three specific objectives have been established. The general objective is to determine the status of sustainability management in Costa Rica in the last five years. The three specific objectives established are: to describe the evolution of sustainability management, its progress, and acceptance by real estate developers in the country in the last five years; to understand the impact and contribution of sustainability management in the real estate market in the country; to analyse the strategies that the country and its institutions have implemented to mitigate the impact on the environment.

To accomplish the proposed goals, the research has a descriptive scope and the approach used to meet the objectives is qualitative. The population for this research is finite. For this study, the population is all experts in sustainability management in the construction and real estate development sector in Costa Rica. The sampling technique used is non-probabilistic for convenience. The selected sample is made up of four people, who work or have recently worked in a sustainability management construction and real estate development sector in Costa Rica, specifically from Green Building Council Costa Rica (GBCCR), Federated College of Engineers and Architects of Costa Rica (CFIA) and Camara Costarricense de la Construcción (CCC). The data collection technique selected is the interview, which has been applied via virtual calls using a questionnaire that contains 17 open questions.

Next, information and essential concepts of the research are presented following the objectives set through the literature review.

1. LITERATURE REVIEW

Nowadays the real estate and construction sector is looking for an opportunity to provide a sustainable impact on society. Uribe Macías et al. (2018) state, “few companies have already begun to truly embrace sustainability as a work structure that leads to growth by increasing shareholder value, giving more weight to the satisfaction of other business actors, and protecting and increasing the reputation of the brand”. To embrace this environmental culture change, we are going to need to implement adjustments in the way of conceptualizing future building projects. Silvius (2021) describes these needs in his article as follows: “the transition towards more sustainable business practices requires the changing of products, services, business model, processes, policies and resources of companies. Projects play an instrumental role in implementing these organizational changes and thereby the sustainable development of organizations and society.”

As we have discussed, every project contributes in a portion to this change, it will be the way to move forward towards a more sustainable thinking mind-set. This will not be possible without the support of the governments and their different authorities involved in the creation of laws and regulations. They play a fundamental role and can affect positively every single project. It is necessary and crucial to take off all barriers that could compromise the development of suitable projects and create incentives that promote them. Benites & Simoes (2021) indicate that: “The commitment of city authorities to sustainability goals has increased their assortment of challenges with other dilemmas. One of them is the demand for

assimilating the complexities of deploying metrics systems to ascertain results of actions from short and medium-term plans associated with sustainability strategies. Another is the primordially to preserve, in the long run, the strategic direction of the initiatives aligned with sustainable development in all its perspectives, thus ensuring comprehensive sustainability”.

Sustainability defines a way of life and work, not just a mere concept of energy-efficient architectural features (Amaiei & Ivan, 2019). Currently, it is something that will be achieved through green building certifications, to change sustainable thinking. Past and current and most up-to-date technologies and strategies are meant to improve the way people design spaces to be eco-friendlier (Amaiei & Ivan, 2019). This concept innovates and influences sustainable construction approaches in the building sector. Herazo and Lizarralde (2015) state, “the building sector must respond to escalating pressure emerging from regulatory obligations and the concern of the population with the built environment’s impact on greenhouse gas emissions, environmental degradation, and natural resource and energy consumption”. Green building certifications give the companies a methodological framework, where it is important to separate the meaning between green building and sustainable construction. Herazo & Lizarralde (2015) explain this difference in the following quote: “It is necessary to emphasize that a ‘green building’ is not the equivalent of ‘sustainable construction’ or ‘sustainable development’. There is no single, widely accepted definition of ‘green building’, but most authors agree (and some regret) that it focuses only on one or two dimensions of Sustainable Development, (with a focus on reduction of energy and resource consumption) while sustainable construction includes the interactions between the three dimensions, namely the social, economic and environmental dimensions”.

Assessing the environmental impact of a building project is the methodology used by the actors involved in the construction industry. This sector is one of the main consumers of energy and the buildings are the principal drivers in global warming. Here is where an important challenge comes in terms of sustainability management. Bruce-Hyrkäs et al. (2018) maintain, “the construction industry faces important challenges when it comes to resource efficiency and environmental impact reduction. This has led to an increase of both official regulations and voluntary certification systems to control the environmental impact of the construction sector”.

In a sustainable world, the companies need to change the objectives and align them to new tendencies. That is why it is so important to work in the business model according to a sustainable mind-set. Agwu and Bessant (2021) state in this regard, “business models have been referred to as a statement, a description, a representation, an architecture, a conceptual tool or model, a structural template, a method, a framework, a pattern and as a set. It tells a story of how a firm does business by creating, capturing, and delivering value at an appropriate cost to different stakeholders relying on financial, human.” Companies should change the thought related to how they work with sustainability management, they focus on the use phase, and they need to start thinking globally, it will help increase the structure performance. Gardner et al. (2019) discuss this issue as follows: “Now that the design of specifically low-energy buildings is abundant, it is time to expand

the scope of thinking from only the use phase to the entire building life cycle. The material impacts and end-of-life stages account for a greater percentage of the building life cycle for these high-performance structures, and efforts should now be made to further minimize these impacts”.

For real estate developments to opt for an environmentally friendly approach and at the same time become more efficient, the United States Green Building Council (USGBC) has developed a series of rating systems that help in the hard labour of developing, constructing, and operating buildings and spaces in a sustainable way. Green building evaluation aims to increase building efficiency and reduce the environmental problem (Lohmeng, et al., 2017). LEED (Leadership in Energy and Environmental Design) is one of the main rating systems implemented in Costa Rica by developers and corporations that have included it as a requirement for their work centres. Sandoval and Prakash (2016) emphasise the importance of having a LEED Gold certification in construction projects: “LEED is not the only green building program. Other programs offer similar certification, specifically Green Globes. However, they point out that Green Globes emphasises the energy use feature of buildings while LEED emphasises the materials aspects. Furthermore, LEED stipulates ‘minimum performance level in categories such as energy use, erosion control, and indoor air quality, among others. In contrast, similar action in Green Globes earns points towards certification. A final point of differentiation concerns the allocation of points for strategies and/or outcomes. Green Globes awards several points for implementing certain strategies, as well as for the outcomes themselves, whereas LEED primarily allocates points for achieving a certain performance level”.

These certifications will help increase the sustainable commitment perception of every company that pursues them, regardless of its size and industry. The award of these types of certifications is the result of people and enterprise efforts. Through the implementation of digital design, the development of different scenarios will help analyse the pros and cons of the projects since their conception. These tools are used to easily show the different perspectives of the building scope. Jiménez, et al. (2016) mention: “The construction sector currently has virtual tools available that are not widely used that enable the optimization of designs to better respond to client requests and the environmental impact generated by its activity. Digital models should be required by project developers because they add value to projects by analysing different scenarios, the analysis of which would be complex without these models”.

There is a trend to make a difference in the world with multiple issues related to climate change. All the efforts made by the countries in looking for a way to reduce the impact on the environment were compiled in an agreement known as the Paris Agreement; it was created to tackle the negative impact on climate change and looking for carbon neutrality. To accomplish these goals, it is necessary to reduce the knowledge gap in society. Huang and Zhai (2021) focus on that statement in their article about this transition: “Despite the urgency and necessity of achieving carbon neutrality, misunderstandings, and misconceptions about the so-called ‘carbon neutrality’ still prevail for policymakers, researchers, and the public. Knowledge gaps still exist regarding a clear understanding of how carbon

neutrality is related to the Paris Agreement's long-term temperature goals in holding global warming to well below 2 °C or pursuing efforts to limit warming to 1.5 °C".

There is a lot of work to be done globally regarding sustainability management. The world is changing its mind-set regarding subjects such as carbon neutrality, climate change, etc. "Green Building has become a trend in the construction industry to promote environmentally friendly and energy-efficient design" (Chen & Nguyen, 2017). Every day more importance is given to these issues, and this is extremely valuable. If they stay the course, we will be enjoying a healthier planet in which we can enjoy one more life and be in harmony with the environment within the next five years.

The details related to the research methodology are presented below.

2. METHODOLOGY

This research has a descriptive scope. This type of research seeks to specify the properties, characteristics, and profiles of people, groups, communities, processes, objects, or any other phenomenon that is subject to the analysis. The scope chosen is used to identify the progress in the implementation of sustainability practices in the construction and real estate development sector in Costa Rica.

The approach used to meet the objectives is qualitative. The facts are examined, and previous studies reviewed, to generate a theory that is consistent with the observed information. According to Deggs & Hernandez (2018), some characteristics of the qualitative approach are the following:

- In most qualitative studies, hypotheses are not tested, but are generated during the process and are refined as more data are collected; they are a result of the study.
- Qualitative research is interpretive as it seeks to make sense of phenomena and events based on the meanings that people give them. Not only objective events are recorded.
- In the qualitative route, the reality is defined through the interpretations of the participants and the researcher regarding their realities. In this way, several points of view converge, at least those of the participants, those of the researcher, and those produced through the interaction of all the actors.
- The researcher enters and collects information about the perceptions, emotions, priorities, experiences, meanings, and qualities of the participants, and builds knowledge, always aware that it is part of the phenomenon analysed. Also, the interactions between individuals, groups, and communities are of interest to the researcher. For this reason, along the qualitative path, the researcher acquires both an "internal" and "external" point of view and a double perspective: the researcher analyses the explicit, and conscious aspects, as well as those implicit, unconscious, and underlying ones.

The population for this research is finite. For this study, the population is all experts in sustainability management in the construction and real estate development sector in Costa Rica.

The sampling technique used is non-probabilistic for convenience. Convenience sampling is defined according to the Economic Encyclopaedia (2021) as a “type of non-probability sampling that is applied when the statistical sample to be formed is selected in the environment close to the researcher, without specific requirements. The objective is to facilitate the work of the person who develops the study. Because this sample is not expected to be representative of the population, no selection process is applied to make it up”. The sampling unit focuses on “what or who”, that is, on the study participants, objects, events, or collectivities. It is also called cases or elements and depends on the approach and scope of the investigation. The selected sample is made up of four people, who work or have recently worked in a sustainability management construction and real estate development sector in Costa Rica, specifically from Green Building Council Costa Rica, Federated College of Engineers and Architects of Costa Rica and renowned consulting firms.

The data collection technique selected is the interview, which has been applied via virtual calls using a questionnaire that contains 17 open questions. The questions of the questionnaire have allowed solving the research problem and accomplishing the objectives set.

As soon as the interview responses were obtained, the data obtained were analysed. The results of the investigation are shown in the next section.

3. RESULTS

The field of sustainability management still has a lot of opportunities to be exploited. The experts in the field, for the past five to ten years, have been specializing in the subject of sustainable construction and design and putting their knowledge into practice at the national level. With the involvement of the Green Building Council of Costa Rica and the pursuit of Certifications such as LEED or EDGE, sustainability management has gained ground among real estate developers.

A common denominator among our interviewees is the fact that Costa Rica is highly respected and considered a leader in the matter of sustainability at an international level. The country is very well positioned in people’s minds and highly recognised worldwide in this field. Also, Costa Rica has a natural green country brand that has had very good marketing and commercialization, which exposes the country internationally. It is important to understand that the quality and number of professionals in the sustainable construction sector are the ones that lead the Latin American market. Areas such as energy coverage, ecotourism, and reforestation put Costa Rica in the spotlight as a leading country in sustainability topics.

Many projects have been carried out so far that are of great importance to the country in this subject. “The real estate industry is well-positioned to improve population health through its direct influence over the design, construction, and operation of the built environment” (Worden, et al. 2020). One of the most recent is “Torre Universal” located in La Sabana since it involves many aspects: will set the tone of how the San José area can begin to repopulate, bring the attraction back to the city centre, and what this city has to offer. This mix-use building is the first to be certified LEED Gold under the Core and Shell rating system v.4.0 in the

country. The sector is intended to be a technological district promoted by the municipality of San José; Microsoft leased an important portion of the building and created an iconic project, which achieved the LEED Gold certification. To sum up, because of the positioning that the project has had, what it implies for future urban development, and in the plan of this technological connector, it is considered of great relevance.

The Central Bank project was developed with private capital funds, placed at the command of the construction of the public sector. It is an innovative project, in addition to the sustainability effort that they made. It has almost all the items that a truly sustainable project must have: an important effort in the recovery and use of water, the renovation of the adjacent river habitat, the integration with the community, use of high-efficiency equipment, conditioning system, lighting controls, automation for almost all systems. All these aspects made possible its certification as a LEED Gold project.

Another project with an interesting value that has several certifications (LEED and EDGE) is the Lindora Business Park. The valuable aspect is that it was rescued from the industrial warehouses of the old Empaques Santa Ana Facility, and the main tower was raised in a residual space. It was certified LEED Silver under Core and Shell v.4.0. It is also an important positioning factor because the entire park has different certifications, LEED Silver, Edge, and Edge Advance. It is a very attractive project because it mixes different certifications.

About the obstacles or limitations for developing sustainable projects in Costa Rica, the most relevant reason considered by the interviewees is the wrong perception or myth that a certified project is much more expensive and that the developers themselves do not know how to get the most out of sustainability; they do not highlight the benefits that it gives or use it as a competitive factor for sale purposes. Moreover, there is a lack of benefits and incentives for the developers to implement sustainable techniques from the government.

As a general perception, there is a high degree of commitment to sustainability from large development companies and during the past five years, there has been an important improvement. Organisations such as Portafolio Inmobiliario and Grupo Cuestamoras are very committed to this topic. There are large developers in the country that seek to attract international markets, international companies such as Microsoft, Amazon, or others that are looking for a building that already has a certification, so they have been evolving, and many already bring it in their know-how of new projects and look for some certification mainly LEED or Edge when developing projects. In their article, ElSorady and Rizk (2020) state the following: "To stay competitive, in the real estate market, firms have to be actively engaged in LEED and sustainable design in various construction domains. With the increase in sustainable buildings number, a greater number of partnerships will be formed; since construction processes and system decisions are mostly instituted with relevance to cost."

Currently at a national level, according to the interviews, the leading real estate development companies in sustainability issues are Garnier & Garnier Desarrollos Inmobiliarios and Portafolio Inmobiliario. These these companies, located in the

great metropolitan area, have brought important growth and a very strong commitment to sustainability issues.

The development of sustainable projects in the country contributed to the generation of employment in the construction field itself, but also it generates this value chain at different levels of society, for example, if a large company begins to recycle, there will be more recycling companies and therefore there will be an increased workforce; not only professionals in construction and architecture, also lots of employment related to companies that have chosen Costa Rica to expand their operations due to offering this kind of buildings.

Sustainability management has brought new talents and professionals committed to changing the world. The green construction field has been growing and will continue to grow, generating this type or line of professionals focused on green projects. This contributes to the generation of employment.

The incentives and benefits given by the Government of Costa Rica are not strong enough and practically non-existent. However, the professionals agree that at a local level, the municipalities are trying to their greatest extent, to offer incentives and many have made some improvement in their regulatory plans to give a benefit to a possible developer.

To understand the current situation in terms of benefits or incentives from the private institutions, we have asked if there is any awareness of incentives for sustainable construction. In terms of private institutions, from the gathered information there are benefits from private banks such as green credits and bonds, better interest rates, and grace periods provided by Banco Promerica and BAC Credomatic to encourage sustainable constructions with EDGE or LEED certifications, or any other project with a sustainable approach. It has been highlighted that these incentives are encouraged by the World Bank through the IFC and there is still a lot of work to do in this matter.

In the public sphere, there is also a need to understand if there is any support from the Development Bank to boost projects with a sustainable approach. In this matter, some public institutions are trying to develop more sustainable projects such as Instituto Nacional de Seguros (INS). They have an approach based on the RESET (Requirements for Sustainable Buildings in the Tropic) local rating system, and they also comply with Bandera Azul. The expansion of the UCR (University of Costa Rica) uses a sustainable approach supported by these banks; government projects related to the border immigration controls in both the north and the south zone; and other municipal institutions.

Green Building Council Costa Rica (GBCCR) is one of the organisations that supports sustainable construction in the country, its mission is to transform the building and construction sector across three strategic areas such as climate action, health and wellbeing, and resources and circularity. To help understand the progress of sustainable construction in Costa Rica, it is also important to analyse the evolution of the GBCCR. In the past five years, the organisation has solidified and reached a point of growth; it has managed to reinvent itself during the pandemic and is making a great effort to connect again. The organisation has been the one that has positioned the projects and this certification has also been on the rise;

therefore, people know it a little bit more. It has become an entity that can train people to continue in this line of sustainability at the country level.

On the other hand, it has been highlighted that the organisation must work on further strengthening its advertising and closely cooperating with its base members. GBCCR is not where it should be to help drive the transformation of the market but nowadays it is in a better position and constantly growing.

The Paris 2016 agreement is a historic agreement to combat climate change, accelerate, and intensify the actions and investments necessary for a sustainable low-carbon future. To identify how sustainable certifications have contributed to achieving the country's commitments acquired in the 2016 Paris Agreement, Huang and Zhai (2021) quote the importance to implement this agreement: "to minimize the potential negative impacts and risks of climate change, net-zero goals corresponding to the Paris Agreement have been formally adopted, announced or under consideration by countries over the globe". We ask the interviewees for their point of view regarding the positioning and acceptance of sustainable certifications in Costa Rica. Construction is one of the greatest polluters. It is important to understand that for the market transformation to have more sustainable products and processes, certifications such as LEED, EDGE (international certifications), and RESET (national certification) help reduce our carbon footprint and raise awareness of climate change. International certifications are a very important part of those that are in contact with updates on sustainability. For example, EDGE four years ago had no carbon and no advanced rating systems. Now there are EDGE Advance and EDGE Zero Carbon. Regarding LEED, now there is LEED Zero. These certifications are from a higher level, which seek the regeneration of the space. The systems are not frozen, those are true, and they are evolving responsibly.

To recognise the impact and contribution of sustainability management, it is imperative to identify if construction companies in Costa Rica are trying to improve their processes despite not pursuing a sustainable certification and its progress in the past five years. The result is that construction companies are changing their process to be more sustainable because they look for efficiency in their processes and understand the market and customer needs.

Large construction companies such as Van Der Laat & Jimenez, Volio y Trejos, and Edificar are the ones that start taking the lead on implementing sustainable practices with continuous training and monitoring during the construction phase, erosion and sedimentation control, recycling control, quality control, internal space, air control, etc.

There is also a programme "Blue Flag" which was founded to improve education and information regarding the environment. This programme is encouraging construction companies to raise awareness and be more sustainable with their process.

Despite the progress and transformation done by some large companies, it has been stated that small companies are not going to do it until they see the results of sustainable changes and adaptations in the market. An explicit focus on the service innovation dimension in the complex product systems in construction extends the company in-house strategic thinking to a supplier-customer dyad, and further, to a network of companies fulfilling specific tasks across projects (Pelli, 2021).

In terms of methodologies that might contribute to sustainable practices, BIM is considered a very valuable practice if applied successfully. According to Eldeep, et al. (2021), BIM technology would be efficient in managing projects at any stage during the project lifecycle if the construction processes were linked to BIM concepts. One of the great benefits that the certification of sustainable construction brings is the way of building. It is an integrated process, which is something that offers a lot of savings, efficiency and reduces the change orders. It also makes projects more accepted by their environments and more profitable for owners. The use of new technologies such as Big Data, artificial intelligence, etc. can also contribute to the operation of real estate projects and their more efficient design. Nowadays having information to make informed decisions and develop new strategies is valuable in the construction business. The new trend also accelerated by the COVID-19 pandemic is to have buildings with sensors to monitor the air quality and healthy spaces for the users. Documenting and analysing information does not only help to have a sustainable building but also a healthier environment. You collect and process the information to bring valuable results to a design team and have metrics for continuous improvement. In the subject of artificial intelligence, it can help with decision making because there is no need to rely on a person to analyse the information and decide when in some way there is an artificial intelligence that can do it or understands how decisions are made.

Lastly, to make recommendations it is essential to understand how Costa Rica is projected in the next five years. Costa Rica is strategically positioned as a green country and has a lot of professional capacity. Most people and companies understand the importance, but it is also expected that Costa Rica's government provides more support with mandatory regulations for sustainable construction to the private and public sectors. As a result, it is also expected from Costa Rica to be a regional icon for sustainable construction, have a much higher percentage of companies and people who seek certification, have a true menu of green financial products, larger number of accredited professionals in LEED and EDGE, also significant growth in sustainable real estate and development projects.

4. DISCUSSION

Being able to determine what has been the progress of sustainability management in a sector such as construction and real estate development is not an easy task, even harder under the economic contraction suffered by the market since 2018. However, despite the adversities suffered by the sector, it has been confirmed that there is ultimately significant progress concerning the previous quinquennium. This can be said after consulting professionals with a high level of knowledge and experience in terms of sustainability issues conferred and who have been part of this evolution by being actively present participating in the execution and planning of real estate projects with a sustainable approach or who have performed in administrative roles at different organisations related to the subject.

The niche of the corporate office and mixed-use buildings is the one that has managed to remain stable; this has been achieved by pursuing the objective of offering the corporate market a portfolio of sustainable, environmentally friendly,

and energy-efficient buildings. This niche is calling the attention of all those multinational corporations that are looking to expand their operations and therefore locations for their future offices, for which they already have defined parameters of quality, efficiency, and sustainability. These developments have achieved various levels of certification under different rating systems, such as LEED and EDGE, which are the most recognised worldwide.

It is important to mention that sustainability management in Costa Rica's real estate market has not received the relevant incentives from the state even though the government issues a recurring speech affirming that the country is making great strides in sustainability to comply with the commitments acquired by the country in the Paris agreement and with the SDGs. It takes more than eliminating plastic bags from supermarkets to achieve the goals set and the commitments made. A change in the way the country is built is required. The construction and operation of buildings are one of the main sources of pollution worldwide and Costa Rica is not exempt from this.

In the professional and union field, the College of Architects of Costa Rica must introspect its position and discourse on green certifications regulated by foreign entities. The entities that created these standards have been traveling a difficult path for many years and that has left them with an invaluable experience, which has allowed them to develop increasingly effective tools and resources. The fact that Costa Rica is a tropical country does not mean that the country should not pursue foreign green rating systems, which are supposedly not designed for the conditions that arise in its territory. According to the vice president of the College of Architects of Costa Rica, when he was consulted about it, he affirmed that these standards did not contemplate the conditions of our country and that they should be tropicalized, unlike the RESET local standard. Why is it necessary to tropicalize standards that fully meet multiple criteria and are designed to generate the same impact regardless of the location of the project? The federated college of engineers and architects of Costa Rica is obliged as the governing body to know beyond the RESET standard, since it is not the predominant one in the national market, and it is not the one that has brought the greatest benefits to the country so far in terms of sustainability.

In the following section, the conclusions and recommendations to the problem posed for this research are presented.

5. CONCLUSIONS AND RECOMMENDATIONS

The real estate and construction sector has shown huge progress in the past five years in terms of the evolution of sustainability management. This progress has been guided by large companies such as Van Der Laad, Volio y Trejos, and Edificar. They took the lead to create the improving path to contribute with mind-set transformation and processes pursuing the proper certification to build a continuous improvement cycle in the matter of the building sector.

In the past five years, the Paris Agreement 2016 has been the main precedent regarding climate change impact. It helped understand that we needed to reverse the damage caused by human beings. Here it is where the countries must work together with the construction sector to implement green certifications to improve

design building processes. As a result, society will get huge contributions in terms of sustainable management.

Even though Costa Rica has shown a transformation line in the past five years introducing methodologies such as BIM and certifications like LEED and EDGE that have gained force and popularity, it has not been enough to create a solid change. It is important to receive a bigger contribution from governmental authorities to help the construction sector grow and transform in terms of strategies and efficient design regarding sustainability management.

Costa Rican government must focus on different strategies of sustainable management to create a real impact on society in terms of climate change. These efforts will help reach the commitments acquired with the Paris agreement and at the same time decrease one of the principal polluters in the world.

It is important to change the way the College of Architects of Costa Rica and the federated college of engineers and architects of Costa Rica rule, evaluate, and establish the standards of green buildings in comparison with the rest of Central and Latin America. All these changes will help the country increase the benefits in terms of sustainability management.

In the intent of pursuing advancement in the sustainability management subject, many actions can be taken. Mainly, Costa Rica's government must invest in improving the incentives and benefits given to companies that seek sustainability and carbon neutrality and supporting the local governments that are already trying to improve their offers.

It is also important to market widely the advantages and benefits offered by private banking to the real estate and construction sector intending to create sustainable projects so that it becomes more attractive to invest in the country.

On an academic level, it is necessary to provide more information and tools regarding sustainability management in the architecture or engineering careers and any other complementary area. Also, the country would greatly benefit from investing in sustainability expertise for the professionals in the field whether it is at a national or international level. This goes hand in hand with the need for continuous training of professionals on certifications and their updates. Creating spaces where specialists in the different areas involved can come to the country and share their knowledge is very enriching.

Also, taking advantage of the academic process is where the myth that sustainable or green projects are much more expensive, must be corrected; clarifying that projects that are not seeking certifications are not necessarily less expensive than the ones that do. Additionally, emphasising the importance and benefits of being certified should encourage more professionals to work towards sustainability.

Regarding the construction materials, Costa Rica has an enormous opportunity to locally produce materials that are more in line with our sustainability goals, therefore reducing the carbon footprint since the transportation will not be necessary and with that, the industrialization process that entails. This also requires a change of mind-set so that the developers, the real estate, and construction sector begin to believe that Costa Rica has the human and intellectual resources to create high-quality materials.

However, with the understanding that the country may have limitations in having access to certain materials, it is always necessary that Costa Rica promotes sustainable construction by seeking agreements with international material suppliers that favour compliance with certifications and transfer that benefit to the real estate developers. As a country, Costa Rica should also seek more international agreements on sustainability issues, where both parties benefit. Therefore, more countries and businesses will be attracted to invest in Costa Rica rather than in other countries.

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