WASD
WORLD ASSOCIATION FOR SUSTAINABLE DEVELOPMENT

12

OUTLOOK 2025

KNOWLEDGE MANAGEMENT MODEL IN SCIENTIFIC TOURISM APPLIED TO CONFERENCES

PROFESSOR VICTOR HUGO MEDINA GARCIA
Universidad Distrital Francisco José de Caldas, Bogotá D.C, Colombia
Email: vmedina@udistrital.edu.co
ORCID: 0000-0002-0989-8676

PROFESSOR LINA MARIA MEDINA ESTRADA
Universidad Distrital Francisco José de Caldas, Bogotá D.C, Colombia
Email: lmmedinae@udistrital.edu.co
ORCID: 0009-0007-2494-542X

ABSTRACT

PURPOSE: The purpose of this study is to investigate the impact of experiences offered to participants at scientific conferences, as well as their influence on the preservation of natural resources.

METHODOLOGY: The methodology applied analysed knowledge management practices in various destinations and companies in the sector, addressing aspects such as staff training, scientific content generation, collaboration with local experts, and social impact measurement. A model and architecture for knowledge management in sustainable scientific tourism was proposed.

FINDINGS: The main findings were the identification of best practices in knowledge management, recommendations for improving the conference attendee experience and destination sustainability, and a deeper understanding of how science and tourism can coexist for mutual benefit.

VALUE/ORIGINALITY OF RESEARCH: The value of this research was to enrich the synergy between science and tourism, opening new perspectives for scientific outreach and environmental conservation in the context of scientific tourism conferences.

KEYWORDS: *Knowledge Management; Scientific Tourism; Scientific Conferences; Environmental Conservation; Tourist Experiences.*

CITATION: Garcia, V. H. M., and Estrada, L. M. M. (2025): Knowledge Management Model in Scientific Tourism Applied to Conferences. In Ahmed, A. (Ed.): *United Nations: What Next After 2030 Agenda and SDGs.* World Sustainable Development Outlook 2025, Vol. 21, pp.181-194. WASD: London, United Kingdom.

RECEIVED: 11 November 2025 / **REVISED:** 11 December 2025 / **ACCEPTED:** December 2025 / **PUBLISHED:** 30 December 2025

DOI: 10.47556/B.OUTLOOK2025.23.13

INTRODUCTION

Scientific tourism is a unique characteristic that combines the exploration of a destination with the acquisition of in-depth knowledge. Thanks to a globalised and interconnected world, it allows for innovative approaches to tourism and plays an important role in environmental preservation. Scientific tourism provides an interface between scientific research and the tourism industry, allowing tourists to actively participate in data collection and knowledge generation.

Its development poses challenges and opportunities in knowledge management that are important for sustainable development. This paper delves into the world of scientific tourism and explains how knowledge management plays a key role in its operation and growth, focusing on the academic activity of international conferences. This takes into account current research and case studies, in addition to the participation of different disciplines and the introduction of innovative technologies that are currently shaping the way scientific tourism destinations are promoted, managed, and developed. This paper conducts a current analysis, given that environmental education and sustainability have become of great importance and generate a latent global concern. Knowledge management is essential to ensuring that future tourism contributes to biodiversity conservation and scientific progress.

CONCEPTUAL BASIS

Scientific tourism focuses on the dissemination and acquisition of scientific knowledge (CEUPE, 2023). Its management can be approached from different perspectives, such as the improvement of skills, the connection between the world of science and tourism (Suárez-Puerta, 2021), and the generation of a more dynamic and lively flow of knowledge (Briceño, 2020).

Knowledge management refers to the set of activities and processes that strengthen the production, transmission, and application of knowledge within an organisation or group of people (Briceño, 2020), with the aim of improving an organisation's ability to solve problems, and thus be able to generate innovation and meet its objectives and goals (CESUMA 2023). Knowledge management follows a systematic, logical, and organised order to produce, transmit, identify, create, capture, organise, store, disseminate, and apply information and knowledge (Quiroa, 2021).

What are the benefits of knowledge management in scientific tourism? Knowledge management contributes beneficially to sustainable tourism in the following ways:

DOI: 10.47556/B.OUTLOOK2025.23.13

- ***Acquisition, creation and dissemination of knowledge*** (CEUPE, 2023).
- ***Innovation:*** Knowledge management helps manage tacit and explicit knowledge, facilitating the learning and adaptation of new technologies, as well as research, ideation, and experimentation, all of which are key to implementing innovation in an organisation (Antonio, n.d.).
- ***Improved productivity:*** Knowledge management can help save energy resources in hotels and hostels, thus improving productivity (Suárez-Puerta, 2021).
- ***Goal achievement:*** Strengthens the capacity of tourism organisations to solve problems (CEUPE, 2023).
- ***Quality:*** What are the main challenges in knowledge management in scientific tourism?
- ***Knowledge complexity:*** The capture, creation and dissemination of scientific tourism can be specialised and for a specific audience (Bassan, 2022).
- ***Difficulties in collaboration and communication:*** Communication between people whose roles are directly related to scientific tourism is not very fluid; this is why its dissemination is negatively affected (IPATEC, 2020).
- ***Lack of resources:*** The lack of human and, above all, financial resources of different actors in scientific tourism can make knowledge management difficult (Szmulewicz and Veloso, 2013).
- ***Lack of appropriate technology:*** Lack of appropriate technology can limit an organisation's ability to capture, store, and share knowledge (Szmulewicz and Veloso, 2013).

There are different types of scientific tourism that can be summarised as follows: astronomical, archaeological (Pérez, 2022), biological, geological (Dq., 2022), spatial (EUM, 2022), and environmental scientific tourism (Ostelea Tourism Management School, 2022). In scientific tourism, there are different types of academic events that can be held to enrich knowledge for tourists:

- Seminars
- Symposia
- International conferences
- Scientific conferences
- Guided tours
- Guided tours

This article focuses on conferences as an academic enrichment activity in scientific tourism. Conferences aim to promote scientific research within the context of travel and allow different areas such as tourism, academia, and research to connect. Conferences have the advantage of being able to be held in person or with the help of information technology.

DOI: 10.47556/B.OUTLOOK2025.23.13

METHODOLOGY

In the development of this research, the following stages were applied:

1. **Contextualisation of scientific tourism:** A comprehensive literature review was conducted to understand the context of scientific tourism, identifying key characteristics and challenges.
2. **Definition of objectives and goals**: Specific objectives were established to address the specific needs of scientific tourism at conferences.
3. **Review of tools and knowledge classification in this sector:** A comprehensive review of commercially available knowledge management tools was conducted. Simultaneously, a classification of knowledge in the sector was also conducted, identifying specific nodes and core processes to inform system design.
4. **Proposed model and architecture:** A conceptual model is proposed that integrates explicit knowledge nodes, core processes, and specific modules for academia, research, and outreach. The system architecture is developed with consideration for efficient content management, information security, and integration with emerging technologies.
5. **Model metrics:** The validity of the proposed model and architecture is assessed through expert review and pilot testing. Feedback is collected to make necessary adjustments and ensure the applicability and effectiveness of a system for "intangible capital as a generator of competitive advantage". This research justifies this approach by its relevance to today's economy, where knowledge and information play a central role.

KNOWLEDGE MANAGEMENT MODEL IN SCIENTIFIC TOURISM APPLIED TO CONFERENCES

The focus of this research on a knowledge management model centred on "intangible capital as a generator of competitive advantage" is justified by its relevance in today's economy, where knowledge and information play a central role.

In the context of scientific tourism (Figure 1), where the quality of the visitor experience and the preservation of natural resources are fundamental, intangible capital (including knowledge, skills, and relationships), becomes an essential asset. This approach not only has the potential to improve customer satisfaction and the sustainability of destinations, but also promotes innovation and continuous improvement, critical aspects in a competitive and constantly evolving environment.

DOI: 10.47556/B.OUTLOOK2025.23.13

Another important factor to focus on in this model is that it specialises in generating value from knowledge. This is because the most valuable asset at scientific conferences or any other professional event is knowledge, an intangible asset. This is where the intangible capital model as a generator of competitive advantage becomes particularly relevant (Rodriguez *et al.*, 2023).

Figure 1: Context of Scientific Tourism
Source: Constructed by authors

Therefore, the following knowledge management model focused on scientific tourism is proposed (Figure 2):

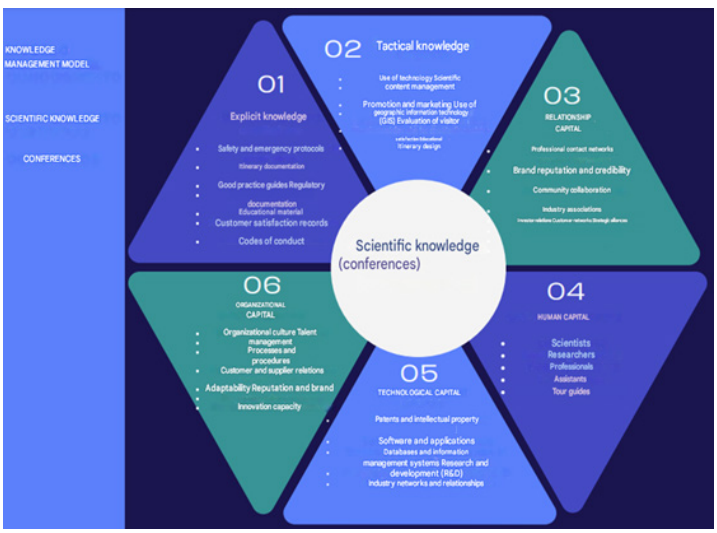

Figure 2: KM Model for Scientific Tourism at Conferences
Source: Constructed by authors

DOI: 10.47556/B.OUTLOOK2025.23.13

The following components interrelate and form a complex system that enables the organisation to create, acquire, apply, and share knowledge. The model manages these components effectively to maximise the value of knowledge for the organisation.

- ***Explicit knowledge:*** Explicit knowledge is knowledge that can be expressed clearly and concisely and that can be easily communicated and shared. It is knowledge that can be codified, such as procedural manuals, databases, and research protocols.
- ***Tactical knowledge:*** Tactical knowledge is knowledge acquired through practical experience and related to the execution of specific tasks. This knowledge is difficult to formalise and communicate, and is based on intuition, common sense, and experience.
- ***Relational capital:*** Relational capital is the set of relationships established between people, organisations, and resources. It is an intangible asset that can generate value for the company as it facilitates collaboration, innovation, and knowledge transfer.
- ***Human capital:*** Human capital is the set of knowledge, skills, and abilities of the people who work in an organisation. It is an intangible asset that can generate value for the company as it allows the organisation to create, acquire, apply, and share knowledge.
- ***Technological capital:*** Technological capital is the set of technological resources owned by an organisation. These resources can include hardware, software, infrastructure, and technological know-how. Technological capital can generate value for the company, as it allows the organisation to automate processes, improve efficiency and productivity, and develop new products and services.
- ***Organisational capital:*** Organisational capital is the set of processes, systems, and structures that exist within an organisation. These processes, systems, and structures can facilitate the creation, acquisition, application, and dissemination of knowledge. Organisational capital can generate value for the company, as it enables the organisation to learn and adapt to change.

KNOWLEDGE MANAGEMENT ARCHITECTURE APPLIED TO SCIENTIFIC TOURISM IN CONFERENCES

Scientific tourism is a branch of tourism that focuses on the exploration and understanding of natural, cultural, or scientific phenomena with the aim of contributing to the understanding and resolution of environmental and social challenges in areas attractive to tourism (Scientific Tourism, n.d.). A very successful way to do this is through conferences, as they promote scientific research within the framework of tourist trips and learning (ISTN, n.d.). It can be seen that in scientific tourism, there is a set of agents that are present within its context.

DOI: 10.47556/B.OUTLOOK2025.23.13

Congresses in scientific tourism are involved with different areas of knowledge; therefore, it can be found that they have several general objectives in which established goals are evident, as shown in Table 1.

Table 1: General Objectives of Conferences in Scientific Tourism

General objectives of congresses in scientific tourism	*Goals*
Facilitate scientific collaboration	Provide collaborative tools that encourage interaction between participants, speakers, and organisers to share knowledge, ideas, and experiences.
Optimise the participant expe-rience	Personalise the user experience by offering recommendations and relevant content based on preferences, engagement history, and areas of interest.
Promote sustainability and conservation	Integrate information on sustainable practices and conservation projects into conference content to raise awareness.
Promote research and innovation	Provide a suitable environment for the presentation and discussion of scientific research, as well as the exploration of new ideas and innovative approaches.
Improve participation and knowledge retention	Implement strategies to increase active attendee participation, such as interactive surveys, educational games, and activities that encourage knowledge retention.
Establish a global collaborative network	Facilitate connections between participants from different parts of the world, promoting international collaboration and a diversity of scientific perspectives.

Source: Constructed by authors

If the objectives are focused on knowledge management, the following technical objectives are obtained (Table 2).

Table 2: Technical Objectives of Conferences in Scientific Tourism

Objectives associated with knowledge management	*Goals*
Efficient content management	Implement a system that allows for easy creation, editing, and management of content, ensuring quick and efficient access to relevant information.
Information security	Ensure data security and privacy by implementing security protocols, encryption, and robust access control.
Accessibility and usability	Ensure that the system is accessible to all participants, regardless of their abilities and devices, and that the interface is easy to use.

Source: Constructed by authors

A model was built to take account of what scientific tourism focused on congresses consists, what are its general objectives and its technical objectives associated with knowledge management in this area, and how this knowledge is classified in scientific tourism in congresses (Figure 3). This is composed of the following layers:

DOI: 10.47556/B.OUTLOOK2025.23.13

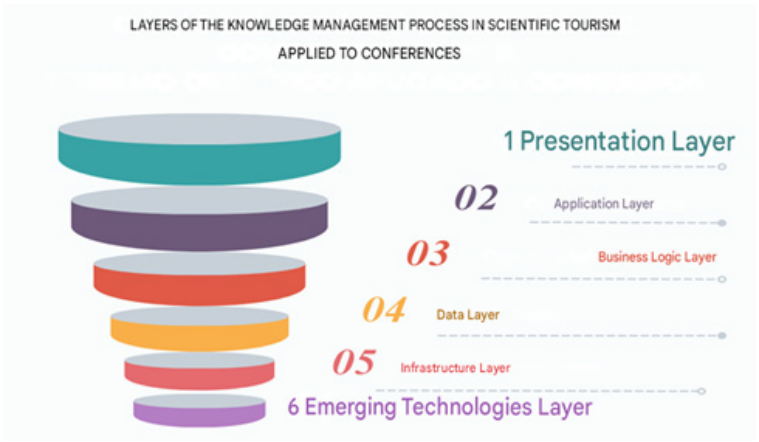

Figure 3: Layers of the Knowledge Management Process in Scientific Tourism at Conferences
Source: Constructed by authors

In each of these layers there are different agents that intervene in knowledge management, as shown in Figure 4.

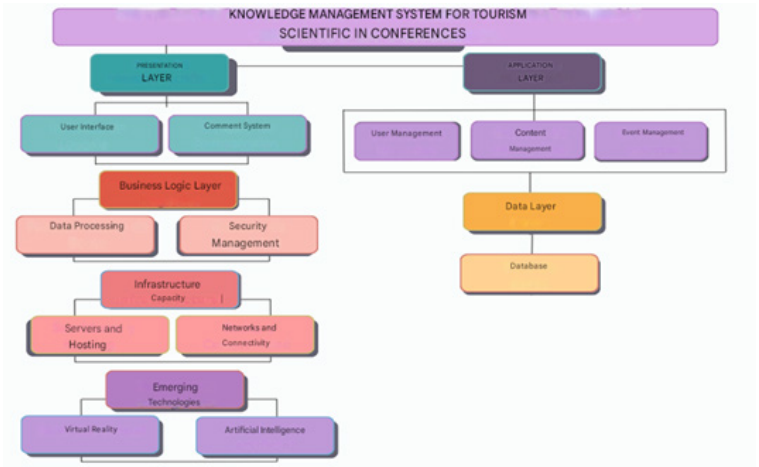

Figure 4: Layers of the Knowledge Management Process in Scientific Tourism at Conferences
Source: Constructed by authors

After presenting the layers of the knowledge management process in scientific tourism at conferences and the agents involved in each of these, the knowledge management architecture for this sector is finally presented (Figure 5).

 DOI: 10.47556/B.OUTLOOK2025.23.13

Figure 5: Knowledge Management Architecture in Scientific Tourism at Conferences
Source: Constructed by authors

KNOWLEDGE MANAGEMENT SYSTEM METRICS

Knowledge management system metrics focused on scientific tourism are essential for assessing their impact in various aspects. Impact metrics analyse key quantitative aspects such as the number of participants in scientific conferences, the number of papers presented, scientific publications produced, scientific collaboration agreements signed, and the number of visitors to science-related tourism destinations. Efficiency metrics, on the other hand, evaluate the system's effectiveness in achieving its objectives. These metrics include percentages indicating the proportion of participants, presentations, publications, collaboration agreements, and visitors who use the knowledge management system. These percentages provide a more detailed picture of system adoption and usability among users and collaborators. Finally, satisfaction metrics measure knowledge acceptance through surveys targeting conference participants, organisers, researchers, authors of publications, and companies or organisations participating in collaboration agreements. Valuable information is obtained about the experiences and perceptions of each user group.

DOI: 10.47556/B.OUTLOOK2025.23.13

Impact Metrics

These metrics are used to assess the impact of the knowledge management system on different aspects of scientific tourism, such as the number of people participating in scientific conferences, the quality of scientific conferences, the dissemination of scientific knowledge, and scientific collaboration:

- number of participants in scientific conferences;
- number of papers presented at scientific conferences;
- number of scientific publications derived from scientific conferences;
- number of scientific collaboration agreements derived from scientific conferences.

Efficiency Metrics

They provide an assessment of the knowledge management system's effectiveness in various aspects, such as user engagement, the system's usefulness for researchers, and the promotion of scientific collaboration. In addition to these general metrics, more specific metrics tailored to the specific objectives of the knowledge management system can also be used. These metrics measure the knowledge management system's effectiveness in achieving its objectives. They include metrics such as:

- percentage of papers presented at scientific conferences that use the knowledge management system;
- percentage of scientific publications derived from scientific conferences that use the knowledge management system;
- percentage of scientific collaboration agreements derived from scientific conferences that use the knowledge management system.

Satisfaction Metrics

These metrics measure the level of satisfaction of knowledge management system users. They include metrics such as:

- satisfaction surveys for participants in scientific conferences;
- satisfaction surveys for organisers of scientific conferences;
- satisfaction surveys for researchers who present papers at scientific conferences.

DOI: 10.47556/B.OUTLOOK2025.23.13

To enhance the evaluation of the system, the implementation of surveys exploring researchers' perceptions of the long-term impact of their conference presentations could be considered. These questions could explore whether the presentations have generated new research opportunities, connections with other colleagues, or influenced the development of their scientific field. This would broaden the understanding of the system's value beyond the immediate conference experience.

DISCUSSION

The research proposal on knowledge management in scientific tourism highlights the convergence between scientific outreach, environmental protection, and visitor satisfaction at scientific tourism conferences. The study's objective is to examine the efficient collection, organisation, and dissemination of scientific information and experiences and assess their impact on the quality of participants' experiences and the conservation of natural resources. The methodology unfolds in several stages, from immersing ourselves in the essence of scientific tourism to carefully weaving a knowledge management model and a tailor-made architecture for scientific conferences. It is hoped that insights will be uncovered, including best practices, suggestions for enriching the participant experience, and strategies for destination sustainability.

The proposed knowledge management model is based on the concept of "intangible capital as a generator of competitive advantage". The relevance of this approach is highlighted in a context where the quality of the visitor experience and the preservation of natural resources are paramount. The conceptual architecture outlined for scientific tourism at conferences is organised in layers, from agile content management to information security and accessibility.

The potential benefits of knowledge management in scientific tourism are recognised, from the efficient acquisition and dissemination of knowledge to sparking innovation, improving productivity, and achieving objectives. However, we also face challenges: the inherent complexity of knowledge, obstacles to collaboration and communication, and a lack of adequate resources and technology.

DOI: 10.47556/B.OUTLOOK2025.23.13

CONCLUSIONS

Scientific tourism is an emerging activity that has the potential to contribute to the sustainable development of tourism destinations. Knowledge management plays a key role in this context, as it facilitates the creation, dissemination, and application of scientific knowledge.

The architectural model proposed in this paper is a valuable contribution to knowledge management in scientific tourism. The model addresses the challenges and opportunities of this field and proposes a knowledge classification and architecture that can be adapted to the specific needs of different tourist destinations.

The proposed knowledge management model, based on the concept of "intangible capital as a generator of competitive advantages", presents an innovative approach to the efficient collection, organisation, and dissemination of scientific information and experiences. This perspective seeks not only to enrich the experience of participants but also to position scientific destinations as leaders in sustainable knowledge management.

The methodological proposal, divided into phases from the contextualisation of scientific tourism to the specific architecture for congresses, offers a solid structure for the practical implementation of the knowledge management model. By highlighting the importance of efficient content management and information security, it provides a robust framework for planning and executing scientific events.

The research identifies significant challenges, such as knowledge complexity, difficulties in collaboration and communication, and a lack of adequate resources and technology. However, it also opens up opportunities to address these challenges by seeking innovative solutions, promoting interdisciplinary collaboration, and ensuring adequate resource allocation for the development and successful implementation of the proposed model.

REFERENCES

Antonio, DAF (n.d.): Contributions of knowledge management to tourism services: a study in a travel agency. Available at: http://www.scielo.org.ar/scielo.php?pid=S1851-17322011000300011&script =sci_arttext

Bassan, C.E. (2022): Scientific Tourism: Conceptualization, Modalities, and Challenges. Reality, Trends, and Challenges in Tourism (CONDET), Vol. 20, No. 2, pp.33-48. Available at: https://revele.uncoma.edu.ar/index.php/condet/article/view/4507/61541

 DOI: 10.47556/B.OUTLOOK2025.23.13

Briceño, B. (2020): Knowledge Management: Resources and Opportunities. Open to the Public; Inter-American Development Bank. Available at: https://blogs.iadb.org/conocimiento-abierto/es/gestion-conocimiento-recursos/

Dq. (2022): What is geotourism or geological tourism? Online Tourism Courses. Available at: https://cursosdeturismoonline.es/turismo/geoturismo-turismo-geologico/

Escola Universitaria Mediterrani (EUM) (2022): What is Space Tourism? Escola Universitaria Mediterrani, Barcelona, Spain. https://mediterrani.com/what-is-space-tourism/

European Business School (CEUPE) (2022): *Archaeological Tourism: Concepts and Characteristics*. CEUPE. [Online] Available at: https://www.ceupe.com/blog/turismo-arqueologico.html

European Business School (CEUPE) (n.d.): *What is Scientific Tourism? Concept, Activities, and Examples*. CEUPE. Retrieved September 25, 2023, from https://www.ceupe.com/blog/turismo-cientifico.html

International Scientific Tourism Network (ISTN) (sf): Available at: https://scientific-tourism.org/

Ostelea Tourism Management School (2022): Nature tourism: what it is, types, and examples. *Ostelea*. [Online] Available at: https://www.ostelea.com/actualidad/blog-turismo/tendencias-en-turismo/turismo-natural-que-es-tipos-y-ejemplos

Pérez, A.M. (2022): *What is archaeological tourism?* Tourist Environment. Available at: https://www.entornoturistico.com/que-es-el-turismo-arqueologico/

Quiroa, M. (2021): Knowledge management. *Economipedia*. [Online] Available at: https://economipedia.com/definiciones/gestion-del-conocimiento.html

Rodríguez, M.A.S., García, V.H.M. and Estrada, L.M.M., 2023. Innovación transformacional en el turismo científico en Colombia. *Revista Ibérica de Sistemas e Tecnologias de Informação*, (E59), pp.595-606.

Science and tourism: a regional challenge (n.d.): IPATEC. Available at: https://ipatec.conicet.gov.ar/ciencia-y-turismo-un-desafio-regional/

Scientific Tourism – International Scientific Tourism Network (sf): Available at: https://scientific-tourism.org/turismo-cientifico/

Suárez-Puerta, B. (2021): *Knowledge Management Manual for Scientific Tourism in Remote Beaches*. Playascorp. Available at: https://www.academia.edu/49913019/Manual_de_Gesti%C3%B3n__del_Conocimiento_del_Turismo_Cient%C3%ADfico_en_Playas_Remotas 228pp.

DOI: 10.47556/B.OUTLOOK2025.23.13

Szmulewicz, P.R. and Veloso, K.M. (2013): Opportunities and Challenges About Tourism Research in Patagonia. *Anales Instituto Patagonia (Chile)*, Vol. 41, No. 2, pp.29-41. Available at: https://www.scielo.cl/pdf/ainpat/v41n2/art02.pdf

Universidad Cesuma (2023): What is Knowledge Management? 2023. Master's and MBA Programs. Universidad CESUMA, Mexico. [Online] Available at: https://www.cesuma.mx/blog/que-es-la-gestion-del-conocimiento.html

BIOGRAPHY

Professor Victor Hugo Medina Garcia is currently full-time professor at the District University "Francisco José de Caldas in Bogotá" - Colombia, where he was also director of the Doctorate in Engineering, of the Master of Science in Information and Communications, Specialization in Software Engineering, Specialization in Telecommunications and Director of the Office of Interinstitutional Relations. In addition, he is a research senior of the GICOGE Group (Research Group in Information Technology, Communications and Knowledge Management) in Bogotá, Colombia. Academic pair of the CNA (National Accreditation Council) since 2001.

Professor Lina Maria Medina Estrada is currently a part-time professor at the District University "Francisco José de Caldas" in Bogotá, Colombia. A professional in Social Communication with an emphasis on journalism, development, research, pedagogy, and art, she manages and supervises cultural and educational projects focused on the environment and social work. She directs and produces artistic, environmental, humanistic, and interdisciplinary educational initiatives. Her research focuses on identities, peace culture, and rural and community-based initiatives. She has experience in co-ordination, management, international co-operation and development, intercultural education, the environment, and conflict resolution. She is a university and early childhood educator.

DOI: 10.47556/B.OUTLOOK2025.23.13