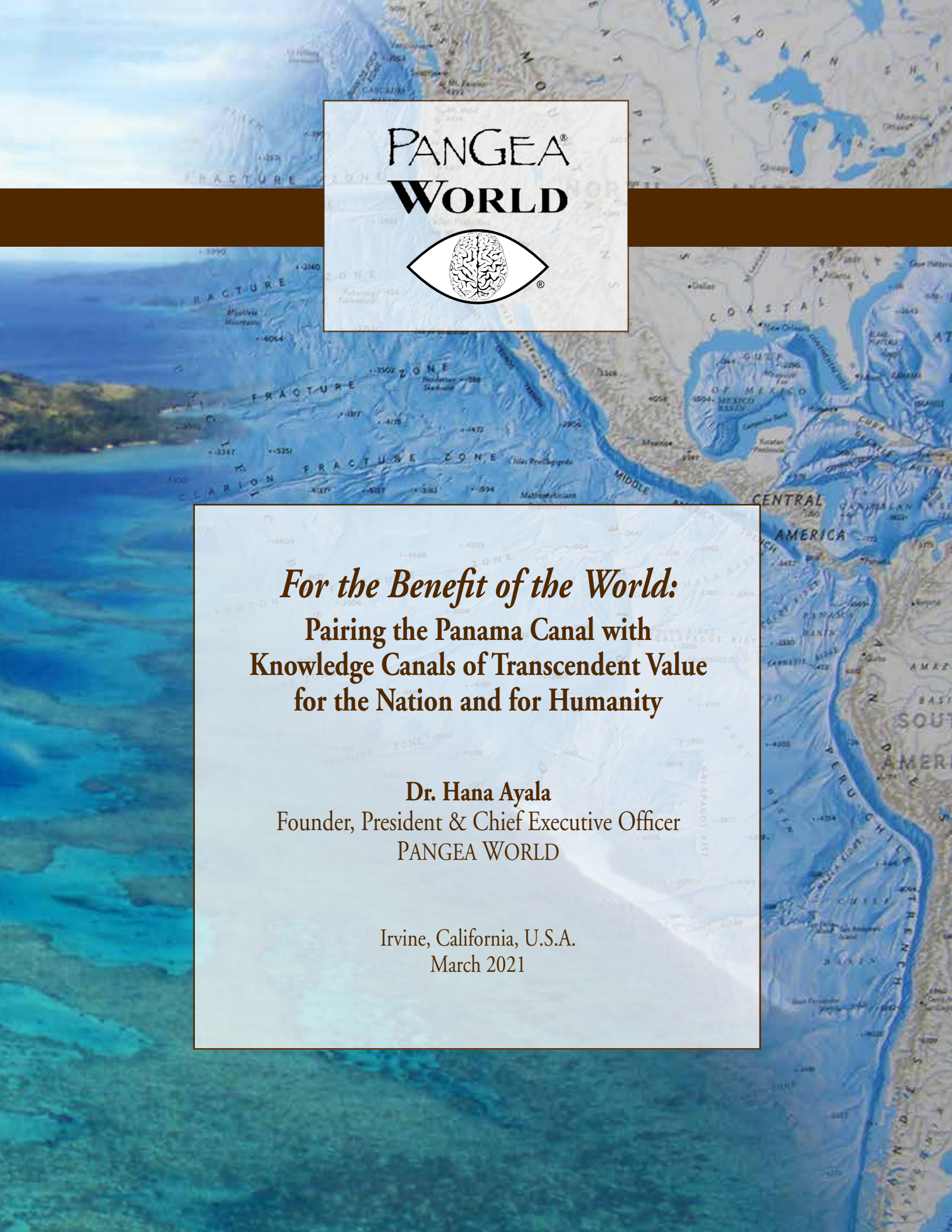

For the Benefit of the World:

Pairing the Panama Canal with Knowledge Canals of Transcendent Value for the Nation and for Humanity

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Contents

"For the Benefit of the World:" Pairing the Panama Canal with Knowledge Canals of Transcendent Value for the Nation and for Humanity

Hana Ayala

Abstract
Linking continents and separating oceans, the Isthmus of Panama harbors two unmatched strategic advantages. The Panama Canal has harnessed one of them in the unrivaled niche it commands in the movement of global trade. The other, the yet-to-be tapped economic significance of the Isthmus as an unparalleled crossroads of the natural world's connectivity packed with knowledge capital is the subject of the original blueprint presented in this document. Building the case and presenting evidence on both the national and transnational scales, the roadmap charted by this blueprint demonstrates the promise of employing natural pathways of great scientific value to engender and nurture a hybrid tourism-cum-knowledge economy of major conservation dividends. It pioneers the concept and strategy of transnational-knowledge neutrality backed by a business model and framed by a most symbolic synergy with the neutrality paradigm of the Panama Canal. And it discloses, and equips with an implementation path, the immense potential of Panama to champion a course towards the earth's sustainable future from its position as a unique intersection of the World Heritage and the world economy.

Keywords
Panama Canal, natural knowledge capital, transnational connectivity, neutrality, New World

1. Introduction

Nations are formed and are kept alive by the fact that they have a program for tomorrow.
José Ortega y Gasset
(*Invertebrate Spain*, 1922)

The Covid-19 pandemic's sweep across the world has changed the world in unprecedented ways, deeply affecting global production, supply chains, and financial markets. It has also added weight to the argument that we ought to be much more proactive in fostering human and environmental wellbeing through synergistic policies that will inevitably blur the line between *national* and *global*. In a recent interview for the Dow Jones Media Group's *Penta* (Schultz, 2020), Harvey Fineberg, president of the Gordon and Betty Moore Foundation and chair of the Standing Committee on Emerging Infectious Diseases and 21st Century Health Threats of the U.S. National Academies of Sciences, Engineering, and Medicine, noted: *There are many connections between this nexus of climate disruption, ecosystem sustainability, transmission of organisms across species, and therefore issues of human health, animal health, agriculture, and planet health. Over time from philanthropic and academic and government perspectives, this intersection is going to be a more prominent place for understanding, investment, and management.*

Augmenting a mutually beneficial interdependence of national and transnational is at the very heart of sustainable development as both a conservation-minded ideal and ever more validated economic platform. I cannot think of more powerful corroborating evidence than that provided by mankind's interface with the world's coral reef system.

As Morrison et al. (2019) point out, coral reefs *cover only 0.5% of the ocean floor, but they support almost 30% of the world's marine fish species. Their loss has huge implications for biodiversity and for the roughly 400 million people who depend on them for work, food, and protection from waves, storms, and floods in more than 100 countries across Australia, southeast Asia, the Indo-Pacific, the Middle East, the Caribbean, and the tropical Americas* (p. 333). The article, published in the journal *Nature*, delivers an urgent call for a new approach that must make changes on land and sea and across countries. Kavousi and Keppel (2018) make a complementary case for the urgency of globally-scaled research and conservation planning that would identify and protect *climate change refugia* for coral reefs, i.e., refugia characterized by long-term buffering of ocean warming and acidification and constituting *the best chance of survival for many coral species in the wild* (p. 43).

What if there was a country that had a concrete plan to value the transnational connectivity of its natural wealth as the foundation of a sustainable development strategy that systematically augments the national benefit with benefits for the global environment and humanity within the ever more knowledge-oriented global economy?

There is. In mid-February 2020, I was on a Copa Airlines flight returning to Los Angeles from Panama City—just a few weeks before the Panamanian government, in sad resonance with actions prompted by Covid-19 across the world, declared a national state of emergency. I was coming back from a reunion with a nation that profoundly inspired the formative stages of my professional journey and has now honored me with an invitation to help shepherd the revival and fulfillment of an economic-development model whose promise I vetted in Panama more than two decades earlier. I wholeheartedly committed to this sequel of my alliance with Panama in shaping an opportunity that outgrows Panama—and that redefines the possibilities of the knowledge-based economy. In the text that follows, I lay out the foundations for this sequel: a nation's plan for tomorrow that celebrates the earth's connectivity and that is conceived and will be executed to benefit all of humanity.

2. Crossroads of Economic Visions a Century Apart

> *The creation of a water passage across Panama was one of the supreme human achievements of all time, the culmination of a heroic dream of four hundred years and of more than twenty years of phenomenal effort and sacrifice. The fifty miles between the oceans were among the hardest ever won by human effort and ingenuity, and no statistics on tonnage or tolls can begin to convey the grandeur of what was accomplished. Primarily the canal is an expression of that old and noble desire to bridge the divide, to bring people together. It's a work of civilization.*
>
> (McCullough, 1977, pp. 613-614)

Panama's National Motto, which graces the country's Coat of Arms, reads *Pro Mundi Beneficio*—For the Benefit of the World. This powerful and distinguished designation resonates in spirit with earlier visions, during the 19th century, of a canal across Central America that would transect Nicaragua or Panama but would boast a universal dimension. In his message to Congress, of December 8, 1885, U.S. President Grover Cleveland spoke about a future isthmian canal withdrawn from international contention: *Whatever highway may be constructed, must be for the world's benefit, a trust for mankind…*(quoted in Padelford, 1942). Now under full sovereignty of Panama, the Canal offers a mighty validation of the worth of the *Pro Mundi Beneficio* platform as a vanguard economic paradigm. The essence of this paradigm could be described as follows: the greater the contribution that a vital national resource makes also to the world, the higher the prestige and value that such resource delivers for the nation.

Major (1983) writes: *The Panama Canal possesses great international significance…Like the Suez Canal, it has become a focal point of global strategy and commerce, a thoroughfare between the oceans of enormous value to the world at large* (p. 17).

The Suez Canal is a sea-level waterway running north-south across Egypt's Isthmus of Suez—the narrowest part of Sinai—to connect the Mediterranean and the Red Seas. In contrast, the Panama Canal, which links the Atlantic/Caribbean and the Pacific shores of Panama, is a lake system fed by damming the Chagres River and is reached by flights of locks at both ends. It depends on rain, not sea water, to fill its locks and, thus, it remains a barrier between the two oceans. Its future is inextricably intertwined with the future of its water's guardian, the tropical rainforest that carpets its watershed (and this bond will endure regardless of Panama's current plan to mitigate years of persistent drought by engineering a supplementary water system). The Panama Canal bridges the Isthmus as *a long-arm of fresh water suspended in the jungle* (McCullough, 1977, p. 590).

Reflecting on the two canals' broader geographical contexts, Wallace (1997) draws another comparison, of utmost relevance to the subject of this article: Central America, he writes, *is neither a continent nor an island. It connects two continents, but it is not a subsidiary of either…Strictly speaking, there is another land bridge in the world today, the Sinai between Africa and Eurasia, but the Sinai is desert, and more of an obstacle to most organisms than a passage. Central America is so crowded with life that it supports seven percent of the earth's species on less than one-half percent of its land, and those species are an extraordinary mixture of North American and South American forms that have surged back and forth across it for millions of years* (p. xiii).

Coates (1997) offers a meticulously documented and exquisitely articulated insight into the story of complicated collisions of tectonic plates that have made Central America one of the most geologically complex parts of the world. I will highlight just a few chapters of this story, starting about 140 million years ago, at the end of the

Jurassic period, when the supercontinent Pangea began to rift apart: at first, North America separated from Europe, North Africa, and South America to form the fledging Atlantic Ocean, which connected directly to the Pacific through the present location of Central America. From about 20 to 13 million years ago, a long line of volcanoes extended from the North American Plate towards South America, marking the turbulent junction of the colliding Pacific and Caribbean Plates. There remained a large stretch of deep ocean between North and South America, occupying the future site of Panama. Starting about 12 million years ago, the active Central American volcanic arc began to collide with the northwest corner of South America and these geologic movements slowly formed and raised up the Isthmus of Panama. The pressure of colliding plates eventually caused the whole length of the Isthmus to become emergent, roughly three million years ago, which completed the closure of the Central American isthmus.

The formation of the Isthmus of Panama, which connected two American continents that had been widely separated for tens of millions of years, has been referred to as *the most important natural event to affect the surface of the earth in the past 60 million years* (Coates, 1997, p. 1). It had a revolutionary impact. It triggered the Great American Biotic Interchange—mass migration of animals and plants through the tropics and into temperate latitudes from both north to south and from south to north (Webb, 1997; Wallace, 1997). It created a barrier that divided the once continuous tropical American ocean into two. The oceans on either side became strikingly different. Organisms in the Pacific and the Caribbean increasingly diverged, creating what Jackson and D'Croz (1997) call two ecologically different realms.

A richness of pre-Columbian cultural legacy complements the natural heritage wealth of the Central American isthmus. Cooke (1997) views the isthmus as a cultural and historical unit initiated by the arrival of the native peoples of Central America some time before 9,000 B.C., defined by a great wealth and variety of its Native American heritage, and encompassing—south of the Maya lands with their impressive ruins—large blocks of time and large tracks of space that are yet to be studied.

The Panama Canal is deservingly praised as an unprecedented feat of engineering. As McCullough (1977) put it: *To build the Great Pyramid or the Wall of China, or the cathedrals of France, blocks of stone were set one on top of the other in the age-old fashion. But the walls of the Panama locks were poured from overhead, bucket by bucket, into gigantic forms. And within those forms there had to be still other forms to create the different culverts and tunnels, the special chambers and passageways, required inside the walls* (p. 591). The milestone expansion of the Canal, completed in 2016, further bolstered the genial conception and execution of this engineering masterpiece while cementing Panama's position as a crossroads of global trade.

Central America is an unparalleled feat of nature's engineering, an awesome labyrinth of wonder with extraordinary influence on the entire world. The Isthmus of Panama is the culminating and unifying link in this masterpiece of geological and evolutionary engineering, and the trigger of the enormous impact that the completion of this masterpiece has had on the global climate and environment. The appreciation of the unique value and significance of Panama's natural heritage bounty as a mighty catalyst and a dazzling microcosm of globally significant connectivity has traditionally been confined to the realm of science. I saw in this value and stature a giant untapped economic opportunity—a national opportunity with a formidable global dividend. I deemed Panama an extraordinary receptor for a sustainable-development paradigm I named "TCR."

2.1. The Connectivity Economics of the TCR Model

The Tourism-Conservation-Research (TCR) economic development model is framed by a vision and strategy of forging a proactive alliance of three sectors that could uniquely help each other and, together, drive an environmentally innovative and highly sustainable economy.

I will refer the readers to two recent articles (Ayala, 2017, 2020) that briefly profile the TCR model and provide references to other publications that detail this model's genesis and credentials. I will confine this introduction to highlighting the critical role that science-guided disclosure of the dynamics and connectivity of natural and cultural heritage riches—as detectable on various spatial and time scales—plays in bonding the TCR together. Here enters the original instrument of TCR heritage routes, based on themes that crisscross a country, a region, or a set of variously distant parts of the world as they interpret and integrate scientific discoveries from new angles and across disciplines. Unmasking and extolling the evolutionary, ecological, geological, or historical belonging of a heritage resource to a much larger natural or cultural context is the core premise of these themes. In turn, this premise is the foundation for a systematic and simultaneous augmentation of the scientific, conservation, and economic importance of the entire heritage-resource pool spanned by a theme.

The TCR's pivotal emphasis on unmasking linkages, affinities, and relationships underscores the "C" component as a proactive conservation strategy of a daring scale, of an infinite growth potential, and of unique guarantees that each new expansion will boost the integrity and strength of the entire network of assets guarded and valued through this strategy. Scientific research, the "R," is vital for endowing the conservation strategy with the desired proactive and unbounded quality and for grounding this strategy in a high-value network of heritage themes. Science ought to be entrusted with mapping out the optimum paths for these themes, thus creating a dynamic heritage matrix that invites trail-blazing research that interlinks multiple locations. In its ever grander scale and ever greater capacity to advance the frontiers of knowledge, such research will also keep fuelling the immense capacity of the heritage themes to serve as interpretive channels that offer unique, ever changing insights into complex legacies molded by nature or by human civilizations.

However, this prospect and its long-term viability are conditioned on a concurrent investment strategy that would value the effectiveness and prestige of the C-R teamwork as measures of reciprocal benefit. And this is where the third component, the "T"—which stands for the tourism and hotel enterprise—steps in. Potential access to and stewardship of one or more heritage themes brimming with wonder that is fluid and expansive as it absorbs new discoveries entail major business value for the enterprise in which the competitive strength and return on investment are increasingly defined by the uniqueness and quality of experience as its core product. The prospect of acquiring the capacity continuously to enrich the experience and to enhance it with input of wonder from places demanding strict protection while returning the favor by sponsoring their conservation is priceless. And so is the prospect of further distinguishing the experience by enabling the adopted themes' function as arteries of sustainable economic development. The motivation of the "T" to enable and sustain this function through its products protecting investments in research, training, and conservation-aiding employment is based on business strategy—not on donations. "T" is the ideal business partner also because its capitalization on the themes-linked discoveries as harvests of wonder in no way diminishes the value of those same discoveries for advancing science, medicine, and other fields.

2.2. Priming the Isthmus for a Heritage-Powered Economy

In an article he titled simply "El TCI" (Spanish for "The TCR"), Gonzáles Clare (2000) reminded Panama of a statement I made years earlier: *If I could close my eyes and choose a marvelous country for my plan's application, that country would be Panama*. That wish was granted.

At the invitation of the Panamanian government, then under the administration of President Ernesto Pérez Balladares, I embarked on a two-year (1998-2000) endeavor to pioneer, in Panama, a nationally-scaled TCR blueprint and to validate it as an economic imperative for the nation. I positioned that endeavor on the following premise: *The priority Panama has given to developing its leisure tourism industry and the presence in Panama of the prestigious Smithsonian Tropical Research Institute superbly position Panama to enter the new millennium through a ground-breaking partnership that would integrate tourism, conservation, and research into a catalyst for Panama's national well-being. The time to do it is now, while Panama enjoys the momentum of the fast-approaching reflagging of the Eighth Wonder of the World—the Panama Canal* (Ayala, 1998a, p. 7). A foremost goal was to demonstrate that Panama is much more than the Canal: *The aspiration behind the TCR Action Plan is to make Panama's national heritage, which is legendary in the academic world, equally legendary in the business world, and to do so on a platform that will make the academic and the business interests strengthen each other* (Ayala, 1998b, p. 74).

If asked to single out the most significant outcome of this pilot national project, I would reply without hesitation: an original network of 23 heritage routes based on themes that equipped Panama with the foundation for securing a unique market position as the first country to intertwine its heritage bounty and frontier science in a value-added platform for national economic development and international prominence. This themed chronicle of Panama's heritage identity in motion, across space and time, became the womb of the TCR Action Plan's overall accomplishment. It was the result of a colossal, multi-month effort never before undertaken in any country—and without parallel still today. It would not have happened without the great support I received from the renowned Smithsonian Tropical Research Institute (STRI) and its then-director Ira Rubinoff and without the involvement of an extraordinary team of experts with whom I held countless brainstorming sessions and whom I credit, with gratitude, for the rigorous substance, superb narration, and mutually energizing effect of these themes. This stellar team comprised three distinguished STRI experts—Anthony Coates (geology of the tropics), George Angehr (biodiversity, tropical ecology, heritage interpretation), and Richard Cooke (archaeology, human ecology)—joined by Omar Jaén Suárez, prominent Panamanian geographer and historian.

Three categories of TCR heritage routes are interwoven within this tapestry of wonder: *Thematic Routes* that highlight and integrate particularly remarkable aspects of Panama's spectacularly diverse natural and cultural heritage; *Chronological Routes* that journey back in time on the wings of paleontological and geological findings and formations; and *Spatial Routes* that emphasize a series of places related to a single theme and are further subdivided into *Trans-isthmian crossings*, which display the diversity of Panama's life zones and species, and *Isthmian corridors*, which extol the role of the Isthmus as a migration corridor between the Americas.

Comprehensive presentations of Panama's one-of-a-kind heritage identity can be found elsewhere (Cooke & Jaén Suárez, 1999; Ayala, 2000). But I wish to make a special mention of the qualities that these routes acquired through their adherence to the TCR model's original concepts of *TCR Staging Areas* and *TCR Benefit Zones*.

The concept of staging areas replaces the traditional concept of development sites on the premise that planning the foundations of leisure tourism should be inseparable from planning the economic foundations of conservation. It defines the optimum locations along each route for the interpretive and hotel infrastructures of vanishing lines between the two. The staging areas will have the key responsibility for spreading the benefits of heritage-centered tourism across the benefit zones catalyzed by the routes.

On the conservation front, worthy emphasizing is the capacity of the interpretation-welded routes to make the eminently marketable conservation sponsorship by the tourism and hotel projects into an economic force that both drives and protects investment in Panama's leisure tourism and to systematically spread the benefits of conservation sponsorship beyond the areas of tourist visitation, especially to ecologically fragile or culturally sensitive areas.

On the knowledge front, the routes superbly invite and structure the industry-sponsored advancement of research on the diversity and complexity of Panama's heritage, as well as initiatives to revitalize traditional knowledge, both of which can be well combined with scholarships funded by the industry. Transforming STRI's ground-breaking discoveries into the never-the-same and impossible-to-imitate qualities of Panama's heritage products is a very special business bonus.

Facilitation of employment opportunities for local communities in sustainable management of the very natural resources that make the themed heritage routes commercial super stars is a crucial third front of the benefit zones. As I was quoted in the journal *Science, Only if sustainable resource management is brought as a financial incentive and an employment opportunity into the tourist trade can the selling of heritage experiences meet the highest standard of product quality while catalyzing economies that will prosper on sustainability* (Ayers, 1999, p. 1546).

The Panama Canal—a route of world acclaim surrounded by natural and cultural riches no less deserving of such acclaim—was chosen as the setting for the most ambitious application of the TCR Staging Areas and TCR Benefit Zones concepts. It was an honor to attract the world-renown architect Frank O. Gehry for this large-scale endeavor. He and the Panama City based planning and urban design firm URBIO, SA led a team of architects, engineers, and financial advisers in the development of a comprehensive economic-cum-conservation strategy that would accomplish the preservation and restoration of the treasure-troves of nature and historic architecture at the Caribbean and Pacific mouths of the Canal in a fashion that combats poverty and prioritizes social benefits (FOGA, Inc., 1999). As noted by Hogrefe (1999/2000), Colón—Panama's second largest city, of rich colonial heritage but plagued by high unemployment and the decay of its physical infrastructure—was the centerpiece of this project. Accordingly, Colón was the designated location for the principal one of the three Gehry-designed models of facilities to be anchored in Panama's Caribbean and Pacific heritage contexts. This state-of-the-art trilogy of staging areas was intended jointly to yield a groundbreaking *national heritage center* that would make the entire country a giant zone of conservation and poverty-mitigation benefits.

Miller (1999) profiled the TCR Action Plan's teamwork and agenda as a mammoth effort in laying the groundwork for a *heritage-driven economy*.

Then the Government changed in Panama and the making of the flagship heritage-driven economy came to a halt and was consigned to the archives. Panamanian architect Gonzáles Clare was among those who endeavored to elevate this opportunity above political transitions. *The notion of the new Republic, now that we are configuring our fully independent and sovereign nationality, demands initiatives such as the TCR that can ponder the natural wealth and heritage, combined with the cultural patrimony. The way ahead is already designed and Panama would be the first country in the world that adopts this innovative plan of comprehensive sustainable development. Let's not lose this opportunity* (Gonzáles Clare, 2000).

His call has been answered—almost exactly 20 years later.

3. Orchestrating "National" and "Transnational" in the Pursuit of Wonder as a Great Economic Frontier

I reflect, with gratitude, on the warmth and enthusiasm that defined my personal meetings with Panama's President Laurentino Cortizo Cohen, members of his Cabinet, and other Panamanian leaders when I was invited to visit Panama in February 2020, to partake in this opportunity's awakening (ANPanamá, 2020; Hernández, 2020). This awakening, as both an act and unfolding process, is a tribute to the foresight and interest of the Tourism Minister Iván Eskildsen and Vice Minister Denise Guillén, who presently head the Panama Tourism Authority. Special recognition also belongs to Gilberto Alemancia, the Tourism Authority's communications executive, guide, and a representative of Panama's indigenous Guna community—and my collaborator of 20 years ago—for alerting Minister Eskildsen and his team to the existence of the TCR Action Plan.

I pledged my involvement with emotion and determination to take this sequel to a new level of national and international ambition.

Panama is rich with a heritage treasure trove of mind-boggling diversity, exquisite beauty, and of a *microcosm* manifestation of some of the earth's most impactful geological and evolutionary dramas that has made Panama, as a spatial unit framed by political borders, such an ideal receptor for a nationally-scaled TCR alliance. However, the full potential of this Panama-pioneered alliance is yet to be realized. Moreover, Panama has another singular quality whose worth stems from the singular role of the Panamanian Isthmus in engendering transnational connectivity. And this quality has a powerful yet dormant economic connotation. The following segments of this document present my vision and offer to mobilize and mutually energize the untapped national and global opportunities unique to Panama. They lay out the strategy I propose for reviving the TCR Action Plan's accomplishment (*3.1. Elevating Panama's Heritage Treasures to an Iconic Treasury for the Nation*) in concert with employing the TCR philosophy on a new, transnational platform that fortifies the national worth and benefit of Panama's unmatched heritage and knowledge attributes (*3.2. Unlocking Panama's Potential to Excel as the Hub of Transnational Heritage Routes for the Global Knowledge Economy*).

3.1. Elevating Panama's Heritage Treasures to an Iconic Treasury for the Nation

Commenting on the significance of the TCR Action Plan's heritage-route achievement and welcoming this project's rebirth, Jaén Suárez (2020) observed: *All the diverse elements of the Panamanian landscape, natural and human, would have a new coherence if integrated in a new broader concept, the concept of route as heritage wealth insisting on the most outstanding characteristic of our territory and our society, their capacity to function as a route since the most immemorial times*.

It is precisely this new coherence—and its systematic strengthening via activating and further evolving Panama's pioneer TCR heritage-route matrix—that, I recommend, should be at the heart of Panama's re-launch of the nation-wide implementation of the TCR roadmap.

3.1.1. A Heritage Master Plan Layered for an Infinite Legacy

The 1998-2000 TCR Action Plan delivered an entirely new concept and content of a *national heritage product* as a dynamic foundation for national development—a foundation whose structure, vigor, and long-term appreciation are granted and guarded by top-caliber science. The *2020 Plus* TCR sequel now has the opportunity to activate and capitalize on this already existing, Panama-exclusive foundation. The value-adding overlays and synergies that the TCR Action Plan has built into the heritage route network will assume major significance during the implementation of this next stage. I will illustrate this point by singling out one specific province of Panama, the Darién, and presenting its heritage riches within a cluster of routes (selected from the 23-route matrix whose overview can be found in Cooke & Jaén Suárez, 1999) that bestow multiple layers of appreciation on these riches.

The Darién—the easternmost province of Panama that harbors the Darién National Park, a UNESCO World Heritage Site resplendent with a spectacular variety of habitats and wildlife—is the domain of the *Route of the Harpy Eagle*, named after the national symbol of Panama. Within the entire heritage route network, this route is perhaps the most symbolic of the awesome dynamic of Panama's natural heritage, as it captures the striking mixture of *stability* and *change* that cements the identity of the Panamanian Isthmus as the *bridge of the world*. In a fascinating

interplay of flow and isolation, both the Darién Highlands and the Darién Lowlands act as corridors for the passage of plants and animals between the Americas while, at the same time, the Darién Highlands—once islands—boast a high number of endemic species, i.e., species not found anywhere else in the world.

However, Panama's richness of endemic species is not confined solely to the Darién. As revealed by the *Route of the Sanctuaries of Life*, Panama encompasses five major endemic areas that collectively merit utmost and urgent attention to ensure their effective protection. This priceless mosaic of natural habitats of terrestrial tropical animals that are found only in Panama complements the Darién's cradle of endemic life with those located in western Panama—in highland settings as well as in the lowlands of the Caribbean and Pacific coasts. It is in its totality that this precious heritage pool will command much greater power than any of its component parts could to fuel national pride, to draw the international attention it deserves, and to entice investment into a staging area that will excel as the patron of the entire route.

The Darién also contributes some of the oldest testimonies to the *Saga of the Isthmus*—the umbrella Chronological Route that integrates the most important geological and paleontological records across Panama into a thrilling, rigorously researched account of the making of the Central American isthmus and its completion with the rise of the Isthmus of Panama. Coded in multiple rows of geological sediments in the Darién's Chucunaque valley and on the Burica peninsula (bathed by the Pacific in Panama's Chiriquí Province that borders Costa Rica) is *The Great Collision*, one of the *vertical* routes that goes back to the time of the collision of the Central American Arc with the Andes and the intersection of three tectonic plates. The Bocas del Toro archipelago is another prominent contributor to this saga of wonder: the islands' geological strata, saturated with preserved marine faunas, are credited with revealing the most complete history of the evolution of tropical life in the sea over the last 20 million years. No less deserving of a special mention are the geological deposits of the *Charges Formation* observable between the former U.S. military base of Fort Sherman and the Colonial ruin of San Lorenzo. While located by Panama's Caribbean coast, this formation is richly endowed with fossils of Pacific species, thus unmasking a wide Pacific-Caribbean marine strait that existed in the very area of the present day Panama Canal before the Isthmus was fully formed from an island chain of volcanoes.

It is impossible to fully appreciate the singularity of Panama's landscapes and seascapes without taking into account their mythological dimension. Darién is one of the portals into the *Route of Mythological Landscapes and the Indigenous World* that traverses Panama as it introduces seven Native American peoples who now live within the country's borders and celebrates their living legacies. Although the uniqueness of each of these legacies can be defined and extolled individually, it is only through insights gathered all along the route that one can appreciate how adaptations to different tropical habitats that evolved over centuries have imprinted the architecture and lay-out of these native peoples' communities and how their handicrafts mirror the bonds between the artisans and the products of coast and forest.

Viewed and valued by the TCR heritage routes through the lens of connectivity, both physical and contextual, the heritage riches of the Darién—and of other Panamanian provinces—have become pillars of legacies of much greater complexity and visibility. The rigorously researched linkages, packed with knowledge and wonder and highly susceptible to combining or branching into new heritage pathways as they absorb new discoveries, possess the power actually to grow and continue enriching the nation's heritage wealth. The preeminence and relevance of STRI's research are vital to this *appreciation* and, hence, securing STRI's participation in expanding and refining the original network of 23 routes via new disclosures of trajectories of connectivity merits utmost priority in the consolidation and expansion of Panama's stores of heritage wealth.

In turn, this route-based, STRI-aided augmentation of Panama's heritage wealth offers a unique platform and incentive for the reactivation of a strategic alliance of the T-C-R (Tourism-Conservation-Research) sectors that would revive the international precedent set by a presidential decree engineered by the TCR Action Plan (Ministry of the Presidency of the Republic of Panama, 1998). I am delighted and grateful to mention that, on September 28, 2020, Panama's President Cortizo Cohen signed an executive decree that reestablishes the TCR strategy and creates the Alliance and the Committee formed by Panama's Tourism Authority, Ministry of Environment, Ministry of Culture, and the National Secretariat of Science, Technology, and Innovation (Ministry of Government of the Republic of Panama, 2020). This Alliance could also provide invaluable institutional safeguards for an investment strategy in support of Panama's re-launch and fulfillment of the TCR as a national opportunity.

3.1.2. An Investment Blueprint Layered for an Infinite Dividend

At the onset of the TCR Action Plan 23 years ago, Panama's leisure tourism industry was in its nascent stage and almost no hotel infrastructure existed outside Panama City. I viewed that as a mammoth competitive advantage given the opportunity it offered to use the heritage route asset as a magnet for investments in discovery travel unique to Panama and anchored by staging areas whose future hotel projects will have the capacity to deliver heritage products immune to imitation. An investment into a staging area would simultaneously be a high-profile investment towards the consolidation of a precedent-setting themed national conservation system that proactively draws from the routes a direction for future expansion that systematically strengthens this system's conservation, research, and economic importance. Thus, each staging area would act and excel as a *co-architect* of a nationally-scaled alignment of tourism and conservation planning that would further heighten the international prestige of Panama's heritage wealth.

In harmony with this strategy, the TCR Action Plan carried out the formal launch of the heritage route matrix jointly with the unveiling of a pilot portfolio of staging areas (Ratchford, 1999). Concrete examples accompanied the event's roll out of the objective to proactively define and distinguish Panama's envisioned hotel industry by hospitality projects born from—and master-planned to fulfill—the aspirations of conservation and research stewardship. Herman Bern, a prominent Panamanian developer and a pioneer in the Panamanian hotel industry, introduced his Gamboa Rainforest Resort as follows: *This project has a very formal commitment to the TCR initiative… our philosophy includes in first place a focus on the ecology, scientific research, and the conservation of the environment… We want the Gamboa project to be not solely a hotel but a museum of all the riches that we have in our country and that even many Panamanians do not know* (Bern, 1999, pp. 53, 55).

Then under development as a member of the pilot portfolio of TCR Hotel Partners, Gamboa Rainforest Resort is surrounded by the lowland tropical rainforest of the Soberanía National Park—a heaven of biodiversity within the Panama Canal Watershed and an important link in several heritage routes. Acting as another staging area within this 55,000-acre national park, The Canopy Tower drew special mention in the coverage of the launch of the TCR roadmap for Panama in publications ranging from *Scientific American* (Nemecek, 1999) to *Civilization*, the magazine of the Library of Congress (Hogrefe, 1999/2000). This TCR pilot gave new life and legacy to a former U.S. Air Force radar tower rising through and above Soberanía's semi-deciduous rainforest. Raúl Arias de Para, the visionary behind this project in whom the TCR Action Plan found, in his own words, *an enthusiastic proponent of this new strategy,* described his motivation as follows: *I imagined I could transform the tower into a unique lodge with rooms opening at the level of the treetops and I did…I call it the ultimate recycling project* (Arias de Para, 1999, p. 57). The Canopy Tower's ever expanding menu of conservation and research initiatives, including studies to determine the importance of the Panama Canal forests as overnight roosting sites for migratory birds, complements this installation's makeover into a vanguard blend of hospitality and interpretation aided by STRI exhibits, graced with rare views of multiple layers of the rainforest canopy, and crowned by the roof terrace and its 360-degree panoramic immersion into the canopy—one of the least explored ecosystems on earth. Treating this TCR-spirited property to a multi-page cover exposure in *Architecture* magazine, Hart (1999) expanded on the visual dimension of the transformative experience that awaited the guests—and still does: *In the distance, container ships and ocean liners raise and fall as they pass through the canal locks. But within a few yards and at eye level, toucans, harpy eagles, macaws, parrots, raptors, and hundreds of migratory birds nest at every level in the thick foliage* (p. 138).

In the network of heritage routes, the TCR Action Plan offered a myriad of far-reaching conservation and research missions. And through the concept and prime locations of staging areas, the Plan encouraged selectivity in inviting hotel projects that would have the luxury of marrying hospitality and interpretation from the earliest stage of their conceptual master plans, transforming their sites into portals into actual and virtual journeys of discovery unique to each staging area but united in shepherding conservation, knowledge, and sustainability across Panama.

The TCR Action Plan's 2020 sequel ought to tailor this blueprint to the present, significantly advanced stage of the development of Panama's leisure tourism industry. A number of hotels, resorts, and other hospitality establishments have sprung up in Panama over the last 20 years. While some sites that originally represented exceptional candidates for staging areas have partially or fully lost that potential, quite a few still remain. Panama is now also the host to high-end resorts that have refined the art of environmental stewardship and social responsibility in their respective locales of great natural beauty and diversity and whose existing products would thus be highly susceptible to further appreciation and distinction on the strength of their belonging to much larger realms of wonder. The 14-island Islas Secas eco-resort and the Isla Palenque Resort, a member of *National Geographic Unique Lodges of the World*, could well exemplify the magnitude of the added value and legacy. Their setting, the Gulf of Chiriquí—

home to Coiba National Park and its Special Zone of Marine Protection, a UNESCO World Heritage Site, and to the Gulf of Chiriquí National Marine Park—is a cornerstone of TCR heritage routes that extol vital connectivity all along Panama's Pacific coast and that bridge Panama's Pacific and Panama's Caribbean. These routes are not only channels of wonder that will tantalize and inspire the human mind; they are also conduits for taking to national scale and stature the laudable support that these two resorts currently give to communities and conservation organizations locally.

The re-launched TCR Alliance is well positioned to act as the custodian of the heritage route matrix and of its ongoing expansion and refinement fed by rigorous scientific expertise. Such a role could include facilitation and coordination of the engagement of like-minded hotel investors and operators with the matrix as the medium of customizing their offers of heritage experiences in a most enlightened, socially beneficial way. The coherence-fomenting synergies among the routes invite grand business ambitions of grand philanthropic aspirations, anchored by a single property or carried out through multi-hotel collaborations. Moreover, the TCR Action Plan's disclosure of the heritage routes' overlay with poverty-burdened areas all across Panama engenders a powerful confluence between the Panamanian government's priority to combat poverty nationwide and the propensity of heritage-savvy investments to activate the routes as carriers of social benefits to where they are needed the most throughout the country. This confluence also strengthens the force of the themed heritage matrix to prime Panama, as a country, for the ever more prominent global trend of *impact investing* that seeks to generate positive and measurable social and environmental impact alongside a financial return. Fittingly characterized by *Forbes* as combining the rigorous analytics of traditional investment with the heart of philanthropy, this game-changing trend is predicted to grow exponentially over the next decade and beyond (Dallmann, 2018).

Panama's singular heritage endowment and its route-woven net of exclusivity, safety, and appreciation deserve to be projected into the nation's development goals, investment promotion strategies, and international trade alliances and, thus, acquire the function and distinction of a *Heritage Treasury* that nurtures the nation's sustainable prosperity and international image and prestige. Such is my aspiration for the TCR Action Plan's encore as truly a national project—an aspiration that I complement with an invitation to Panama to once again shape the frontiers of the *New World*, this time as a bridge to a new economic geography of the world.

3.2. Unlocking Panama's Potential to Excel as the Hub of Transnational Heritage Routes for the Global Knowledge Economy

To expand on this invitation, I ought to start with its context. Since 2000—and under the auspices of the Pangea World organization I founded—I have brought the TCR philosophy to a transnational level and into the arena of the knowledge economy. This shift has yielded original economic and business models. The economic model places a premium value on the earth's evolutionary and ecological fabric as a transnational reservoir of latent scientific knowledge—the *knowledge mineral* that could propel the emerging global knowledge economy as profoundly as oil defined the industrial economy and could catapult the conservation of natural resources into a pivotal economic force (Ayala, 2017). The business model pioneers a blueprint for *Transnational Resorts* (Ayala, 2020) with the power to align a private enterprise system with investments in geographically unrestrained basic research endeavors. In their interplay, these novel economic and business models aspire to shape business, philanthropic, and political leadership along transnational bridges of knowledge.

The two models complement each other in their focus on the *free flowing*, political borders trespassing characteristic of the knowledge mineral. Both converge in addressing the immense potential of research that would have the financial and logistical support to pursue *free flowing* insights into the earth's natural fabric, be it along borderless paths of spatial connectivity or within themes that integrate unbounded sets of comparisons and correlations. Together, these two models are the cornerstones of an alliance that now officially interlinks the spirit of Pangea World's mission with the UNESCO World Heritage legacy of Villa Tugendhat, Ludwig Mies van der Rohe's architectural masterpiece of *free flowing* harmony with nature.

Located in the Czech Republic and inscribed on the World Heritage List in 2001, the Villa and its garden are lauded by UNESCO as a pioneering work that embodies innovative spatial and aesthetic concepts and their articulation into space without limits. Mies' masterful realization of these concepts *fundamentally changed the relationship that people had to their spatial surroundings, and even infinite space by suppressing anxieties that come from unknown distances. It was a revolutionary approach* (ICOMOS, 2001).

The highly symbolic bond between Villa Tugendhat and Pangea World was unveiled via two international events held in two different parts of the world: The first one, in June 2017, formally ratified this bond on the Villa's premises in the heart of Europe; the second one, in October 2018, celebrated it in California, with the Pacific Symphony's special performance of Antonín Dvořák's world-renowned *Symphony from the New World*. The Pacific Symphony's president John Forsyte referred to the occasion as a *historic concert, linking UNESCO World Heritage sites and Pangea World's mission to awaken the value of earth's raw material of knowledge…bridging new and old worlds* (Pacific Symphony, 2018).

Both events were united by the theme of the discovery of the *New World*, explored from two contrasting angles and venturing into the Pacific and beyond in a poetically named *New World Symphony for the 21st Century*. This exploration, undertaken to illustrate the fundamental principles of Pangea World's transnational mission, deserves a more detailed explanation.

3.2.1. In the Light of New World Discoveries

The first angle offers a perspective ignited in the late 15th century. In August 1492, explorer Christopher Columbus embarked on the first of his four voyages west across the Atlantic in the service of the Spanish Crown, determined to find a direct ocean trade route from Europe to Asia. Instead, sighting an island in the Bahamas on October 12, he encountered the *New World*, opening the era of European influence in the Americas. He *brought into connection two great, before disconnected, hemispheres of the world* (Fernández-Armesto, 2009, p. 42). That spurred a chapter of the world history that was deeply intertwined with the Isthmus of Panama, as highlighted by two of the TCR Action Plan's heritage routes that I intentionally left for this segment.

In the Darién province of Panama, the *Route of the Southern Sea* freezes in time the second most significant geographic event in the American continent after Columbus' discovery of America (Cooke & Jaén Suárez, 1999). During his trip across the Darién Isthmus, Vasco Núñez de Balboa became, on September 25, 1513, the first European to see the Pacific Ocean (then named South Sea/Mar del Sur) from the New World. Some days later he completed this first inter-oceanic route and *took possession of the Mar del Sur and the adjacent lands for the king of Castile* (Pletcher, 2010, p. 86).

The discovery of the Pacific Ocean, which made possible the unification of the geography of our planet, triggered the founding, in 1519, of the city of Panama, the oldest European settlement on the Pacific coast of the Americas whose original component—now the Panama Viejo Archaeological Site—bears the UNESCO World Heritage distinction as a testimony to the transference from Europe of the idea of a planned town. The Pacific Ocean discovery also propelled the development of trans-Isthmian and maritime routes that facilitated Spanish expansion in Central and South America and consolidated Spanish dominion of the New World. The *Route of the Treasures of the Americas* comprises the trans-Isthmian Camino Real (Royal Road) land route and the Chagres River-Camino de Cruces mixed fluvial and land road through which gold, silver, and other riches of Peru and other South American possessions of Spain were transported on their way to Europe. On the Caribbean coast of Panama, the fortified port town of Portobelo and the San Lorenzo Castle and its Upper Battery, now World Heritage Sites, have been recognized by UNESCO as exemplary of the 17th- and 18th-century military architecture developed by the Spanish Empire in its New World territories. These fortifications were pivotal parts of the defense strategy enacted by the Spanish Crown to protect the trans-Isthmian land and water paths. *Through the trans-Isthmian axis of Panama-Nombre de Dios/Portobelo passed 50-60 percent of all precious metals, gold and mostly silver, that arrived to Europe during the 16th and 17th century* (Cooke & Jaén Suárez, 1999, p. 43).

As Conde-Salazar Infiesta (2009) observes, the discovery of the New World and its consequences *made of Europe a true metropolis and of America Europe's grand frontier* (p. 39).

In 1892, the year marking exactly four centuries after the discovery of the New World by Christopher Columbus, the Czech composer Antonín Dvořák landed in America, with a noble mission of no less historic proportion, for it engendered an artistic discovery and transformation of America. Dvořák's journey to New York, where he assumed an invited position of director at the National Conservatory of Music, and to the vast open countryside of Iowa was, in its relationship with Europe, an antidote to Columbus' encounter with America. As Dvořák stated in an interview for the *New York Herald* published on May 21, 1893, *I did not come to America to interpret Beethoven or Wagner for the public…I came to discover what young Americans had in them and to help them express it* (quoted in Abbott & Seroff, 2009, pp. 273-274). Crowning the fulfillment of this historic mission, Dvořák's Symphony No. 9

in E minor, *From the New World*, premiered at Carnegie Hall in New York on December 16, 1893, influencing the development of music for decades and centuries to come.

This brings me to the second angle of my exploration of the New World discovery. Dvořák felt that the core of an American sound could be found in Native American tunes and African-American spirituals. As he also shared with the *Herald, These beautiful and varied themes are the product of the soil. They are American…These are the folk songs of America, and your composers must turn to them…I intend to do all in my power to call attention to this splendid treasure of melody which you have* (Abbott & Seroff, 2009, p. 273).

Dvořák's journey of discovery and celebration of the New World also uniquely blended the rich musical landscape of music originating in America with the magnificence of America's natural landscape. During his travels in Iowa in the summer of 1893, Dvořák was enthralled by the splendor of that state's nature. Velická (2011) documents one of the enthusiastic statements he made: *And what about the Mississippi, along which we rode to a valley and to the little Minnehaha waterfall!! I can't tell you how enchantingly beautiful it was* (p. 70).

Dvořák proceeded to fuse the awakening of the American voice with the joy and inspiration he drew from America's nature, thus bridging the Symphony's New World identity with the Czech tradition of integrating landscape into music. Reflecting on one of the Symphony's movements, Clive (2016) put it as follows: *The Czech nationalist propensity for sketching landscape in music is evident in this movement, but the landscape itself—with its rocks, crags, and rushing waters—is…a dramatic evocation of America's unique heritage, a sense of its natural beauty and an epic, virginal wildness*…Dvořák brought into the New World this Old World tradition in a most respectful and mutually enriching fashion that added a transcontinental layer of appreciation to America's natural assets. This augmented the value to America of Dvořák's discovery of America while immortalizing his *Symphony from the New World* as a gift not only to America but to the entire world.

I have conceived Pangea World's transnational mission in the spirit of this symphonic masterpiece. It is a mission of economic discovery and economic empowerment of large realms of natural riches welded by relationships of great conservation importance and research worth, harboring a major potential to serve as incubators of dynamic knowledge economies that foster better management and conservation of global natural capital, and receptive to further growth in value through association with cultural legacies of international significance.

Panama's ascendance as a global hub for the implementation strategy is unmatched at making this strategy uniquely meaningful in the context of the history of the world's exploration and uniquely proactive in complementing the Canal-facilitated approximation of continents and cultures.

3.2.2. Exclusivity of Borderless Benefit to Humanity

The initially arduous trails and later royal paved roads over which the treasures of the Americas were carried across the Isthmus to the Atlantic shore and then shipped to the royal treasuries in Madrid represent a legacy of three colonial centuries. They constitute an axis around which much of Panamanian history has been articulated, alongside the idea of a water link across the Isthmus that would connect the two oceans—an idea born during the earliest stage of the Spanish occupation. *Balboa's discovery of the Pacific revealed definitely to civilization the fact of the narrow strip of land lying between the two great oceans and connecting the two great continents, afterwards to be known as North and South America. Immediately there sprang into the brain of man a dream that would vex it for nearly 400 years, and until it ultimately came true: that is to say, the dream of an artificial waterway to connect the two oceans* (United States Congress, 1930, p. 9842). Fulfilling that dream, the Canal is a masterpiece of human ingenuity in harnessing the great strategic advantage of the Isthmus' location in the middle of America to seize an unrivaled niche and advantage in the movement of global trade. In comparison, the significance and worth of the Panamanian territory as an unparalleled crossroads of natural pathways that transcend the borders and exclusive economic zones of multiple countries and even wind across high seas beyond national jurisdictions are yet to be appreciated as mighty sources of competitive strength and leadership position in the global marketplace. I assert that the rise of the global knowledge economy is generating immense momentum and value for Panama's natural bounty as a crossroads of transnational connectivity packed with knowledge capital. And I will translate this assertion into a strategy for awakening Panama's potential to excel as a portal into transnational heritage routes along which tourism-based economy and knowledge economy grow into a mutually reinforcing relationship on the premise that they share a resource base of vital importance to their—and the earth's—sustainable future.

The staging areas that are to ignite and catalyze these transnational endeavors must measure up—in their locations and potentials—to the magnitude of the opportunities that will become their legacies and that they will have the power to fashion into achievements of global inspiration. These staging areas will be the ideal receptors for the transnational-resort business model, since they will grant the investments in this model the capacity to rise to *transformative investments in the global knowledge economy* (Ayala, 2020).

This perspective already informs a pilot, Panama-based staging area. Comprised of a portfolio of privately-owned islands—Isla Bayoneta, Isla Cañas and Cañas-adjoining islet Isla La Caida—located in the Archipiélago de las Perlas (Las Perlas Archipelago) in the Gulf of Panama, this staging area comprises nearly 1,800 acres of natural beauty framed by 50 beaches several of which play host to nesting sea turtles. Importantly, this staging area is already equipped with a conceptual master plan that charts this project's transnational benefit zones and has already been previewed at international events held in the settings of the U.S. National Academy of Sciences and the United Nations. I will refer to an already published article (Ayala, 2020) in which I detail these credentials, reveal the Bayoneta-Cañas island duo's collective scientific value as a microcosm of Las Perlas Archipelago's immense biological, ecological, and geological interest, and take the discussion of this project's significance deep into the Pacific, with appreciation for the welcome it has received from representatives of the Pacific Island nations and UNESCO. I will use this document to channel the historic and environmental importance of this project's anchor location into novel strategic synergies designed to further value this pilot project as a steward of entwining and mutually strengthening Panama's cultural heritage of universal value and a multi-national pool of natural heritage of global significance.

The Gulf of Panama is a large inlet of the Pacific Ocean on the southern coast of Panama. The Bay of Panama, on which Panama City is located and which frames the Pacific entrance to the Panama Canal, is the Gulf's inner part. Hence, it was just north of Las Perlas Archipelago where Panama Viejo, the original Spanish settlement on the Pacific shore, was founded and from where the trans-Isthmian routes of New World treasures stretched to Panama's Caribbean shore and its harbors. Las Perlas Archipelago itself figures prominently in the saga of the European discovery of the Pacific Ocean and of Spanish expansion in Central America and in Andean South America. Las Perlas *were the first islands in the American Pacific visited by the Spanish Conquerors of the New World in the 16th century, including Vasco Núñez de Balboa…these conquerors found indigenous people diving to get beautiful pearls…experts in diving and pearl fishing were brought in, including indigenous people from Margarita, Venezuela, and African slaves, since this activity had become very lucrative* (Cooke & Jaén Suárez, 1999, p. 41). During the 16th and 17th centuries, Spanish galleons carrying South American gold were subject to attacks by pirates who used Las Perlas islands as bases. The Old City of Panama also fell victim to a pirate attack, when Sir Henry Morgan reduced it to ruins in 1671.

However, the waters and islands of the Gulf of Panama are not only an integral part of the turbulent history of America's treasures that spurred the rise of Modern Europe and endowed Panama with cultural legacies of universal value. They also figure prominently in the paths of natural treasures that skirt large expanses of Central and South America's Pacific coast, extend far into the Pacific, and embrace several World Heritage Natural sites.

Las Perlas is the second largest archipelago in the marine biogeographic region known as Eastern Tropical Pacific—a region of great marine biological and ecological connectivity, of exception biodiversity, and of complex oceanographic characteristics, primarily due to the convergence of major marine currents. The Gulf of Panama and its natural wealth of great scientific importance are components of the Panama Bight ecoregion: a part of the Eastern Tropical Pacific that extends westward from the coasts of Panama, Colombia, and Ecuador to about longitude 81º W. Listed among priority ecoregions for global conservation (Olson & Dinerstein, 2002), Panama Bight encompasses highly productive marine systems supported by rich nutrients that are brought to the ocean surface by tropical upwelling and currents. The Gulf of Panama also pertains to the Eastern Tropical Pacific Marine Corridor, a trans-border marine conservation network that boasts four World Heritage properties: Cocos Island National Park (off the Pacific Coast of Costa Rica); Panama's Coiba National Park and its Special Zone of Marine Protection; Malpelo Fauna and Flora Sanctuary (off the coast of Colombia); and the Galápagos Islands (some 620 miles from the South American continent, under the jurisdiction of Ecuador). Research conducted by Guzmán, Benfield, and Breedy (2008) in the recently created Las Perlas marine protected area has revealed this protected area's potential to become the second highest coral diversity area in the Eastern Tropical Pacific Marine Corridor and an inspiration for using comparable survey methods to review the representativeness of regional coral diversity, thus facilitating better design of small-scale reserves all across the Eastern Tropical Pacific.

I value Las Perlas as a unique crossroads of the flow of the riches of the past and the flow of the riches of the future: the latter characterized by the precious capital of potential scientific knowledge embedded in the natu-

ral world's *infrastructure* of connectivity. The entire Pacific and its archipelagos are an exceptional reservoir of this borderless raw material of knowledge. We still have only limited understanding of the connectivity fabric within this immense ocean, including the connectivity between the Eastern and Central Tropical Pacific across the *two Pacifics* separating Eastern Pacific Barrier of deep water that is considered impassable for most species. Subjecting this impassibility hypothesis to the first ever test using coral, specifically a reef-building coral species *Porites lobata* that is abundant from Indonesia eastward to Fiji, Samoa, and the Line Islands, Baums, Boulay, Polato, and Hellberg (2012) disclosed that the coral larvae originating in the central Pacific cannot make it across the Barrier and, thus, cannot replenish coral populations in eastern Pacific. The picture has become more complex—and encouraging—with another trail-blazing research endeavor. Romero-Torres, Treml, Acosta, and Paz-Garcia (2018) broadened the focus to key reef-building coral species and used the discovered evidence for connectivity—and dispersals in both directions—across the Eastern Pacific Barrier to map out a conservation strategy aimed at preserving this connectivity of profound implications for the health of the economies, many of them tourism economies, of the Pacific Island nations and the Pacific-bordering nations.

It is precisely their quality as a crossroads of monumental cultural paths that shaped the past *and* no less monumental natural paths that could shape the future that makes the Gulf of Panama and its Las Perlas Archipelago an iconic location for the Bayoneta-Cañas staging area and its mission to facilitate a *discovery* of the Pacific as a knowledge-economy frontier whose wealth is in the collective scientific importance of the connections and dynamics that transcend its megadiverse natural heritage. A transnational resort master-planned from that staging area and adopting its mission will command a privileged position to orchestrate, through architecture and design, an interplay of ever-changing exhibits, panoramic views explored as interpretive channels, and other tools to offer genuine experiential encounters with those dynamic connections whose exploration will constitute its prestigious legacy. The resort will possess the capacity to bring the nurturing of travelers' minds to a level of sophistication that matches and surpasses the ever more refined art of hospitality and physical pampering, without exerting any monopoly over the basic-research findings generated under its sponsorship.

Separated from the Pacific by the Central American isthmus, the Caribbean Sea harbors another monumental story of connectivity and isolation. The Caribbean is home to the Mesoamerican Reef ecoregion that features the largest barrier reef system in the Atlantic Ocean. What is the relationship, if any, between this ecoregion, which extends from the tip of Mexico's Yucatán Peninsula to and along the coasts of Belize, Guatemala, and Honduras, and the belt of coral reefs along the Caribbean coasts of Costa Rica and Panama? Research of relevance to this question is revealing limited connectivity, limited genetic drift between the two, as exemplified by the work of Salas, Molina-Ureña, Walter, and Heath (2010) who identify the Panama-Colombia gyre as the likely barrier. Clearly, and not unlike the case of the Eastern and Central Tropical Pacifics' interface, it is both a conservation *and* an economic imperative to fully understand the *rigidity* or *porosity* of the isolation of the Costa Rica-Panama reef populations from those of the Mesoamerican Barrier Reef System. Aiding such understanding is also a formidable business and legacy opportunity, one that would well complement the rewards of a global endeavor envisioned for a transnational resort project that would be based on the Caribbean coast of Panama.

A meeting place of the extensive coral reefs of Panama's Caribbean coast and a vast realm of primary tropical rainforest in the Province of Colón is under exploration as a prospective staging area for this project. That privately owned land is more than two kilometers in length, along a magnificent expanse of reefs. It is also of considerable depth as it climbs and further widens, carpeted with rainforest, to the border of the primary-forest realm of the Chagres National Park that it adjoins for over 10 kilometers. The National Park is the prime source of water for the Panama Canal operation and a key component of the Mesoamerican Biological Corridor that encompasses a system of protected areas and connecting corridors from southern Mexico to eastern Panama. Commanding nearly 6,000 acres in total, this staging area would offer an exquisite anchor location for a transnational-resort business plan that would interlink and help guard, through vanguard science and diplomacy, the few places on earth where the opulently biodiverse coral reef and tropical rainforest habitats co-exist in close proximity. As I pointed out when first introducing this opportunity: *A resort that would advocate and support an effort to link these two-habitat jewels into a transnational necklace of knowledge of universal value would not only seize a unique niche and business premium; it would also accelerate science and conservation in a major way* (Ayala, 2020, p. 1584).

3.2.3. A Neutrality Paradigm for the Earth's Sustainable Future

Basic science is a public good. Berluzzi (2017) affirms the generally held position that public funding is the only effective way to foster an open-ended, curiosity-driven scientific inquiry. He echoes the established view that, even if they could afford it, for-profit corporations would not fund a public good such as basic biological understanding, since they would not be able to profit from a conceptual breakthrough discovery for long.

The transnational-resort business model seeks to lead the way in awakening the dormant capacity of the international tourism and hotel industry—the resort industry in particular—to deliver a singular exception. This model, which is a centerpiece of Pangea World's mission, elevates stewardship of the scientific exploration of the free-flowing connectivity of the natural world to a lucrative investment platform. It uses an economic argument to establish that the currently dormant potential of many resort sites to serve as windows into wonder-packed connections among variously distant ecosystems, geological formations, and other pillars of the earth's architecture is of an even greater value for the sites' business and legacy capitalization than the natural assets of the sites themselves (Ayala, 2020). The investments in driving new scientific discoveries along these boundless connections will be well rewarded by the opportunity to process these discoveries via interpretation into unique experiences and to make these experiences uniquely meaningful and *exclusive* since they will be offered from distinctive vantage points on the very paths of these connections. This uniqueness and exclusivity—interpretation-mediated and highly customized—leaves intact the scientific value and intellectual property of the underwritten basic research findings. It offers a strong business incentive also for encouraging an unrestricted use by science of the underwritten research findings as input into new research endeavors and as a foundation for conservation and sustainable-development initiatives of transnational scales, since such a use delivers guarantees of continued appreciation of the investment in both business and legacy dimensions.

I view knowledge mobilized through basic-research endeavors of transnational dimension as a public good in the purest sense. Basic science pursued across and above national jurisdictions is most needy of logistical and financial support. Yet, it is of ever greater timeliness and importance in the world that is ever more connected in both economic and environmental dimensions. The transnational resort model pioneers a business paradigm that thrives on alliances with science-based visions of transnational ambitions to reveal the complexities and mitigate the vulnerabilities of the earth's natural fabric. I use this document to establish that the transnational resort model is inclusive of a pledge and demand that the resort-underwritten harvests of knowledge yielded by basic research endeavors conceived and executed on transnational scales must be always treated as *neutral*—they must be accessible to all and be used without any hindrance to fuel further advancements of basic science. My intent to pioneer this *transnational-knowledge neutrality* from Panama-anchored transnational resort projects is framed by a powerful and most symbolic synergy with the neutrality paradigm of the Panama Canal.

The principles controlling the defense and operation of the Panama Canal are contained in the Treaties that were signed by U.S. President Jimmy Carter and General Omar Torrijos of Panama on September 7, 1977. Treaty provisions are contained in three documents: The Panama Canal Treaty, the Treaty Concerning the Permanent Neutrality and Operation of the Panama Canal (the Neutrality Treaty), and Protocol to the Neutrality Treaty (full text of these treaties can be found in United States Congress, Senate Committee on Foreign Relations, 1977). Excerpting from the Neutrality Treaty, *The Republic of Panama declares that the Canal, as an international transit waterway, shall be permanently neutral* (Article 1) and *The United States of America and the Republic of Panama agree to maintain the regime of neutrality established in this Treaty* (Article IV) and *shall jointly sponsor a resolution in the Organization of American States opening to accession by all nations of the world the Protocol to this Treaty whereby all the signatories will adhere to the objectives of this Treaty, agreeing to respect the regime of neutrality* (Article VII).

The Organization of American States acts as the depositary for the Neutrality Treaty and for its Protocol whose premises include that *the maintenance of the neutrality of the Panama Canal is important not only to the commerce and security of the United States of America and the Republic of Panama, but to the peace and security of the Western Hemisphere and to the interests of world commerce as well and that the regime of neutrality which the United States of America and the Republic of Panama have agreed to maintain will ensure permanent access to the Canal by vessels of all nations on the basis of entire equality* (Organization of American States, 1977).

As charted by the transnational resort model, the principle of transnational-knowledge neutrality fully respects and honors the nations' sovereignty over their natural heritage riches. Along the borders-crossing paths of the basic-research endeavors underwritten by the resorts, knowledge derived from natural resources in a particular country will be shared with that country while knowledge brought to light through comparisons and correlations

undertaken at a transnational level will be treated as an asset of universal value destined to benefit all of humanity. This generates a unique affinity with the World Heritage paradigm. The inclusion of a site in the prestigious global portfolio of World Heritage properties in no way influences the site's ownership by the country within whose jurisdiction it is located. However, with inscription on the World Heritage List, the site acquires an additional, universal dimension within which it is honored for its irreplaceable value to humanity and shared with the world. A most timely opportunity now exists in Panama to demonstrate the potential of this affinity on a project whose national benefit would be multiplied by the inspiration it would offer to the world.

4. The World Heritage Horizon of the Path Between the Seas

I applaud a recent proposal by the Permanent Delegation of Panama to UNESCO (2017) that seeks to integrate some of the country's already existing World Heritage sites into a *serial property* that would bring two additional new components into the Outstanding Universal Value of a collective legacy to be known as *The Colonial Transisthmian Route of Panamá*. This serial nomination complements two composite sites of World Heritage distinction (namely, the Archaeological Site Panamá Viejo and Historic District of Panama, whose boundaries would be further modified, and the Fortifications on the Caribbean Side of Panama: Portobelo-San Lorenzo) with the Camino de Cruces and the Camino Real—the trans-Isthmian paths that sealed the *Strategic Triangle* defensive system of fortifications, communication roads, and associated structures established by the Spanish Crown. As noted in the proposal, *the impact of the transisthmian transport through The Colonial Transisthmian Route of Panamá, as a driving force for world economy, was enormous*.

Weaving the preserved testimonies of this globally transformative chapter of the Panamanian history into a serial nomination of a cultural *heritage route* classification is an undertaking of great merit. But this singular inheritance from the past could outgrow the past as a foundation for a strategy that would proactively facilitate the world's path into a more sustainable future. I make this assertion taking into account a development that I view as an opportunity for the pursuit of this perspective.

At its 43rd Session held in Baku, Azerbaijan, the World Heritage Committee (2019) deferred the examination of the nomination of *The Colonial Transisthmian Route of Panamá, Panama* and encouraged the submission of a revised proposal by February 1, 2022. Among the Committee's recommendations are: to fully implement and operationalize the management system, including the allocation of funds for the planned conservation, documentation, and management actions; produce a single, comprehensive Management Plan; and to establish the management authority for the entire nominated serial property.

The seeds for my recommendations are already planted in the existing proposal of this serial property. The proposal highlights the remarkable continuity, across centuries, of the idea of creating a navigable waterway between the Pacific and Atlantic Oceans. It was in 1532 when the King of Spain issued an order to explore the possibility of joining both oceans with a canal through the Chagres River. That order, as pointed out in the proposal, eventually resulted in the creation of the transisthmian road network of which Camino de Cruces and Camino Real were the two principal components. The Charges River—the fluvial route of the Camino de Cruces—has been mostly dammed to create Gatún Lake and the Panama Canal, which makes the Cruces Road the precursor and predecessor of the Canal.

I pair the two on a different premise, that of a critical role of environmental conservation both for perpetuating the vital bond between the Canal and its rainforest-clad Watershed and for securing the World Heritage distinction for the proposed Colonial Route's cultural legacy as an outstanding example of land use and human interaction with the environment, which UNESCO conditions on comprehensive conservation and management plans. The 2012 inscription—still in force—of the Portobelo-San Lorenzo fortifications on the *World Heritage in Danger List* underscores this premise. And I emphasize the significance of the spatial overlay of the Canal-Watershed Route and the Colonial Route, which makes the Watershed—a natural heritage jewel in its own right and, as a forest corridor reaching from the Atlantic to the Pacific Ocean, a priceless research laboratory—a stellar environmental companion to the inter-oceanic pool of irreplaceable cultural heritage.

A noteworthy component of this vision is its timing. The effort to secure the Colonial Route's future as a heritage of all of humanity coincides with an unfolding endeavor to redefine the scale and content of an integrated management of the Canal's water resource—the critical prerequisite of the Canal's sustainable future. The climate-change inflicted disruption of rainfall patterns and its consequence, several years of unprecedented drought that

has progressively and severely decreased water levels in the Gatún and Alajuela Lakes—the main sources of water for both the Canal and much of Panama's growing population—have triggered a colossal mitigation strategy. With the estimated cost of about two billion dollars and expected completion by the end of 2025 (Jordán S., 2020), this strategy seeks to intertwine measures to maximize the water storage within the Watershed, to employ digital technology in optimizing the management of the Canal's entire water system, and to study, design, and engineer a solution that will deliver new sources of water (Panama Canal Authority, 2020a). As Fountain (2019) points out, the new water will have to come from watersheds that are farther from the Canal, requiring the construction of tunnels as well as dams. Desalination is also a consideration.

I will suggest that a paramount priority be given to ensuring that this milestone project not only reaffirms but enriches the Canal's positioning and legacy as *The Green Maritime Route of the World* (Panama Canal Authority, 2009, p. 149). A spectrum of innovative efforts already distinguishes the Panama Canal operation on sustainability and environmental fronts, including speed limits and other measures implemented at both the Caribbean Sea and Pacific Ocean entry points to the Canal to protect whales, dolphins, and other aquatic mammals during their seasonal migration and the Green Connection Award that recognizes customers who demonstrate extraordinary environmental stewardship in reducing greenhouse gas emissions. Also included is the 2019 cooperation agreement ratified by the Panama Canal Administrator and the Regional Director of UN Environment in Latin America and the Caribbean and pledging the two parties' alliance in combating climate change and championing sustainable development via the creation and management of environmental economic incentives, integrated watershed management, and other joint contributions (Panama Canal Authority, 2016, 2019, 2020b). The engineering of a robust water management system that will insert the Watershed into a man-made network of connectivity presents a momentous opportunity to fortify the Canal's national and global stature with a new, bold commitment to the guardianship of Panama's heritage, along the nature-engineered, far-reaching connectivity of the Watershed's natural wealth and with a parallel emphasis on shepherding a conservation-powered reunion of two world-changing arteries of global commerce.

Although separated from each other by several centuries, the Canal-Watershed Route and the Colonial Route could superbly complement each other within a conservation strategy designed and executed to elevate the unique intersection of the *World Heritage* and the *world economy* on the Isthmus of Panama to a catalyst of a mutually enriching convergence of these two value systems, with a transformative effect on the emerging global knowledge economy. I will use this document to re-introduce a project that was to become a showcase of the 1998-2000 TCR Action Plan but was abandoned with the change of the Panamanian Government 21 years ago. I now position this project as a staging area for a legacy investment that would be entrusted with and globally distinguished for facilitating this history-making undertaking.

Fort Sherman, originally a U.S. military base whose gun batteries guarded the Atlantic entrance of the Panama Canal, was the centerpiece of a TCR project described by Miller (1999) as a *model for future large-scale TCR partnerships* (p. 44). As noted by Hogrefe (1999/2000), Fort Sherman was also the designated receptor for one of the three pillars—and Gehry-designed models—of the national heritage center envisioned by the TCR Action Plan. In 1998, I published my vision of a new life for this military base that was about to revert to Panama, a vision biased towards celebrating and protecting the base surrounding cultural and natural heritage riches. I wrote: *The historic jewel of San Lorenzo is a World Heritage Cultural Site. However, the magnificence of the site does not stem solely from the impressive ruins of a fort dating back to Panama's colonial period. It also arises from the spectacular setting, which contains breathtaking views of the coast, the Chagres River, and the rain forest. As STRI's George Angehr pointed out to me as we toured the area, one could experience here three different forest types on a loop trail of just one kilometer…The site even has an excellent staging area, the U.S. military base Fort Sherman, which is to revert to Panama in 1999. The setting will be a priceless reward for the investor who transforms Fort Sherman's great infrastructure into a heritage resort. The commitment to protecting the entire site must measure up to this reward* (Ayala, 1998b, p. 74).

The two decades that have passed since then have left abandoned and no longer usable a significant portion of the infrastructure of this military complex. However, the remainder still has the capacity to anchor a project of major benefit to Panama nationally and on the international stage. Central to this assessment is the fact that when Fort Sherman reverted to Panama in June 1999, it encompassed more than 23,000 acres of land within its boundaries, with over a half of that land covered by tropical forest. Since the early 1950s, that forest served as the site for intensive training program in jungle warfare and survival techniques. Following the reversion, it has acquired a new life as a core component of the San Lorenzo Protected Area. Both Fort Sherman and Fort San Lorenzo are now located within this protected area that spreads across 30,000 acres (12,000 hectares) at the northwestern entrance to the Panama Canal and contains a treasure trove of natural, historical, and cultural legacies (as detailed in Weaver, Bauer, & Jiménez,

2003). In March 2017, Panama's Ministry of Environment adopted a Resolution that approved a 5-year plan for the public use of the protected forest and landscape of San Lorenzo, intended to become a model of sustainable tourism that is inclusive of the participation of and benefit to local communities (Ministry of Environment of the Republic of Panama, 2017). I assign a special importance to the recognition that *it is necessary to show that the tropical rainforest is not simply a decorative vegetation that surrounds the San Lorenzo Castle, but an extraordinary ecosystem with rich biodiversity and complex processes that are fundamental to the life on the Earth* (p. 135 of the plan annexed to and forming an integral part of the Resolution).

This extraordinary ecosystem includes an extraordinary research partner: STRI. A ridge overlooking the entry of the Chagres River into the Caribbean Sea and located within the San Lorenzo Protected Area is the site of STRI's canopy research crane. Ascending some 55 meters vertically and equipped with a crane gondola for a horizontal reach, this structure has revolutionized research at the difficult-to-access level of the tropical forest canopy. It should be noted that this location in the wet evergreen forest has a counterpart location—and research crane—in the seasonally dry forest of the Metropolitan Natural Park on the opposite side of the Isthmus, which allows for invaluable comparative studies of the still little explored *New World* of the forest canopy.

Adjacent to the canopy access crane in the San Lorenzo Protected Area is a pillar of another trail-blazing endeavor of STRI: the San Lorenzo forest plot. It belongs to a vast STRI-shepherded network of forest plots designed to monitor forest diversity and change and now known as ForestGEO (Forest Global Earth Observatory). Within Panama, the forest plot portfolio includes the world-renowned Barro Colorado Island, where the 50-hectare plot of tropical moist deciduous forest is better researched than any site of comparable size throughout the world, and more than 50 one-hectare plots in the Panama Canal Watershed. Ibáñez et al. (2002) detail the genesis and significance of STRI's comprehensive program to monitor the Watershed ecosystem, pointing out that *the area of the Panama Canal is one of the few sites where a corridor of forest reaches from Atlantic to Pacific Ocean* (p. 91). Also located in the Panama Canal Watershed is STRI's Agua Salud Project—a research initiative and a large-scale field experiment aimed at quantifying the ecosystem services or benefits gained from tropical forests and, thus, further exposing and helping support the critical role of forests in sustaining the Canal's pivotal role in world commerce.

I view the canopy research crane, the forest plots, the Agua Salud, and other vanguard research endeavors that are augmenting the worth and resistance of the Canal-sustaining forest corridor as the *fortifications* that provide an ever more crucial defense system for the Canal-Watershed route of global significance. That defense system is also of great value and relevance to protecting the environmental integrity of the proposed Colonial Transisthmian Route of Panamá and its cultural treasures that include, within the Strategic Triangle territory, some of the earliest evidences of human occupation in Panama and the Americas. Moreover, that research-based defense system will nurture and strengthen the knowledge-enriched sustainable tourism model adopted by the San Lorenzo Protected Area and applicable all along these two trans-Isthmian paths.

This leads me to offer two recommendations. One, I believe that the TCR Alliance Committee would be the ideal management authority for the entire serial property proposed for the World Heritage nomination. Second, I recommend that consideration be given to intertwining the irreplaceable cultural and natural heritage of the Colonial and the Canal-Watershed routes within the revised proposal. The revised version would nominate for the World Heritage inscription a mixed Cultural-Natural serial property whose emphasis on the future also bestows new vigor and relevance to a world-changing legacy of the past.

This second recommendation comports with an important quality of the UNESCO World Heritage instrument, namely, that it does not draw a rigid boundary between *natural* and *cultural* in honoring legacies deemed to be of irreplaceable value to all of mankind. For example, cultural properties include cultural landscapes: the *combined works of nature and of man*, manifestations of the interaction between humankind and its natural environment. Moreover, while the assessment of *Outstanding Universal Value* was originally based on two separate sets of criteria, the revision of the *Operational Guidelines for the Implementation of the World Heritage Convention* adopted by the UNESCO Intergovernmental Committee for the Protection of the World Cultural and Natural Heritage at its 6th extraordinary session in March 2003 (World Heritage Committee, 2003) merged both into a single set. Consequently, a site's inclusion on the World Heritage list is now conditioned on meeting at least one out of the ten combined selection criteria.

The rationale behind intertwining the Colonial and the Canal-Watershed routes within a nomination of a Cultural-Natural serial property is also readily expandable to a transnational scale. The UNESCO description of the World Heritage ranking Portobelo and San Lorenzo fortifications positions these military compounds on their belonging to a larger defensive system—including Veracruz (Mexico), Cartagena (Colombia), and Havana (Cuba)—

that served to protect the route of commercial trade between the Americas and Spain. Fort Sherman belonged to a borders-spanning defensive system, as a crucial link in the Caribbean Defense Command created with the main task of guarding the Canal from air attacks and spread out over many islands (Larew, 2004). Fort Sherman's new home, the San Lorenzo Protected Area, as well as the Charges National Park and other parts of the Canal Watershed are important components of the Mesoamerican Biological Corridor—a multi-country system of *defense* of biological diversity and landscape connectivity aimed at fostering sustainable social and economic development.

Commanding a unique niche at the crossroads of defensive systems that evolved—and continue to evolve—around two world transforming and unifying arteries of trade and commerce, Fort Sherman stands out as a singular anchor for a most consequential legacy investment. Attuned to and guided by Pangea World's mission, that investment would become, in prestige and transformative power, synonymous with a grand heritage route that combines the guardianship of a trans-Isthmian treasury of mutually inseparable cultural and natural legacies of irreplaceable value to humanity with a systematic augmentation of this treasury's worth to Panama and to the entire world. It would also enjoy a momentous connection with the Bayoneta-Cañas staging area's ambition to make Panama the portal into a route of the riches of the Pacific that seeks to engender a transnational knowledge economy around the mind-boggling connectivity that welds and bolsters in value the Pacific's natural treasury of the knowledge capital. The *Pacific Bridge to Noble Wealth* is how this route has been named and will be presented for complementary legacy investments (Ayala, 2017).

A transnational and, ultimately, global level is where the most transformative discoveries can be made about relationships and affinities that open new frontiers for science and conservation and could also profoundly influence the health of the economies of clusters of nations. I originated the transnational resort model with the aspiration to introduce a business partner to geographically unrestrained exploration of the natural world and to design and shepherd this breakthrough partnership on the premise that the knowledge yielded along the transnational paths of this exploration must forever remain a global asset that is accessible to all. Activating this premise via the launch of pilot *transnational canals of knowledge neutrality* from Panama, in inspirational resonance with the neutrality paradigm of the Panama Canal, is a prospect of a breathtaking force and potential. It bolsters the capacity of the transnational resort model to engender, from Panama, a globally momentous convergence of tourism economy and knowledge economy within a mutually reinforcing relationship that draws strength from—and strengthens—the free-flowing veins of natural knowledge capital. The prospect of planting additional offspring of this model at the level of the Mesoamerican Biological Corridor and other borders-spanning heritage paths that offer a vast uncharted territory for legacy investments of extraordinary rewards is integral to a plan for tomorrow that pairs the Panama Canal with knowledge canals devised to insert conservation firmly into the vocabulary of the ever more knowledge-oriented global economy.

May this plan for tomorrow bolster the ideal and the economic savvy of global sustainability that reinforces human health with the health of our planet and, thus, also strengthens the global society's resilience to pandemics and other pan-nation challenges.

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Comentario al documento *En Beneficio del Mundo: Emparejar el Canal de Panamá con Canales de Conocimiento de Valor Trascendente para la Nación y la Humanidad* (Hana Ayala, 2021)

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La pandemia provocada por la trasmisión a los humanos del SARS-CoV-2 ha cambiado por completo el mundo que conocíamos. A la catástrofe sanitaria, que ha causado unas cifras de mortalidad inimaginables hace apenas un año —casi 6.000 fallecidos en Panamá, más de 60.000 España y cerca de medio millón en los Estados Unidos cuando se escribe este comentario—, se añade una crisis económica de alcance planetario y un derrumbe de las claves principales en las que se asentaban nuestras sociedades. Los Gobiernos buscan a la desesperada fórmulas para combatir lo que en principio parece incontrolable, porque las amenazas que afectan a la salud obligan a tomar medidas que paralizan las actividades económicas y los intentos de aliviar los confinamientos llevan a la aparición de nuevas oleadas de la Covid-19.

Si a las dificultades para adaptarse al mundo confinado se les añade la angustia acerca de un futuro que nos resulta imprevisible, llegamos a lo que parece ser el desafío más grande al que se enfrenta la humanidad tras las grandes guerras del siglo anterior. Sin embargo, cualquier intento de buscar soluciones para nuestros problemas actuales debería tener en cuenta que otros aún mayores nos esperan. En una entrevista concedida al diario español *El País*, Bill Gates —quien, por cierto, predijo hace años la amenaza de un nuevo virus capaz de extenderse por todo el planeta— asegura que el cambio climático que estamos sufriendo ya tendrá efectos mucho peores que la pandemia.

Haciendo caso a la advertencia de Gates, y conviene tomarla muy en cuenta, aparece una dificultad añadida a las que tiene que afrontar ya cualquier solución que se aporte para la triple crisis sanitaria, económica y social que padecemos. La de tener que luchar de manera decidida contra los factores que, de la mano humana, agravan el calentamiento global. En su principal dimensión, esa lucha tiene un soporte político: el de los Gobiernos que no hacen lo bastante para cumplir con los compromisos asumidos en el Acuerdo de París de 2015 sobre el cambio climático quizá porque el populismo, con sus promesas falsas, se ha vuelto una gran amenaza en los últimos años. La política no es la única clave relevante: incluso el esfuerzo individual de cada uno de nosotros cuenta para lograr la reducción en las emisiones de gases de efecto invernadero. Y por supuesto que el mundo de la industria y el comercio añade la necesidad de nuevas fórmulas de negocio más respetuosas con las necesidades medioambientales.

Sin embargo, de lo que se trata en este caso en particular que estamos comentando es de dar con una fórmula capaz de diseñar las mejores fórmulas para organizar o, mejor dicho, impulsar ese mundo nuevo tras la pandemia que atisbamos hoy.

Será con toda probabilidad un mundo diferente al que vivíamos hace un año. Cuesta ya casi recordar que antes del comienzo de la pandemia nuestras costumbres incluían el turismo masivo, la concentración en actividades de gran afluencia —estadios deportivos, museos, mercados, templos, conciertos— e incluso la indiferencia, relativa al menos, hacia la dilapidación de recursos no sostenibles... Pues bien, la búsqueda de respuestas creativas debe lograrse por medio de una estrategia común en la que colaboren los distintos frentes: el económico, el sanitario, el científico y, por supuesto, el político, dentro de una de las pocas ventajas que habíamos alcanzado antes de que el SARS-CoV-2 nos azotase: la de vivir en un mundo global.

La propuesta de Hana Ayala, que cuenta ya con dos décadas de experiencia, se refiere a un país en concreto, Panamá, pero desde una perspectiva que es global en dos sentidos: el primero, el de integrar esfuerzos que proceden de distintos sectores siguiendo un modelo multidisciplinar en su sentido más amplio. El segundo, el de suponer una estrategia que puede ser seguida en cualquier otro espacio de nuestro mundo global.

El proyecto Pangea World, basado en el paradigma de desarrollo sostenible TCR (*Tourism, Conservation, Research*), es una respuesta global en esos dos sentidos a una de las primeras preguntas que nos plantea Hana Ayala:

> *¿Qué pasaría si hubiera un país que tuviese un plan concreto para valorar la conectividad transnacional de su riqueza natural como la base de una estrategia de desarrollo sostenible que aumenta sistemáticamente el beneficio nacional con beneficios para el medio ambiente global y la humanidad dentro de un mundo cada vez más orientado al conocimiento?*

Una primera respuesta que podemos dar es que ese país lideraría el empeño por alcanzar cuanto antes el nuevo mundo de superación de las diversas crisis que nos azotan. Una segunda respuesta anticipa que los beneficios de tal iniciativa no alcanzarían sólo al protagonista que haya dado el primer salto sino a la humanidad entera. Pero la tercera, y más temible, respuesta advierte, por el contrario, acerca de los riesgos que supone no hacer nada, seguir de brazos cruzados esperando que el destino nos alcance. Esos mismos riesgos con el que el pensamiento mágico azotó al ser humano hasta que la ciencia apuntó el camino hacia la liberación.

Si Panamá se convierte, asumiendo el paradigma TCR, en el impulsor de ese nuevo mundo, España tendría la oportunidad —y la obligación— de retomar los puentes con Centroamérica ejerciendo de embajadora de la Unión Europea para la diseminación y globalización del proyecto. Permítaseme añadir una pregunta más. ¿Podemos permitirnos el lujo —por no decir el disparate— de perder esa oportunidad?

Comments about the document *For the Benefit of the World: Pairing the Panama Canal with Knowledge Canals of Transcendent Value for the Nation and for Humanity* (Hana Ayala, 2021)

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The pandemic provoked by the transmission to humans of the SARS-CoV-2 has completely changed the world we knew. The sanitary catastrophe, which has caused mortality numbers unimaginable only a year ago—almost 6,000 deaths in Panama, more than 60,000 in Spain, and almost half million in the United States at the time when these comments are written—is compounded by an economic crisis of planetary reach and a collapse of the key principles in which our societies were based. The Governments are desperately searching for formulas to conquer what seems fundamentally uncontrollable, because the health-affecting threats force to take measures that paralyze the economic activities and the efforts to alleviate the confinements prompt the emergence of new waves of the Covid-19.

If we add the anguish about a future that we find unpredictable to the difficulties to adapt to the confined world, we come to what seems to be the greatest challenge confronting the humanity after the great wars of the previous century. Nevertheless, any efforts to find solutions for our present problems should take into account that others even greater are awaiting us. In an interview he granted to the Spanish newspaper *El País*, Bill Gates—who, by the way, years ago predicted the threat of a new virus capable of reaching all across the planet—asserts that the climate change we are already suffering will have much worse effects than the pandemic.

Heeding Gates' warning, and it should be taken seriously, an added difficulty arises that has to be faced by any intended solution for the triple health-economic-social crisis that we are experiencing. Namely, having to fight in a decisive way the factors that, by the human hand, aggravate the global warming. In its main dimension, this fight has a political context: that of the Governments that do not do enough to satisfy the commitments adopted in the 2015 Paris Agreement on climate change perhaps because populism, with its false promises, has become a big threat in recent years. Politics is not the only relevant issue: even the individual effort of each one of us contributes towards achieving a reduction of greenhouse gas emissions. And, needless to say, the world of industry and commerce adds the need for new business formulas much more respectful of the environmental needs.

Nevertheless, at issue in this particular case that we are talking about is to obtain a solution that will deliver the best formulas to organize or, better said, to propel that new world after today's pandemic.

It will be, with all probability, a different world from the one in which we lived a year ago. It is difficult to remember that before the onset of the pandemic our habits included massive tourism, the concentration of activities of great influx—sports stadiums, museums, markets, temples, concerts—and also the indifference, at least relative, towards the waste of non sustainable resources…Therefore, the search for creative responses must be accomplished by means of a common strategy based on the collaboration of different sectors: economic, health, scientific and, of course, political, within one of the few advantages that we have achieved before the arrival of the SARS-CoV-2: that of living in a global world.

Hana Ayala's proposal, which already counts with two decades of experience, refers to a particular country, Panama, but from a perspective that is global in two meanings: the first implies an integration of efforts that come from different sectors following a model that is multidisciplinary in the broadest sense. The second connotes a strategy that could be pursued in any other place of our global world.

The Pangea World project, based on the TCR (*Tourism, Conservation, Research*) paradigm of sustainable development, is a global response in both those meanings to one of the first questions raised by Hana Ayala:

> *What if there was a country that had a concrete plan to value the transnational connectivity of its natural wealth as the foundation of a sustainable development strategy that systematically augments the national benefit with benefits for the global environment within the ever more knowledge-oriented global economy?*

The first response that we can advance is that such a country would lead the effort to achieve as soon as possible the new world that overcomes the various crises that affect us. The second response anticipates that the benefits of such initiative would reach not only the protagonist that would have taken the first step but all of humanity. But the third, and most troublesome, response points, on the contrary, to the risks of doing nothing, passively awaiting that destiny will reach us. These are the same risks with which magical thinking afflicted human beings until science pointed out the way towards freedom.

If, adopting the TCR paradigm, Panama becomes the driver of that new world, Spain would have the opportunity—and the obligation—to take up again the bridges with Central America, acting as ambassador of the European Union for the project's dissemination and globalization. Allow me to add one more question. Can we allow ourselves the luxury—not to say the folly—of missing that opportunity?

In the past two decades, globalization has resulted in greater economic, social, and ecological interdependence among nations. Today there is broad recognition of the nature and scope of global public risks and their impact on development. Climate change is one of the challenges that transcend national borders.

In 2020, we faced another dire example of a natural crisis that requires joint action by nations: the pandemic caused by the SARS-CoV-2 virus. The rapid spread of this pathogen throughout the world shows us, once again, that nature does not recognize political barriers. What is needed are internationally agreed sustainable solutions (Mordasini, 2012).

The Panama Canal Watershed is part of one of the most diverse ecosystems on earth, with a richness of species that rivals the Amazon, the Andes, and Southeast Asia (Ibáñez et al., 2002). The economy of Panama depends fundamentally on the Canal. Thanks to it, Panama is one of the most competitive economies concerning regional standards. In 2019, Panama's economy grew 3%, thanks to investment in infrastructure and revenues from the Canal. According to estimates from the International Monetary Fund, due to the COVID-19 outbreak, GDP growth in Panama fell to -2.1% in 2020. However, it is expected to rebound to 4% in 2021, thanks to the projected global economic recovery (IMF, 2020; OECD, 2020).

In her document titled "*For the Benefit of the World:" Pairing the Panama Canal with Knowledge Canals of Transcendent Value for the Nation and for Humanity*, Hana Ayala unlocks the potential of the Canal and future infrastructure developments to distinguish and guard Panama's natural wealth as a cradle of a new-generation sustainable economy that thrives along the paths of nature's connectivity. The fact that the ecological importance of the route that connects the Pacific Ocean with the Caribbean Sea is as relevant as the commercial use that it has been historically given needs to be recognized on the deepest level. The related proposal of nomination of mixed Cultural-Natural serial property as World Heritage also means transcending historical relations and updating the territory's vision towards a global and unifying perspective favoring the environment, communities, and regional development.

Expanding on world trends, Hana's "plan for tomorrow" is an innovative initiative that further emboldens her past efforts, marking the way towards a sustainable future.

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The first woman President of the Mexican Academy of Sciences (2008-2010)

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I am pleased to endorse Hana Ayala's document outlining her 2020 vision for promoting a much deeper integration of Tourism, Conservation, and Research (TCR), which highlights the key global leadership role that Panama can play in providing a model system for her vision's implementation on a transnational scale. As Hana herself states in her document: "It (her mission guided by this vision) is a mission of economic discovery and economic empowerment of large realms of natural riches welded by relationships of great conservation importance and research worth, harboring a major potential to serve as incubators of dynamic knowledge economies that foster better management and conservation of global natural capital, and receptive to further growth in value through association with cultural legacies of international significance." The country of Panama is in effect both a demarcation between two oceans and a bridge between two continents, so it is uniquely positioned to serve as a model State for exploring the many possibilities of amalgamating Tourism, Conservation, and Scientific Research into a holistic and futuristic paradigm for the entire world.

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