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Regenerative design approach for twin transition in Travel and Tourism sector

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Abstract.
Nowadays, design is experiencing a turn towards complexity, from the product to the value-chain level, to tackle the challenges of new '*phygital*' (physical + digital) socio-technical systems. This is opening designers to new advanced sectors but is also leading to reframing established research domains. Among those, Tourism is characterised by a highly complex and fragmented value chain, marked by a business-as-usual model that needs design-driven innovation. It has been a front-runner sector in e-commerce, but this has mainly affected booking processes and commercial transactions. A systemic transition towards digital innovation is still lacking. The design discipline has missed the holistic perspective needed to understand the mutual relationships between the actors in the system. This process is even more urgent considering the global and local impacts of travel experiences, which the pandemic has just paused but not stopped. Decision-makers are increasingly striving for a sustainable sector transition; hence the research community is advancing systemic reflections on a regenerative culture of tourism. Design can support this new scenario, exploring how tourism can generate social, environmental, and economic value and well-being within the visited context, improving the travel experience through sustainable behaviours. The chapter will address the complexity behind the socio-technical tourism system and the digital-physical experiences that travellers undergo to explore, plan, book, live and then remember and share a journey. Present and future strategies for regenerative tourism are examined to define the ongoing and forward-looking trends that can involve design disciplines. These include designing and managing sustainable dynamics through stakeholder engagement practices, mapping and using data and digital information, designing communication and physical products supporting regenerative travel experiences.

Keywords: Design for Tourism; Regenerative Culture; Phygital Systems.

1 Connections and clashes between the digital and ecological dimensions of the tourism sector transition.

1.1 The systemic turn of Design to tackle the challenges of an Experience Economy.

Time and again, the Design discipline questioned the scale and scope of its inquiry, moving from product innovation to services and systems development. We agreed with Papanek (1984) when he pointed out that in these years of mass production, where everything must be planned and designed, Design has become the most powerful tool for people to shape things and the environment. Although it refers to the 1980s, it is still highly relevant today, even if we need to contextualise it in a contemporary society that is increasingly dematerialising products and digitalising all aspects of our lives. This outlines the need to come to terms with a physical world in profound dialogue with the virtual one. At a European policy level, this also represents a pressing challenge: the acceleration of the 'twin transition', which combines digital and green transitions, has been set as a European priority, in line with the EU's new growth strategy and the European Green Deal (Ortega-Gras et al., 2021). The literature underlines how the twin transition considers the digital and physical worlds as a whole. Horizon Europe Programme, as an example, emphasises the need to introduce new ways of thinking and working to lead this twin transition in specific industrial sectors and value chains, including Travel and Tourism. From that perspective, digital technologies, such as Augmented Reality, Virtual Reality, Big Data but also the emerging communication media platforms can increase the resilience of key strategic value chains.

The urgency of dealing with twin systems also arises from the changes that have shaped economic and business models over the past two decades. Our economies increasingly rely on the experiences consumers desire rather than on goods. In the late Nineties, Pine and Gilmore (1998) reported that "today, we can see that consumers unquestionably want experiences, and more and more companies are responding by explicitly designing and promoting them" (p.1). Services, like goods before them, have become incrementally commodified. Experiences have emerged as the next step in the progression of economic value (Fig.1.) for this reason, designers increasingly focus their efforts on developing high-performance physical and digital experiences and this is also the case for the tourism sector.

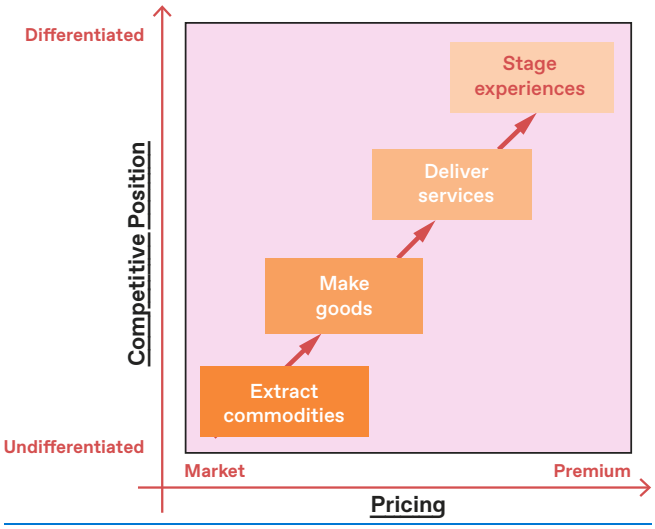

Fig.1. The *Progression of Economic Value* graph adapted from Pine and Gilmore, 1998.

Thus, today's so-called Experience Economy (Mehmetoglu & Engen, 2011) focuses on the intentional use of services and goods to engage individual customers in a personal way, according to different experiential dimensions involving different levels of active and immersive participation. The phenomenon of experience is inevitably adaptable, replicable, and scalable within interconnected socio-technical systems, thus linking supply chains and entire value chains of the most diverse sectors. Likewise, Design disciplines have been broadening the scope of the problems addressed, tackling what is defined as "*wicked problems*" (Rittel & Webber, 1973): complex, ill-defined problems that traditional problem-solving methods cannot fix. This naturally led to a shift towards designing interactions and systems by drawing inspiration from Nature so that ecosystems can benefit from Design in a mutual exchange between inspiration and integration. Bill Reed (2007) stresses how, as designers, *"our role is to shift our relationship to one that creates a whole system of mutually beneficial relationships*" (p. 674), as it happens in Nature. Therefore, Design disciplines have developed a systemic approach that shows significant connections with the transition sciences, encompassing system analysis, multi-level design, and co-creation processes (Pereno & Barbero, 2020). Overall, the designers' ability to facilitate and frame knowledge has proved to be especially relevant in addressing complex technical and managerial challenges. As a result, today, designers are asked to tackle those complex socio-technical challenges, acting within interconnected systems (Norman & Stappers, 2016) that need to be addressed from a holistic and systemic perspective (Aulisio et al., 2021) by developing tools and methodologies for designing innovative solutions with stakeholders.

The present chapter zooms out and concentrates on the Travel and Tourism (T&T) sector, which is marked by a business-as-usual model that the Experience Economy

strengthened in terms of financial growth rather than in terms of sustainability and regeneration. Indeed, the T&T industry has been deeply affected by the Covid-19 pandemic: in 2021, it experienced a temporary slowdown in departures and a change in travel styles and distances. However, now, everything seems to be swooping back to pre-pandemic habits: economic growth may outpace the 2019 results, and studies show a return to the *status quo* regarding the quality and mode of travel experience. Therefore, while the economic recovery is well underway, stakeholders should harness the pandemic experience as a driver for addressing its uneven nature and reviewing the sector's development plans. Indeed, policy and economic instruments supporting recovery can actually trigger the twin transition of the industry. By promoting cross-sectoral interaction that fosters dialogue and co-design between industry, institutions, and academia. The aim is to raise the valorisation of the territory, its features, and the ways to reach it, focusing on the qualification of the demand and an effective value communication that contributes to a change of behavioural perspective on the part of tourists.

1.2 Reframe the Travel and Tourism industry thought the twin transition.

The European *Tourism Manifesto* signed in 2021 by several private and public industry players, reinforcing the synergy of objectives and coordination with other European action programmes that also aim at the industry's ecological and digital transition. The roadmap defined before and during the pandemic are undoubtedly relevant but lack decisive concrete actions capable of redesigning the value chain. The Manifesto and European programmes mainly aim to support, from one side, a sustainable transition by focusing on investments in infrastructure (energy-efficient housing, sustainable conference and meeting venues, greener mobility, etc.). On the other hand, the digital transformation of the sector emerged as a core topic, hence the need for investments in digital infrastructure, the definition of a tourism data strategy, the implementation of enabling technologies and the development of employee digital skills. These actions state how digitisation is a horizontal priority crossing all other aspects of the sector's transition, such as promoting sustainability, increasing productivity, and building background for innovative skills with an increasingly transdisciplinary orientation.

Otherwise, by looking at the past, the tourism industry has been a front-runner in adopting e-commerce models, that have dramatically changed the market conditions for tourism organisations (Buhalis & Law, 2008). However, this digital turn mainly affected commercial transactions, just leading to greater traveller autonomy in booking and managing transport and accommodation. Alongside, but independently, there has been a grassroots approach to digital communication in tourism, resulting in new travel blogs, peer review portals, and, more recently, social networks for sharing travel experiences. Today, the growing relevance of social media marketing for travel shows how travellers are steadily selling themselves and becoming providers of experiences. The era of the peer-to-peer sharing economy (Wirtz, 2019) has highlighted how the commercial and marketing aspects are converging with the sharing of experi-

ences. Therefore, marketers become social, and travellers become the first sellers of experiences. These occurrences highlight how human beings adopt a design attitude to a degree that can develop new professional expertise, facilitated by the emergence of digital technology in a hyper-connected society. While T&T thus may appear as a highly advanced sector in the use of digital tools and infrastructures, it is lagging behind in pursuing a digital transition, as we understand it today. Indeed, digitisation strongly affects the cultural behaviour of people working in the sector who need to update and retrain themselves to learn how to use the new technologies that can be introduced along the value chain to foster an innovative and sustainable transition of the sector. The latter overlaps with the twin transitions, the empowerment of citizens can set in motion new habits and new behaviours that will hopefully lead to greater change that will make tourists more aware of their choices.

The digital phenomenon of travel experiences has already changed the role of the travellers, also in relation to sustainability: sustainable experiences are increasingly showcased and given a positive echo, but the risk is to flatten the phenomenon of ecological transition and divert travellers and stakeholders from the actual priorities of the T&T sector's transition. To this end, it is essential to dwell on the real meaning of sustainable tourism experiences that move towards regeneration processes of the local context, along with digital and cultural transitions, and how these experiences may require effective design input to drive innovation in the T&T sector.

2 From sustainable to regenerative tourism. A choice to be made or an unavoidable path?

2.1 Basic principles of Sustainable Tourism

The concept of Sustainable Tourism gazes beyond the ecological dimension alone, whose priority is to reduce CO_2 emissions to make the sector carbon-neutral by 2050, as stated by the Glasgow Declaration on Climate Action in Tourism of 2021 (One Planet Sustainable Tourism Programme 2021).

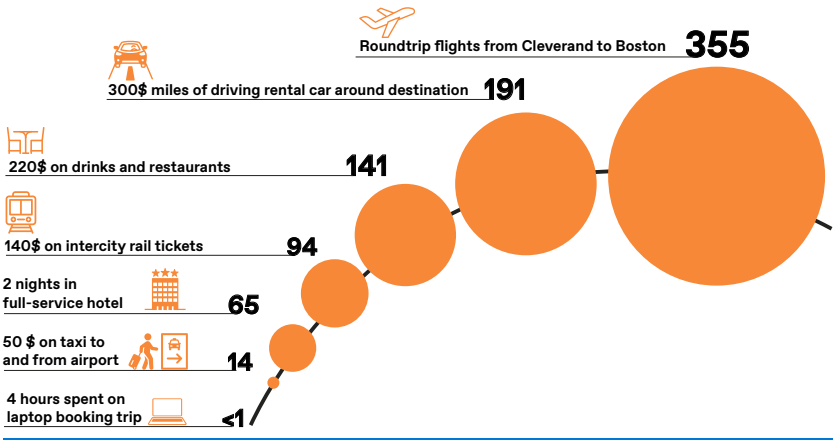

Fig.2. Emissions from a representative trip, kg CO2e., from McKinsey & Co, & Skift Research 2023.

A sustainable transition of T&T's industry definitely needs to balance the economic, social, and environmental aspects (Stoddard et al., 2012) and even cultural elements, which cut across the first three. As the OECD (2021) states, rural communities and local populations who live off tourism-related activities – especially women and young people - have been the most affected by the pandemic. But those populations are also the ones most affected by climate change which, consequently, impacts on the social dynamics at the European and the global level (UNWTO, 2021). Considering the social aspects of the sector, the job losses among seasonal and part-time workers have been severe due to the pandemic (Knezevic Cvelbar et al., 2021) since, aside from the Covid-19 emergency, protections have always been precarious for workers in the different stages of the T&T value chain. Overall, the intensive tourism industry can result in dramatic consequences for the communities living in tourism-exploited locations at environmental, social, and economic levels.

Considering the socio-economic consequences of the tourism industry as it has been treated so far, it becomes evident that a radical change is needed. Several high-profile international organisations are now developing policies, foresight strategies, and certification guidelines for sustainable tourism development. These include the U.N. World Tourism Organization (UNWTO), UNESCO World Heritage Center, World Travel & Tourism Council, Pacific Asia Travel Association, and the European Network for Sustainable Development, among many others, as Stoddard, Pollard and Evans defined in 2012. However, despite the above-mentioned good practices and programmes, the T&T industry is still far from balancing the three dimensions of sustainability, perpetuating its tremendous impact on our planet, our economies and the people who live off tourism. Hence, a resulting question emerges. Is the mere pursuit of a three-dimension balance enough to cope with the impacts of tourism? Recent theories go beyond the concept of Sustainable Tourism to move towards a regenerative shift, so how can design nudge these transitions forward?

2.2 The urgency of a shift towards Regenerative Tourism

Dianne Dredge, founder and director of the Tourism CoLab, points out one of the key aspects that allows understanding the differences between the concept of sustainability and the one of regeneration (Dredge, 2022). An ecological or living systems worldview underpins the regenerative mindset, which aims to create the conditions for all systems and especially the natural ones to renew and restore themselves (Reed, 2007) (Mang & Reed, 2011). In this holistic perspective, humans and nature are not separate categories. Instead, they are connected and intertwined (Dredge, 2022). Different research disciplines, like Social and Touristic Science, Marketing and Economy but also Design and Urban Planning are working on rebuilding the tourism sector with a regenerative and systemic approach that is not just a niche in the whole sector. From Dianne Dredge to Anna Pollock and, again, Daniel Christian Wahl, many researchers have been trying to highlight the importance of leading a change that can bring added and positive value to a location experienced as a traveller. If we look at the evolution of Sustainable Development from its first definition (World Commission on Environment and Development, 1987) to the creation of the UN Sustainable Development Goals (SDGs) in 2012, our societies' greatest challenge is to acknowledge and frame the problem of sustainability as if our current lives and needs, those of future generations, the planet, and its biodiversity are dependent upon our actions. We should move beyond the paradigm of *'do not harm'*, aiming to contribute to the regeneration of communities and nature. We must revisit what we deeply value and what we care about (Wahl, 2016) also during the choice and then the experience of a travel.

(Fig.3.) clearly shows that the regenerative paradigm pushes forward the balance between the 3Ps – People, Planet and Profit –, aiming to restore environments and communities and to enable conditions for regenerative growth (Klein, 2015), which is restorative. If sustainability gives warnings to keep an eye on the next generations, the regenerative approach aims to act to make a real paradigm shift, not just developing technological solutions but to embrace and to dialogue with it pushing humanistic and ecological values (Sonetti et al., 2019). As human beings, our actions are at the centre of anthropogenic impact, and social aspects are crucial to respond effectively to climate change. The decision-makers should consider that the challenges related to sustainable development are social in their core identity. So that, regenerative behaviour must therefore be take into account in policy interventions, also fostering a bottom-up approach to directly involve people interacting within the value chain.

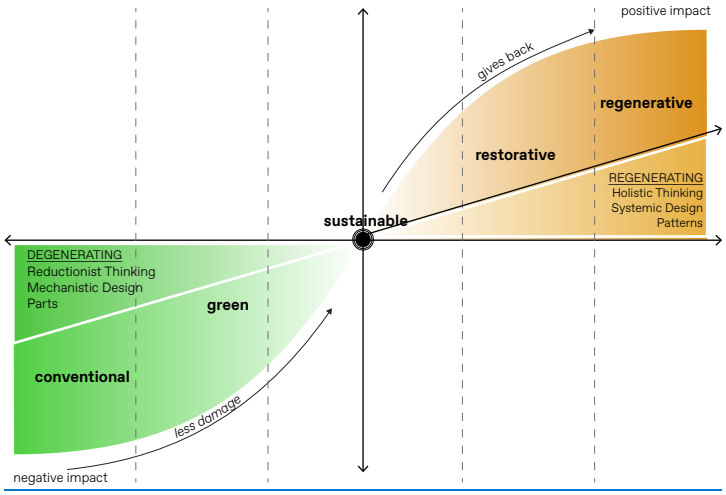

Fig.3. Schema adapted from the conventional stages of *Regenerative Capitalism* by Fullerton and adopted by Wahl, 2016.

3 The contribution of Design disciplines to the *phygital* dimension of Tourism

3.1 Designing products supporting tourism experiences

To better delineate which role Design has played within the travel and tourism sector, we need to go back to the definition of tourism itself, as stated by the World Tourism Organisation: "*Tourism is a social, cultural, and economic phenomenon which entails the movement of people to countries or places outside their usual environment for personal or business/professional purposes. These people are called visitors (either tourists or excursionists, residents, or non-residents), and tourism has to do with their activities, some of which involve tourism expenditure."* (2008).

This description uncovers a key factor: tourism fulfils the ontological need to travel and experience new environments, but it also conveys a range of activities that must involve an economic return. Indeed, the financial element has profoundly shaped the sector's structure, deeply profit-oriented. As a result, the experiences, that mainly characterise today's travels, must be designed, communicated, and sold to potential consumers. The literature identifies the 4A's Tourism Component: Attraction, Accessibility, Amenities and Ancillaries (Andrianto & Sugiama, 2016). Attraction refers to natural and cultural attractions of a specific destination; Accessibility includes the transportation infrastructures and services that facilitate the tourists' access; Ameni-

ties relate to accommodation, retailing, catering and other tourism facilities; Ancillaries are the local organisations supporting travel experiences. Nowadays, these four marketing components are brought to light by strategic communication that is mainly conveyed through social media and instant marketing. However, the role of products and physical goods is topical to all the 4A's that make a travel experience enjoyable: from local handicrafts to food, from hotel products to interior furniture, not to mention the pervasive use of packaging from single-use products to souvenirs. In some cases, the purchase and use of physical products end within the travel experience; in other cases, it builds customer-traveller loyalty even after the trip is over. To that extent, e-commerce is not just a tool for travel purchasing but an influential channel for retaining a relationship with travellers through the sale and purchase of products. Like packaging and product design, communication design also cuts across tourism components. Over the past two centuries, designers' creativity has always contributed to the promotion campaigns of tourist destinations through iconography and posters that conveyed the amusements and delights of a location. More recently, communication design has been central to *Place Branding* strategies, which focus on creating a vision of the location, providing travellers with a key to reading the socio-cultural assets a destination offers (Hankinson, 2004). To properly communicate the peculiarities and identity of a place, tourism promotion strategies require the communicative and expressive capacity of graphics and visual arts, which today mainly address web and digital platforms rather than physical communication channels.

At present, the main research and innovations on sustainable tourism have focused on what are called *primary tourism products*, a complex combination of tangible and - mainly - intangible elements that attract and motivate people to visit a destination. Thus, Design disciplines have also been contributing to designing *secondary tourism products* that are less likely to have a specific attraction but a key part of the experience; these include sustainable products for accommodation, catering, and tours (Benur & Bramwell,2015). The recent work of Haid and Albrecht (2021) attempted to link the dimensions of Sustainable Product Design defined by Ceschin and Gaziulusoy (2019) - product, product-service, spatio-social, socio-technical - with emerging key topics in sustainable tourism. The emerging framework shows how product and product-service dimensions are crucial in the development of sustainable tourism, both at the level of design areas, such as mobility or sport, and in terms of qualitative innovation, from the valorisation of regional products to the inclusion of locals' needs in product design, to the longevity of tourism products. Moreover, digitisation is highlighted as an emerging and urgent topic cross-cutting for primary and secondary tourism products.

Therefore, the transition, or rather, the intermingling of physical and digital channels, is strongly concerned with product design. Over the years, the interest in people-place relations has grown, going beyond the concept of place as a 'residence place' to comprise other kinds of meaningful places (Lewicka, 2011). Those also include virtual or imagined places (Droseltis & Vignoles, 2010), that digital technologies have enhanced, straddling the dimension of physical and virtual dimensions. In particular, Augmented Reality (AR) and Virtual Reality (VR) have proved to be powerful tools

for tourism experience development. While AR enhances a real-world environment using layers of computer-generated images through a digital device, VR is a computer-simulated environment with and within which people interact (Tussyadiah et al., 2018). AR and VR should be viewed "as lying on different ends of the Reality–Virtuality continuum where one end consists of solely real-world objects and the other end consisting of solely synthetic or computer-generated objects" (Yung & Khoo-Lattimore, 2019).

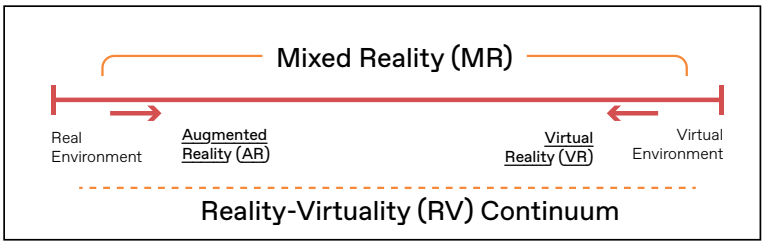

Fig.4. *Simplified representation of a Reality-Virtuality continuum* adapted from Yung & Khoo-Lattimore 2019.

Hence, in the current transition towards *phygital* experiences, technological tools enhance physical places on-site or remotely through virtuality. It is evident how, in both cases, technology is a medium that can only add value to the tourist experience if carefully designed (Moro et al., 219). The outbreak of Covid-19 pandemic has accelerated the interaction between physical and digital, experimenting the virtual remote access to museums or the use of social platforms to share experiences with other people from different places. Overall, the interest in immersive virtual travel experiences has still grown, and VR apps and hardware have become more accessible and inclusive. In particular, VR also emerged as a complement to help people plan their next trip by enabling travellers to experience a place before moving there. A remarkable case study is the Egyptian Museum of Turin, which has implemented new digital tools after the pandemic. As of 2022, virtual tours are available to the general public, making it possible to remotely visit the most famous rooms that made the Turin collection known worldwide. Starting with a showcase of high-definition 360-degree panoramic photos, users can use multiple tools that broaden the visiting experience, including innovative 3D models of the exhibits realised through the photogrammetry technique, so as to offer unprecedented precision and detail.

Since 2020, there has thus been an acceleration in the adoption of immersive technologies, as the possibility of overcoming physical and social constraints was a road worth pursuing. Even after the pandemic, they are proving to be a great way to enhance the territory, engage audiences in new narratives, preserve cultural heritage and enhance the planning and management of travel experiences. In this scenario, the role of the designer is more strategic and essential than ever. Interaction and UX Design disciplines are key to implement effective virtual modelling but, above all, to enhance the proper storytelling of places, increasing the 'sense of place' and the perception of

authenticity to generate interest in preserving and restoring local context. Although virtual tourism is still a niche today, Design is among the disciplines most likely to drive the sector's development with a view to sustainability by influencing the travellers behaviours with the use of its tools. The need for a twin transition is clearer than ever, as immersive technologies offer enormous potential in preserving heritage, fostering sustainable behaviours, and increasing social interactions and connectivity with locals (Tussyadiah et al., 2018). This emphasised the strategic role of UX Design in interpreting and establishing a deep interaction with their potential users. Having examined the technologies and new frontiers of the *phygital* travel experience, we must consider the construction of the aspirations that lead users to choose where to travel. The travel experience, therefore, takes shape even before leaving (Filieri et al., 2015). These activities also emphasise the connection between the physical and digital modes, where the designer, as mentioned, has always played a vital role in the communication of values, as well as in the UX component to engage the potential consumer, the visitors in this case. Those actions open the discussion on the platform business models, which generate value by enabling interactions between people, groups, and users by leveraging network effects in general, and the sharing economy in particular, which have produced disintermediated industries (Wirtz, 2019). The internet has fuelled the growth of platform businesses and mobile technologies and rapid advances in analytics, artificial intelligence (AI) and Big Data, together with changing traveller preferences and experience patterns.

The traveller is more and more used to post a photo, video or any content while travelling, trying to do so with professionalism aimed at stimulating the interest of followers, friends, acquaintances, and other travellers. This action has vast potential, so even a simple gesture becomes a marketing activity. At this stage, bringing together the elements previously expressed, from the destination choice to the selection of local experiences, we see how the multiple spheres belonging to the T&T value chain begin to intersect. There are many types of platform business models, including search, communication, social media, matching, content, and review, booking aggregator, retail, payment, crowdsourcing and crowdfunding. To date, the democratisation of the travel experience and its communication through social media can support the user to make conscious choices if communicated correctly. However, more is needed to make the industry more aware and able to systemically face its social, environmental, and economic impacts. The sustainable and regenerative transition of large value chain systems requires practical research methods and tools to manage its systemic complexity.

3.2 From products to tourism systems: the turning point of Design discipline

As (Fig.5.) shows, T&T is a global sector spanning other sectors like transport, accommodation, retail, food and beverage, culture, events, and tourism experiences. Each single tourist destination presents a complex system made up of several stakeholders from afore mentioned sectors, as it is dependent on multiple essential resource and commodity chains that also include virtual platforms and tools.

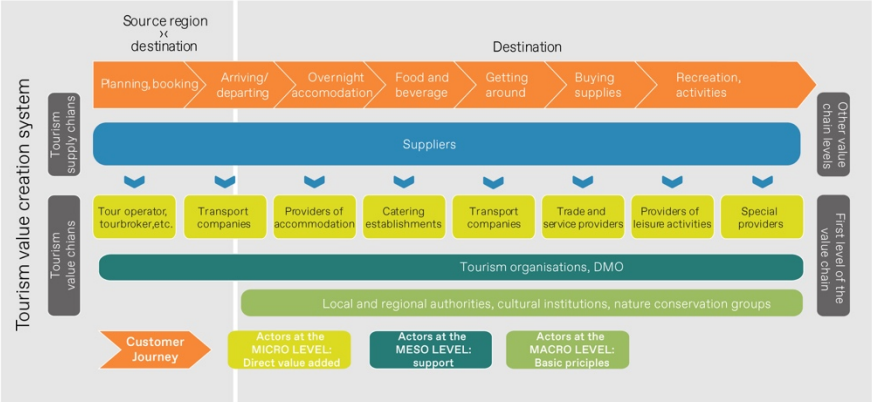

Fig.5. Tourism industry value chain. Schema based on Epler Wood, 2017.

These highly interconnected systems, however, have always been managed with a linear approach based on maximising seasonal tourist flows and increasing services and infrastructures that could boost profits. This is showed by the established role of Marketing disciplines in tourism research. Time and historical events led to a highly fragmented complex system, which is no longer sustainable in its current global circumstances. As mentioned in section 1.2.2, the research community has shown relevant opportunities for the regeneration of the sector. From that perspective, the Circular Economy model can boost the regenerative shift of T&T industry as stated by Einarsson and Sorin (2020), who identified opportunities for implementing circular solutions within the T&T industry. They also encourage stakeholders in the tourism ecosystem to rethink their existing which, most often, are linear business models, value chains, and capacities for value creation. In this sense, the T&T stakeholders can both act as enablers of circularity in a broader economic context and, at the same time, benefit from circular models in other industrial ecosystems (Fig.6.). This logic can foster regenerative mindset and actions. To do so, they need to be guided in a fruitful dialogue, capable of launch joint actions that can overturn the fragmented structure in which the sector finds itself (Einarsson & Sorin, 2020). Moreover, circular, and systemic approaches can steer the behaviour of consumers, whether residents or visitors, to engage them in circular and regenerative practices.

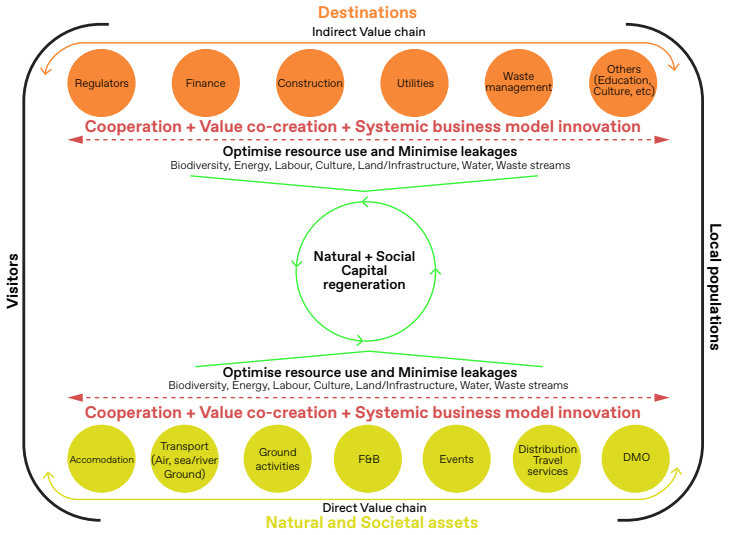

Fig.6. Circular Economy tourism ecosystem. Schema based on Einarsson and Sorin, 2020.

The mediation attitude of Design must be embedded in the macro framework of decision-making dynamics, where its contribution as a system facilitator can have a tangible impact within a complex socio-technical industrial ecosystem. Therefore, research in Design is increasingly expanding, trying to understand what tools and methodologies can facilitate multi-stakeholder dialogue to support the definition of government action plans, encourage transition pathways between industry and decision-makers, and drive funding programmes at local and international levels. Indeed, a starting point can be outlined in the research areas that Jones and Kijima (2018) define as co-evolving fields of 'design-led systemics', grouping them under the umbrella of Systemic Design, to distinguish from Systems Design disciplines related to engineering and hard sciences: Design for Territory, Design for Sustainability, Systems Oriented Design, Transition Design or Design for Social Innovation. The facilitator component of Design has always been brought to light by defining interpersonal and cross-cutting dynamics with stakeholders, communities, and decision-makers for the good of places and the people who inhabit them. The common point of all the above approaches is declining the design action according to a strategic way of acting (Manzini 2010) (Zurlo, 2012). The tools and methodologies of Design are thus harnessed at the service of parties with different backgrounds to co-design through creative processes aimed at fostering collaboration between different actors and competencies acting at different scales of the project with multiple objectives. The participatory concept thus covers different levels, from the redefinition of power to the growth of awareness and the sharing of practices and objectives (Villari, 2021). In particular, Systemic Design has developed specific tools to frame existing systems, usually relying on the design's ability to visualise problems and frame complexity (Pereno & Barbero, 2020).

4 The designer's role to boost regenerative strategies

4.1 Designing systemic interactions within multiple stakeholders' environments

The latter contribution of Design to the tourism system relates to a broader design scope. As discussed above, the shift of Design towards complexity is undeniable, and our disciplines have proven to be able to apply innovative methods and processes to address complex socio-economic problems. In today's tourism scenario, new tools of dialogue and planning with decision-makers and communities are needed to integrate a sustainable way of conceiving relations between parts of a place subject to tourist flows.

A practical example that currently has a considerable resonance at international level is the Living Labs Network (Schuurman et al., 2016). Living Labs (LL) are contexts for the experimentation and prototyping of concrete solutions that promote co-creation and open innovation among the key players of the Quadruple Helix Model, in a specific contest: science, policy, industry, and society (Carayannis & Campbell, 2009). LL-based innovation is a practical example that aimed at stimulating dialogue and participatory design within governmental infrastructures. In this scenario, the specific field of Design for Policy (Villa Alvarez et al., 2022), has the possibility of interfacing with governmental bodies referring to promotion and valorisation. This happens for the T&T sector within the case of Urban Leisure & Tourism Lab Rotterdam in which local authorities, businesses, residents, entrepreneurs, researchers, and students collaborate to explore the ways in which tourism can better their city. Using design thinking techniques, they make physical and digital prototypes of what could become a new tourism product or service. The Lab in this case develops workshops based on authentic leadership, design-oriented research, and autonomous learning. Here, the application of Design shows the potential of the discipline and professional as a facilitator, providing methods and tools to foster the envisioning capacity of stakeholders, using creativity and visualisation archetypes. This shows how Design could define new trajectories for the sustainable and regenerative development of the tourism sector. Not only by addressing specific tourism supply chains and technologies, but by fostering the dialogue between different stakeholders and value chains in a systemic, interconnected manner, tackling the fragmentation still present today within the sector. By developing the tourism offer in consultation with locals and with tourism enterprises that create new business models within the digital ecosystems, thus supporting the creation of local added value. Within this specific context, the birth of regenerative cultures and a regenerative human civilization is the most profound transformative innovation which work with complex systems in bottom-up approach to engage communities in the deeper cultural dialogue that asks the kind of questions and proposes the kind of provisional answers that drive cultural transformation and continued learning. By visualising complex interactions, the facilitators, and actors of LL for example can overcome the barrier of involving users into the development processes of systems as an enabler for generating common values and thus resulting in a better grasp on sustainable and regenerative transition. Adaptations

to changing demands, stakeholders, or relations, can be applied and thus swift transformation can be ensured. The possibilities for re-purposing the T&T sector are undoubtedly there and in place. As mentioned, global, European, and regional strategic action plans aim to overhaul the sector through the twin transition, by allocating funds at all levels to encourage a disruptive shift. Also, the Blueprint European Skills Agenda mentioned tourism in the list published in 2018 and again in 2022, stressing how the sector transition is also deeply affected by the skills of people working there. Looking at the mere evidence of quantitative data, the sector is fully recovering, benefiting the entire value chain. According to the World Travel & Tourism Council, the international tourism sector is on track to beat pre-pandemic levels as early as 2023, registering a +2.2% increase over 2019. However, lessons learnt during the pandemic have shown that tourism is a fragmented and fragile industry, still highly embedded in linear business patterns. This is particularly marked in those countries whose economic health is highly dependent on the T&T industry, as shown in (Fig.7.) At the same time, as it is stated in climate change shows how some areas of the world are particularly at risk, compromising even the transit of tourists themselves.

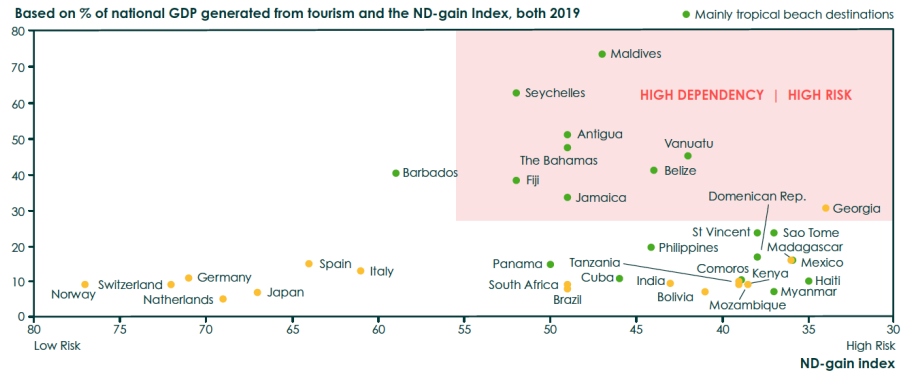

Fig.7. Based on % of national GDP generated from tourism and ND-gain Index, from System-iq, 2019.

4.2 Design-driven innovation for the twin transition of the Travel and Tourism Industry

Take in consideration the leisure travellers, who generate 70% of all travel revenues, studies define that they are increasingly keen to support decarbonisation. And although travellers are increasingly focusing on how they can help the decarbonisation of the sector, in practice they do not have the tools to make a tangible contribution to this transition. The recent Skift & McKinsey (2022) survey indicates that 40% of travellers globally are willing to pay at least two per cent more for carbon-neutral flight tickets. However, the consumer survey also exposes a "*say-do*" gap, as only 14% of travellers has actually paid more for sustainable options when travelling. Among the reasons, there is the lack of clear sustainability-related information, a scarcity of sustainable booking options, and high-cost barriers. Many customers also

struggle with balancing competing priorities when purchasing a travel service or product. T&T industry and policymakers are currently working to bridge this gap to help consumers choose more sustainable actions by focusing on proposals that operate in short to medium term.

In particular, by offering more sustainability-oriented travel products and services visibly during the booking journey or by compellingly presenting decarbonisation information to engage travellers. An additional element that is currently being experimented to steer strategies in the medium to long term is to rely on behavioural science to encourage travellers to make sustainable purchasing decisions (e.g. by actively promoting greener options). However, this cannot be the only way forward, promoting actions oriented towards marketing and the experience economy. Design working for nature and with nature is indeed evolving to have a greater impact upstream in the value chain. Traditionally, design which deals with tourism industry focused primarily on downstream activities, such as product development, service, and communication strategies, but now there is a growing recognition of the need to address systemic issues and promote sustainable practices from the outset. The involvement of stakeholders of the value chain must also include regenerative actions capable of operating a paradigm shift in the long run. If reasonable efforts are made, the twin transition in T&T will become one of the driving forces in growing the sector's role in inclusive, sustainable, and resilient development. Redesigning the experiences and places travellers encounter so that they are empowered to generate added value for the territory, not only in terms of profit, but in terms of their active involvement in feeling part of the context of its nature, thus bringing their own active contribution as a driver of regeneration and not depletion of resources.

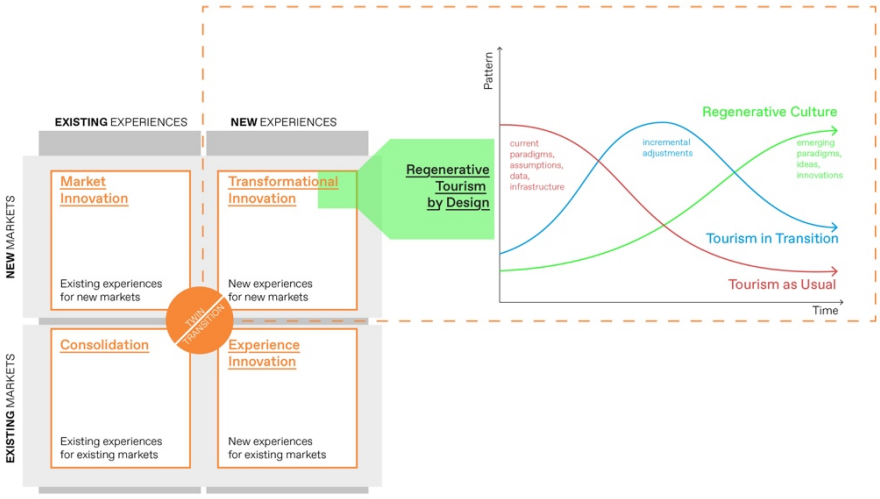

Fig.8. *Market and Experience Innovation Matrix* and *Three Horizons Model for Regenerative Tourism*. Based on Curry and Hodgson, 2008; Gardiner and Scott, 2018.

According to the statements (Fig.8.), it may be noteworthy that it is nonetheless necessary to situate the theoretical reflections proposed in this paper within a matrix aimed at mapping and categorising the innovative contributions, like the Market and Experience Innovation Matrix, where Design for Regenerative Tourism can make toward markets and experiences to implement the twin transition with the introduction of the three Horizons thinking model highlights an effective method for evaluating, make sense of and facilitate cultural transformation and explore innovation and disruptive actions over worn-out linear models. The Three Horizons Model defines "three conditions of the same system, over time, against its level of viability in its changing external environment" (Gardiner & Scott, 2018). Time along the x-axis and the level of a systems strategic fit with its environmental context, as it relates to political, economic, organisational, and cultural norms, along the y-axis (Gardiner & Scott, 2018).

5 Final remarks and studying implications

Over the short- and mid-term period, the communication, and the promotion of new and alternative ways to do tourism can be a valuable path where contribution of design can find the best way to be expressed. But then the shift needs to have a transdisciplinary dimension to re-design the tourism value chain as part of the economic engine that boosts the transition towards more local and regenerative systems. It can even help to stimulate both technological and social innovation, research, entrepreneurship, cooperative development, participatory governance, and define bioregional climate resilience by localising systems of production and consumption. Tourism could potentially help the people to travel to tomorrow differently and hence have a chance to arrive at a different future than we are currently committed to societal breakdown and systemic collapse (Bendell, 2018).

Designer as an expert (Manzini, 2010) can continue to perform its function by synthesising and catalysing different knowledge, making innovation spendable on new market, and re-shaping product, communication, and service innovation towards new experiences in T&T value-chain. Thus, the Market and Experience Innovation Matrix (Bendell, 2018) provides a tool to assess the revolutionary contribution of Design disciplines towards new regenerative horizons for tourism. But the Design that wants to drive innovation (Verganti, 2009) must also know that the stakeholders involved in innovation processes are varied and different (companies, research centres, decision-makers, civil society) so the designer can develop and practices co-design methods and tools, mixing the different contributions with the ability to envision a regenerative future. An experienced designer must be able to analyse problems, discover and extract knowledge, integrate interdisciplinary experience, implement co-design techniques, define innovation scenarios, and drive travel innovation through cross-fertilisation processes to ensure that the twin-transition can be truly actuated.

References

Andrianto, T., & Sugiama, G. (2016). *The Analysis of Potential 4A's Tourism Component in the Selasari Rural Tourism,Pangandaran, West Java*. *April 2020*. doi: 10.2991/atf-16.2016.21

Aulisio, A., Barbero, S., Pereno, A., Rovera, F. (2021). Systemic Design education in interdisciplinary environments: enhancing a co-disciplinary approach towards Circular Economy. *Proceedings of DRS LEARN X DESIGN 2021: Engaging with Challenges in Design Education*, Jinan (China), 529-539. doi:10.21606/drs_lxd2021.05.250

Bendell, J. (2018). Deep Adaptation: A map for navigating climate tragedy. *IFLAS Occasional Paper*.

Benur, A.M., & Bramwell, B. (2015). Tourism product development and product diversification in estinations.*Tourism Management* ,50, 213–224.

Blueprint European Skills agenda, https://ec.europa.eu/social/main.jsp?catId=1415&langId=en, last accessed: 2023/02/27

Buhalis, D., & Law, R. (2008). Progress in information technology and tourism management: 20 years on and 10 years after the Internet-The state of eTourism research. *Tourism Management*, 29 (4), 609 - 623. doi: 10.1016/j.tourman.2008.01.005

Carayannis, E.G., Campbell, D.F.J., (2009). Mode 3' and 'Quadruple Helix': Toward a 21st century fractal innovation ecosystem, *International Journal of Technology Management*, 46 (3-4), pp. 201-234. doi: 10.1504/ijtm.2009.023374

Ceschin, F., & Gaziulusoy, İ. (2019). Design for sustainability: A multi-level framework from products to socio-technical systems. Routledge. doi:10.4324/9780429456510

Curry, A., & Hodgson, A. (2008). Seeing in Multiple Horizons: Connecting Futures to Strategy. *Journal of Futures Studies, 13*

Dredge, D. (2022). Regenerative tourism: transforming mindsets, systems and practices. *Journal of Tourism Futures*, 8(3), 269–281. doi: 10.1108/JTF-01-2022-0015

Droseltis, O., & Vignoles, V.L. (2010). Towards an integrative model of place identification: Dimensionality and predictors of intrapersonal-level place preferences, *Journal of Environmental Psychology*, 30(1), 23-34. doi:10.1016/j.jenvp.2009.05.006

Einarsson S. and Sorin, F., (2020). *Circular Economy in travel and tourism: A conceptual framework for a sustainable, resilient and future proof industry transition*, CE360 Alliance.

Epler Wood, M., (2017). *Managing a Spider Web. The tourism Industry supply chains and sustainability.*

Filieri, R., Alguezaui, S., & McLeay, F. (2015). Why do travelers trust TripAdvisor? Antecedents of trust towards consumer-generated media and its influence on recommendation adoption and word of mouth. Tourism Management, 51, 174–185. doi:10.1016/J.TOURMAN.2015.05.007

Gardiner, S., & Scott, N. (2018). Destination Innovation Matrix: A framework for new tourism experience and market development. *Journal of Destination Marketing Management.* 10, 122-131

Haid, M., & Albrecht, J. N. (2021). Sustainable tourism product development: An application of product design concepts. Sustainability, 13(14). doi:10.3390/su13147957

Hankinson, G. (2004), "Relational network brands: Towards a conceptual model of place brands", in *Journal of Vacation Marketing,* 10 (2), pp. 109-121

International Recommendations for Tourism Statistics (2008). United Nations: New York 2010, Chapter 3 (p. 23-30). ST/ESA/STAT/SER.M/83/Rev.1

Jones, P.H., & Kijima, K. (eds.) (2018), Systemic Design: Theory, Methods, and Practice. Tokyo, Japan: *Springer*.

Klein, J.T. (2015). Reprint of "Discourses of transdisciplinarity: Looking back to the future". *Futures*, pp. 65, 10–16.

Knezevic Cvelbar, L., Antonucci, B., Cutrufo, N., Marongiu, L., Rodrigues, M., Teoh, T. (2021). Research for TRAN Committee – *Relaunching transport and tourism in the EU after*

COVID-19 – Tourism sector, European Parliament, Policy Department for Structural and Cohesion Policies, Brussels

Lewicka M. (2011). Place attachment: How far have we come in the last 40 years? *Journal of Environmental Psychology*, 31 (3), pp. 207 - 230. doi:10.1016/j.jenvp.2010.10.001

Mang, P. and Reed, B. (2011). Designing from place: a regenerative framework and methodology, *Building Research and Information*, Vol. 40 No. 1, pp. 23-38, doi:10.1080/09613218.2012.621341

Manzini, E. (2010). Small, Local, Open and Connected: Design for Social Innovation and Sustanability, *The Journal of Design Strategies*, 4(1), 8-11.

McKinsey & Co, & Skift Research (2022). Report: *Accelerating the Transition to Net-Zero Travel: Strategies for actions*

Mehmetoglu, M., & Engen, M. (2011). Pine and Gilmore's Concept of Experience Economy and Its Dimensions: An Empirical Examination in Tourism. Journal of Quality Assurance in Hospitality and Tourism, 12(4), 237–255. doi:10.1080/1528008X.2011.541847

Moro, S., Rita, P., Ramos, P., & Esmerado, J. (2019). Analysing recent augmented and virtual reality developments in tourism. Journal of Hospitality and Tourism Technology, 10(4), 571–586. doi: 10.1108/JHTT-07-2018-0059

Museo Egizio TorinoVirtual Tour, Homepage, https://virtualtour.museoegizio.it/ last accessed: 2023/02/27

Norman, D, & Stappers, P. (2016). DesignX: Complex Sociotechnical Systems. *She Ji: The Journal of Design, Economics, and Innovation*. doi:1.10.1016/j.sheji.2016.01.002

One Planet Sustainable Tourism Programme (2021). *Glasgow Declaration: a Commitment to a Decade of Climate Action*

Ortega-Gras, J. J., Bueno-Delgado, M. V., Cañavate-Cruzado, G., & Garrido-Lova, J. (2021). Twin transition through the implementation of industry 4.0 technologies: Desk-research analysis and practical use cases in Europe. *Sustainability (Switzerland)*, 13(24). doi:10.3390/su132413601

Pereno, A., & Barbero, S. (2020). Systemic Design and co-creation processes for territorial enhancement. *Strategic Design Research Journal*, volume 13, 02, May–August 2020. 113-136. doi: 10.4013/sdrj.2020.132.02

Pine II, B.J. & Gilmore, J.H. (1998). Welcome to the Experience Economy. Harvard Business Review, July-August, pp. 97–105.

Reed, B. (2007). Shifting from 'sustainability' to regeneration, Building Research & Information, 35:6, 674–680, doi: 10.1080/09613210701475753

Rittel, H.W.J., Webber, M.M. (1973). Dilemmas in a general theory of planning. *Policy Sci* 4, 155–169. doi:10.1007/BF01405730

Schuurman, D., de Marez, L., & Ballon, P. (2016). The Impact of Living Lab Methodology on Open Innovation Contributions and Outcomes. *Technology Innovation Management Review*, *6*(1), 7. www.timreview.ca

Sonetti G, Brown M, Naboni E. (2019). About the Triggering of UN Sustainable Development Goals and Regenerative Sustainability in Higher Education. *Sustainability*,11(1):254. doi: 10.3390/su11010254

Stoddard J. E., Pollard C. E., & Evans M. R. (2012), The Triple Bottom Line: A Framework for Sustainable Tourism Development, International Journal of Hospitality & Tourism Administration, 13:3, 233-258, doi: 10.1080/15256480.2012.698173

Tourism Lab Rotterdam, About Page, https://www.tourismlabrotterdam.nl/en/about-us/ last accessed: 2023/02/27

Tourism Manifesto Homepage, https://tourismmanifesto.eu/, last accessed: 2023/02/27

Tussyadiah, I. P., Wang, D., Jung, T. H., & tom Dieck, M.C. (2018). Virtual reality, presence, and attitude change: Empirical evidence from tourism. *Tourism Management*, 66, 140–154. doi: 10.1016/j.tourman.2017.12.003

Verganti R. (2009) Design-driven Innovation: *Changing the Rules of Competition by Radically Innovating what Things Mean*, Boston, Harvard Business Press, pp. 269.

Villa Alvarez, D. P., Auricchio, V., Mortati, M. (2022). Mapping design activities and methods of public sector innovation units through the policy cycle model. *Policy Sciences*, 55(1), 89–136. doi: 10.1007/s11077-022-09448-4

Villari, B. (2021). The empathic (r)evolution. Lessons learned from Covid-19 to design at the community, organization, and governmental levels. *Strategic Design Research Journal*, *14*(1), 187–198. doi:10.4013/sdrj.2021.141.16

Wahl D. C. (2016). *Designing Regenerative Cultures*. Chicago, Triarchy Press. 1st Edition,

Wirtz, B. W. (2019). Digital Business Models. Cham: *Springer Nature*. doi:10.1007/978-3-030-13005-3

World Commission on Environment and Development, (1987). Our common future. New York, NY: Oxford University Press

World Tourism Organization (2021), Recommendations for the transition to a green travel and tourism economy, UNWTO, Madrid, doi: 10.18111/9789284422814

World Tourism Organization and United Nations Environment Programme (2019), *Baseline Report on the Integration of Sustainable Consumption and Production Patterns into Tourism Policies*, UNWTO, Madrid, doi:10.18111/9789284420605

Yung, R., & Khoo-Lattimore, C. (2019). New realities: a systematic literature review on virtual reality and augmented reality in tourism research. In *Current Issues in Tourism* (Vol. 22, Issue 17, pp. 2056–2081). Routledge. doi:10.1080/13683500.2017.1417359

Zurlo, F. (2012). Le Strategie del design. Disegnare il valore oltre il prodotto, Libraccio Editore, Milano