



2023

IL CAPITALE CULTURALE
Studies on the Value of Cultural Heritage

eum

Rivista fondata da Massimo Montella



Il capitale culturale

Studies on the Value of Cultural Heritage

n. 27, 2023

ISSN 2039-2362 (online)

© 2010 eum edizioni università di macerata

Registrazione al Roc n. 735551 del 14/12/2010

Direttore / Editor in chief Pietro Petrarola

Co-direttori / Co-editors Tommy D. Andersson, Elio Borgonovi, Rosanna Cioffi, Stefano Della Torre, Michela di Macco, Daniele Manacorda, Serge Noiret, Tonino Pencarelli, Angelo R. Pupino, Girolamo Scullo

Coordinatore editoriale / Editorial coordinator Maria Teresa Gigliozzi

Coordinatore tecnico / Managing coordinator Pierluigi Feliciati

Comitato editoriale / Editorial board Giuseppe Capriotti, Mara Cerquetti, Francesca Coltrinari, Patrizia Dragoni, Pierluigi Feliciati, Costanza Geddes da Filicaia, Maria Teresa Gigliozzi, Chiara Mariotti, Enrico Nicosia, Emanuela Stortoni

Comitato scientifico - Sezione di beni culturali / Scientific Committee - Division of Cultural Heritage Giuseppe Capriotti, Mara Cerquetti, Francesca Coltrinari, Patrizia Dragoni, Pierluigi Feliciati, Maria Teresa Gigliozzi, Susanne Adina Meyer, Marta Maria Montella, Umberto Moscatelli, Caterina Paparello, Sabina Pavone, Francesco Pirani, Mauro Saracco, Emanuela Stortoni, Carmen Vitale

Comitato scientifico / Scientific Committee Michela Addis, Mario Alberto Banti, Carla Barbati, Caterina Barilaro, Sergio Barile, Nadia Barrella, Gian Luigi Corinto, Lucia Corrain, Girolamo Cusimano, Maurizio De Vita, Fabio Donato, Maria Cristina Giambruno, Gaetano Golinelli, Rubén Lois Gonzalez, Susan Hazan, Joel Heuillon, Federico Marazzi, Raffaella Morselli, Paola Paniccia, Giuliano Pinto, Carlo Pongetti, Bernardino Quattrocchi, Margaret Rasulo, Orietta Rossi Pinelli, Massimiliano Rossi, Simonetta Stopponi, Cecilia Tasca, Andrea Ugolini, Frank Vermeulen, Alessandro Zuccari

Web <http://riviste.unimc.it/index.php/cap-cult>, email: icc@unimc.it

Editore / Publisher eum edizioni università di macerata, Corso della Repubblica 51 – 62100 Macerata, tel (39) 733 258 6081, fax (39) 733 258 6086, <http://eum.unimc.it>, info.ceum@unimc.it

Layout editor Oltrepagina srl

Progetto grafico / Graphics +crocevia / studio grafico



Rivista accreditata AIDEA
Rivista riconosciuta CUNSTA
Rivista riconosciuta SISMED
Rivista indicizzata WOS
Rivista indicizzata SCOPUS
Rivista indicizzata DOAJ
Inclusa in ERIH-PLUS

The outlines of a micro-founded food ecosystem: unexpected events, dormant resources and triggering actors

Gianni Lorenzoni*, Sonia Massari**

Abstract

The lionfish invasion represents an unexpected event quickly spreading in a wide area of the Caribbean. A wide spectrum of actors was confronted at the policy level, the marine conservation authority, large and small communities of economic actors starting from the tourism to the fisheries sectors. The first option to eradicate the new species was confronted with the search for balanced control. The threat was transformed into an opportunity by using the predator as an edible source of food. This target required the coordination activity of a wide network of players, and design activities took place showing the relevance of emerging idle, dormant resources, new project design capabilities, but also new organizational practices fitting with an innovative eco-friendly inclusive perspective. The collaborative creative paths and unconventional routines helped to reach a new equilibrium in the marine ecology and economic activities as well.

* Gianni Lorenzoni, professore emerito, Università di Bologna, e-mail: gianni.lorenzoni@unibo.it.

** Sonia Massari, research fellow, Università di Pisa, via del Borghetto 80, 56124 Pisa; Future Food Academy Director at Future Food Institute (Bologna), e-mail: sonia.massari@agr.unipi.it.

Grazie a Juan Jose Arango per l'aiuto nella ricerca e per aver fornito dettagli e dati sul progetto di food design. Thanks to professor Juan Jose Arango (for Tadeo University), who co-designed the food design and food system project in San Andrés Island.

L'invasione del pesce leone rappresenta un evento inaspettato che si è diffuso rapidamente in un'ampia area dei Caraibi. Un ampio spettro di attori si è confrontato a livello politico: con le autorità per la conservazione dell'ambiente marino, con le comunità grandi e piccole e con gli attori economici, dal settore turistico a quello della pesca. Una prima opzione di eradicazione della nuova specie si è confrontata con la ricerca di un controllo equilibrato. La minaccia è stata trasformata in opportunità utilizzando il predatore come fonte di cibo commestibile, consentendo una trasformazione ambientale ed economica a medio termine. Questo obiettivo ha richiesto l'attività di coordinamento di un'ampia rete di attori; una serie di attività di progettazione hanno mostrato la rilevanza di risorse inattive e dormienti, di emergenti capacità di utilizzare metodi di design, e di nuove pratiche organizzative che si adattano a una prospettiva innovativa eco-compatibile e inclusiva. Percorsi creativi collaborativi e routine non convenzionali hanno permesso di raggiungere un nuovo equilibrio nell'ecologia marina e nelle attività economiche.

1. *Introduction*

The lionfish (*Pez-Leon*) species was first reported in South Florida in 1985¹, but the perceptions of the phenomenon magnitude's was delayed as soon as it became contagious in various regions of the Caribbean and could represent irreversible changes in the marine system.

In the late 90s (after *Hurricane Andrew* destroyed Florida land) an alarm signal of a singing bell probably gave the sentiment of the consequence and the lionfish invasion climbed at the top of the list of problems in search of solutions. The predator hazarded to destroy the marine ecosystem and asked institutions, scientists, and economic operators, entire local communities, to take care of the challenge. The unexpected event was stifling the source of supply and the source of economic revenue of the local communities along with the marine life sustainability².

At the regional level, the invasion followed a rapid lag time where some local communities suffered the initial attack while the laggard started to prepare taking advantage of the former experiences. Scientific analysis and trial and errors initiatives on the turf evaluated the efficacy of different methods of fighting and controlling the lionfish invasion. The first reaction was to imagine and try to exterminate the invading species.

As the issue became more impactful, two schools of thought emerged. The former options targeting the eradication of the species had the dangerous backside of the destruction of the complementary marine ecosystem, while the latter options considered a "harvesting" initiative where the invader could

¹ Morris, Akins 2009.

² See Ecoteam 2016, p. 16.

become a meal within an integrated marine ecosystem, asking for an economic and social challenge.

Researchers have found that the lionfish has toxic fins so it is difficult to catch, but it loses its toxicity after two hours in contact with the air and more importantly, its firm white flesh tastes great.

Traps and other fishing equipment are to be developed to support the activity of the local fishermen. Exploration, confrontation, and dialogue led to the latter option selection to reach an eco-friendly fishery condition, trying to solve the conflicting views of various stakeholders.

The selected path required the contribution and the change of routines of different actors using market-based incentives, not easily absorbed and complemented by project design, training, and formation granularity at the micro-organizational level, as well.

Design methods support innovation processes that not only aspire to develop original solutions, but also to identify strategic directions and development scenarios that are relevant both for the companies or institutions that pursue them and for the people who will experience them. The recent evolutions of design are based on a renewed interpretation of collaborative creativity which is no longer exclusively based on the attitude to solve problems or propose new solutions, but must be combined with a critical and transdisciplinary approach based on empathy³, and on the desire to give space and development to both tangible and intangible resources, often hidden, or buried by other more superficial ones.

How does the alignment of a multilateral set of partners contributes to circumventing bottlenecks and managing trade-offs incorporating new actors and resources downstream in the ecosystem? When the market is perfect, left-aside resources should not exist, but when discontinuity matters a new chasm emerges and innovation and creativity are searching for new positioning. Some products, knowledge, and artifacts are left aside or neglected or need to be (re)invented. There are cases, such as the ecosystem described which demonstrate that dormant resources unveil and transdisciplinary knowledge boosted by triggering actors can turn threats into opportunities.

This paper is organized following the presentation of our conceptual backdrop, methods and data collection and the blow up of the setting and the sequence of steps of the lionfish evolutionary process during some design-driven activities organized with the community of San Andres (Colombian island) and ultimately the discussion and conclusion.

From the case study and results of the food design-oriented workshops developed in Colombia involving the multicultural Raizal community, three phases of the Lion fish evolutionary process emerged. First is the role of the

³ Massari 2021.

Institution, the monitoring of the phenomenon, and the tail to define a grand design of policy and legal rules for integrated solutions. Second, the role of design methods is to coordinate the network of players, aiming to control the ecosystem and the discovery of dormant resources: a macro-level scaffold to master collaborative creativity and change. Third, is the implementation stage at the micro-level with the emergence of new, sometimes, unexpected opportunities and routines, along with the role of local activists.

2. *Conceptual backdrop*

Exogenous shocks generated multiple research streams starting from the phenomenon conceptualization⁴, its unexpected emergence, its quest for a better understanding and foresight⁵, and the search for a response to adverse events⁶.

Extending the latter stream of research, the focus was on the rebound by the sectors involved in adverse events, facing distress, and exploring new trajectories to industry recovery and repositioning⁷.

Following Penrose's seminal work⁸, the growth of the firms and industries is determined by the exploitation of a wide set of resources as a starting point of an evolutionary process and exploring under what conditions combined resources generate superior performances⁹.

The contribution of Prahalad and Hamel on the role of organizational capabilities in the combination and consistency of a mix of resources was a further step in search of a durable advantage¹⁰. The attention to resources and capabilities elicits a turning point, marking the relevance of internal sources in search of competitive advantage compared to environmental conditions imposing new threats and new opportunities. Therefore, a decision path is not given but discovered and accomplished through the capabilities to combine and recombine sparse and fragmented resources.

Penrose dug into the micro-foundations of resources pointing out the role of "idle" resources that were not fully exploited, ultimately determining a stock of unused resources, an unavoidable waste in scale manufacturing¹¹, but

⁴ Perrow 2000.

⁵ Lampel *et al.* 2009.

⁶ Williams *et al.* 2017.

⁷ Salvato *et al.* 2020.

⁸ Penrose 1959.

⁹ Barney 1986; Barney 1991; Mahoney 2004; Mahoney 1995; Drucker 1993; Amit, Shoemaker 1993.

¹⁰ Helfat, Lieberman 2002.

¹¹ Ivi, p. 68.

neglect resources arising from different factors market, such as new product or new processes.

The extraordinary body of research in the past forty years probably neglected the fact that many resources are yet to be discovered, dormant, unused, waiting for an agent of change.

The sleeping beauties phenomenon denouncing the hibernation of scientific knowledge attracted the attention of researchers and practitioners as well: “A Sleeping Beauty (SB) in science refers to a paper whose importance is not recognized for several years after publication. Its citation history exhibits a long hibernation period followed by a sudden spike of popularity”¹². Moreover, sleeping beauties “achieve delayed exceptional importance in a discipline different from those where they were originally published”¹³. In the wake of Penrose, Wernerfel¹⁴ opened a new conversation casting the emergence of the resource-based view¹⁵ contemplating the role of idiosyncratic resources and their role to get Ricardian rents. But idle and dormant resources attracted limited attention since the focus was on endowed visible resources, not on the hidden interstice of the invisible ones or on “the resources that are visible but not seen”¹⁶.

For the above-mentioned reasons, the categorization of dormant resources deserves more attention from researchers moving beyond the recognition it draws in the past in the study of affordance¹⁷ and transformative capabilities¹⁸. There is a wide room for speculation in the long span of the process of creativity, and value creation forward.

Agarwal *et al.*¹⁹ introduced a new granularity in the innovation and creativity space, a wider agency by incumbents, institutions, and new entry players, facing a scenario of a new ecosystem in motion, a big challenge where new activity space takes the form²⁰.

There are two perspectives that can help in a better exploration and understanding of the tension of the genesis and dynamics to cope with big challenges facing unexpected or unpredictable events, the wider lens of the ecosystem and the granularity of the network analysis in the exploration of the agency involved. They are marching on different trails that need to be reconciled²¹.

Following Ron Adner’s suggestion of wider lenses²² an ecosystem is “the

¹² Ke *et al.* 2015, p. 1.

¹³ Ivi, p. 2.

¹⁴ Penrose, Wernerfel 1984.

¹⁵ Barney 2021.

¹⁶ Goshal 1987.

¹⁷ Cattani *et al.* 2018.

¹⁸ Gary *et al.* 2015.

¹⁹ Agarwal *et al.* 2007, 2011.

²⁰ George *et al.* 2016.

²¹ Jacobides *et al.* 2018.

²² Adner 2012.

alignment structure of a multilateral set of partners that need to interact for a focal value proposition to materialize”²³. “The ecosystem as structure view begins with the value proposition, considers the activities required for its materialization and ends with actors that need to be aligned”²⁴. The activities, the actors and the process dynamics are the composing elements²⁵. The Jacobides *et al.* contribution emphasizes the ecosystem organization governance rules and how alignment occurs²⁶. Shipilov and Gawer²⁷ recommend an integration of networks and ecosystem perspective applying network analytics to map components interdependencies in order to improve ecosystem inter-organizational path. Constraints to the ecosystem configuration and evolutions are represented by “bottlenecks” to be removed or circumvented, setting up an open innovation view in the decision process²⁸.

Barney²⁹ tries to explain performance in spite of bad news underlining the role of superior information or good luck; Denrell *et al.*³⁰ complement this view arguing that a valuable response can be found beyond luck, involving capabilities and luck coupled with alertness and flexibility. These conditions arise and are exploited when opportunities to reboot can be captured and coordinative mechanisms are working out.

New interpretations of design methods lead to significantly rethink the most modern approaches to innovation³¹. Design Thinking (DT) moves the design method upstream of the innovation process, involving actors other than designers³². It aims to go beyond product design and innovative artifacts, and to contribute to the strategy of the organization, of the system behind it. It is therefore interesting for this type of analysis and turns out to be an interesting tool for all types of stakeholders involved in the ecosystem³³.

The design approach is therefore not only a creative process for solving multi-faceted problems, but includes the analysis to understand the complexities and devise solutions based on the understanding of human values, needs, emotions, and the most hidden desires³⁴. Since it was theorized in 1987³⁵, multiple models of design and design thinking methods have emerged, draw-

²³ Adner 2017, p. 40.

²⁴ Ivi, p. 44.

²⁵ Iansiti, Levien 2004.

²⁶ Jacobides *et al.* 2018.

²⁷ Shipilov, Gawer 2020.

²⁸ Adner, Kapoor 2010; Masucci *et al.* 2020.

²⁹ Barney 1986.

³⁰ Denrell *et al.* 2003.

³¹ Razzouk, Shute 2012.

³² Kat *et al.* 2011; Nelson, Stolterman 2014.

³³ Lafley *et al.* 2012; Liedtka *et al.* 2013; Liedtka, Ogilvie 2011.

³⁴ Massari 2017; Norman 2009; Redström 2017.

³⁵ Rowe 1987.

ing on theories and models from design methodology, psychology, education³⁶.

Design Thinking consolidated as a methodology in the 2000s, at *Stanford University*, as a design model for solving complex problems employing creative vision and management³⁷. Over time, the DT as an approach and methodology has developed evolutionary trajectories that have seen it applied in further challenging contexts, gaining space in change management projects and supporting innovation and development processes. DT was basically born as a problem-solving methodology, but its application has been successful above all because it provides collaborative tools of critical, creative, and complexity thinking, easily applicable even by non-designer and non-design methods experts³⁸. Nowadays, DT is identified as a new paradigm for addressing grand challenges in a number of new fields and sectors³⁹.

The popularity of design thinking in corporate research reflects the need to overcome silos and to introduce innovation for a more effective dialogue between different stakeholders, for example in the area of corporate responsibility, which is increasingly challenged in the face of climate change. financial crises and market uncertainty⁴⁰. In recent times, there has been a growing interest in co-design approaches, both among scholars and professionals⁴¹, also applied to sustainability⁴². Recently, the notion of co-design through design thinking has emerged in the management literature⁴³. In this context, it has been suggested that anyone can learn to apply a design approach to any innovation challenge⁴⁴ to generate meaningful innovations that can lead to positive economic, social, and environmental impacts.

Co-design has played an important role above all in placing people (end-users) at the center not only in relation to the needs they have towards products and services, but above all in relation to the values that make the same products and services meaningful. More recently, co-design has been used in change management projects in which the person (user) at the center of the change is not the end user, but the eco-system itself, including all the actors, including the user, with the goal of making them aware and proactive towards change and activated innovation⁴⁵.

³⁶ Archer 1979; Buchanam 1995; Schon 2017.

³⁷ See D. School at <<https://dschool.stanford.edu/> and <https://designthinking.ideo.com/>>, 15.02.2022.

³⁸ Veryzer, de Mozota 2005.

³⁹ Sameti *et al.* 2022.

⁴⁰ Bendell, Doyle 2017.

⁴¹ Mutanen 2018; Perks *et al.* 2005.

⁴² Young 2010.

⁴³ See, among others, Brown 2008; Brown 2009; Martin 2011; Dunne, Martin 2006.

⁴⁴ Brown, Katz 2011; Martin 2009.

⁴⁵ De Bernardi, Sydow 2022.

A switch in recent years is evident, addressed by growing grand challenges, from an approach aimed at ideation and consequently at the numbers of ideas produced, to a working method aimed at criticism, analysis, study, interpreted as a process of confrontation aimed at deepening and strengthening a vision of values. This has also led to a change from outside-in innovation processes, which are therefore based on a careful recognition of the needs expressed by the market, to inside-out innovation processes that, on the contrary, are inspired by visions developed within organizations, starting from the study of scenarios, opportunities, and resources that are often not visible, to become proposals to the market⁴⁶.

Design approaches argue that social, technical and organizational aspects must be understood in their interactions. Rizzo⁴⁷ points out that artifacts are identified as basic units of analysis, which relate to technology, people, people and their social, organizational and cultural context. The context is not intended as the container in which human activities take place, but as something that is actively built and rebuilt through human activity and the use of resources. Consequently, the designer focuses and investigates mainly on the ways of interaction and co-construction of cultural mediation, rather than on the needs and requests of users.

Big challenges, require combining old knowledge exploitation and learning new capabilities to fill the gap with new exogenous jolts, setting up new tasks. Co-creation is a tool for collaborative innovation: ideas are shared among research stakeholders to improve and increase the social value of the innovation process. Co-design and co-learning are essential in acquiring collaboration skills and problem-solving competencies for innovation. The collaborative learning perspective involves new knowledge to sustain new activities, upgrading individual level skills and tasks⁴⁸ or generating innovative routines at the organizational level⁴⁹. In this wake of innovation collaborative learning is a process devoted to the “development and implementation of new ideas which aspire to create social and economic well-being”⁵⁰.

2.1. *Methods and data collection*

The management field studies generate organizational topics compared and confronted with established theories and constructs that don't help to explain emerging phenomena and might be unable to significantly response.

⁴⁶ Sydow 2021.

⁴⁷ Rizzo 2000.

⁴⁸ Argote 1999.

⁴⁹ Feldman, Pentland 2022.

⁵⁰ George 2012, p. 20.

Ployhardt and Bartunek⁵¹ made a strong call for more phenomenon-driven theorizing in management research to fill the gap between academic research and management practices. Unexpected and unpredictable events phenomenon are a good arena to challenge existing knowledge, starting to question that need to be better understood⁵².

The lionfish invasion created a big challenge for institutions, industries and organizations asking for the origin, the boundaries and the implication of the phenomenon for the whole ecosystem. We adopted an explorative and qualitative approach. To paraphrase Gioia, a single case study may be sufficient to understand the dynamics and define the ecosystem evolution⁵³.

- Preliminary phase: following the unfolding process over time (1985 to nowadays), we used historical data (mostly collected by internet) contributing to the reconstruction of individual and organizational paths⁵⁴, blending historical and qualitative research methods describing the grounded track of specific events. The result was a narration which emphasized the role of triggering actors and multiple heterogeneous players helping to circumvent the bottlenecks and ultimately shaping an industry emergence⁵⁵.
- First phase: one of the authors was in touch with one of the designer who worked in San Andrés Island, and designed the food design and food stylist project, as part of Tadeo University's interaction with Local Government and Environmental Agency of the Islands. During a series of informal conversations with him more data were collected and thanks to his engagement during the evolution path, we had a first insight into the involvement of a community, the role of activists, meanings and participation, gaining open-source access to "unusual research access"⁵⁶, oral and incomplete at the outset, and afterward helping in the selection of more organic documentation with diverse data (scientific reports, ministerial documents, workshops invitations, photo and video documents, personal notes).
- Second phase: interviews updated the evolutionary path and the (re)boosting of a new ecosystem. The confrontation with the rich documentation underlying the lionfish event posed the risk to be lost in complexities and focusing on a narrower perspective. We decided to focus on actors involved in ecosystem shaping and their efforts to circumvent

⁵¹ Ployhardt, Bartunek 2019.

⁵² Fisher *et al.* 2021.

⁵³ Gioia *et al.* 2013.

⁵⁴ Sydow *et al.* 2009; Hargadon 2003.

⁵⁵ Agarwal *et al.* 2017.

⁵⁶ Yin 1984.

the bottlenecks⁵⁷ that are a key concern in the ecosystem evolutionary process, constraining the pace and the partial accomplishment. The Marine Conservative Departments represented the prime actor to start in the analysis of the marine system scenario, investigating “the state of the art” and signaling the threat to the balance of the ecosystem. Battilana *et al.*⁵⁸ introduce the role of institutions entrepreneur among the triggering actors that can contribute to the experimentation of new practices to overcome bottlenecks. Therefore, the departments represented a cornerstone to produce secondary data, along with the research in universities and research centers (Simon Fraser University).

- Third phase: the design scholars were a second source of detailed information, as much as we moved from the macro organizational level to the micro organizational level investigating the role of the fishermen community and actors, the restaurants and tourists’ agencies and the jewelers emerging as an unexpected actor. The design method applied in the S. Andres workshops was “emergent”. In the “egg model” proposed by Marti and Rizzo⁵⁹, three levels of design are defined:
 1. *Reactive*: where the designers are called to solve a problem in order to ensure that the activity is better consolidated and that the task can be done better, trying to understand which types of actual brokers can be introduced;
 2. *Proactive*: where designers have to design a new system for a well-defined human activity, which supports a clear category of users and identifies the technologies that allow to imagine new fields in which to evolve the activities.
 3. *Emerging*: when designers have to imagine new human activities, and design together with new technologies to support them. The trans-disciplinary approach turns out to be fundamental for this type of design because it allows to produce visionary scenarios for new human activities, achievable only if supported by the co-creation of strategic networks of communities and operations. Project networks are typically conceived as being more than only temporary form, combining the temporary with the permanent in a specific manner⁶⁰ and it is of importance to consider how the past and the future of these relational contexts play out in the present. The structures of signification, domination, and legitimation shape network processes and how they are reproduced under the auspices of network effectiveness.

⁵⁷ Adner, Kapoor 2009.

⁵⁸ Battilana *et al.* 2009.

⁵⁹ Marti, Rizzo 2003.

⁶⁰ Sydow 2021.

The past is present in all future creation activities⁶¹. It is relatively rare, however, for future processes – foresight, imagination, planning and construction together – to interact explicitly with the past.

Anyhow, back to the future interaction requires amphibious actors⁶², activists⁶³ “heroes” and deviation⁶⁴ to make it happen, overcoming bottlenecks and conventional inertia.

In S. Andres Island, an evolutionary model for co-creating has been implemented, where the formulation of the problem and the design solutions were modified in an iterative and interactive approach⁶⁵. In defining the objectives of a design intervention to build new tools for a socio-technical ecosystem, the designers studied the nature of the resources that mediated the community-based activities on the island. From the mediating properties they have identified which ones to preserve and which to be considered in new configurations. A co-evolutionary design model always takes into account the interactions between the problem space (in which the problem has not yet been formulated) and the solution space (in which different solutions are proposed). Co-Design is a participatory design methodology, in which all stakeholders (users, designers, citizens, suppliers, technicians, workers, producers, fishermen, politicians, etc.) are directly involved in the design⁶⁶.

Our role in this phase was to study the evolutionary collaborative design model with the goal of understanding what and how it enabled coordination of the player network, ecosystem control, and the discovery of dormant resources.

- Fourth phase: in the search for expansion from the information gained, we applied methods for absorbing information without molding it. The lesson from J. March is considering the case of learning from a sample of one or fewer, illuminating on the matter “Great organizational histories, like a great novel, are written, not by first constructing an interpretation of events and filling within the details, but first identifying the details and allowing the interpretation emerges from them”.

⁶¹ Bendor *et al.* 2021.

⁶² Sandholtz, Powell 2019.

⁶³ Rao 2008.

⁶⁴ Merton 1959.

⁶⁵ Maher 2000.

⁶⁶ Gulati *et al.* 2012; Young 2010.

3. *Co-designing the co-evolutionary process.*

The lionfish invasion started in the Southern Florida area and had an evolutionary pace in different areas. The first impact was in the Miami area and spread across the Caribbean area over time. Therefore, some Regions were able to trace a “pre-lionfish analysis” providing information and facilitating the development of Marine policy trying to mitigate the impact of the new species invasion on the marine reef ecosystem. A map of the progression process of the “pandemic” can be found in Figure 1.

A common generic target but different environmental local conditions and different grades of institutional and private intervention and alignment emerged over time.

The lionfish was considered an invasive species in the Caribbean but how and when it ended up in a more absorbed and balanced equilibrium is still unknown⁶⁷.

The invasion had ecological, economic and social impacts. Ecological analyses were quickly showing the impact of the lionfish’s arrival into the local sea ecosystem through the activity of the marine conservation offices of the various regions involved.

In Barbados, the invasion could be predicted and absorbed in advance beginning to establish a policy in defense of the reef and reef fishery.

The options become more complex when considering the technical, economic and social impact of the invasion at large. A school of thought suggested the eradication through removal methods (derbies, safari, fishing tournament) but over time there was a clear perception that more players had to be involved starting from the fisheries. At the same time, the lionfish for food use gained popularity, creating problems to redesign the fishing activity aligned with market demands, supply chain fit and ultimately be consistent with non-damaging ecological requirements. A shifting outcome can move in the opposite direction when not properly managed⁶⁸.

Eating lionfish became popular but ask for a balanced ecosystem managerial control across the various actors involved⁶⁹. Actors previously working individually and stand-alone need to reset their relationships and work with a wider body of different players in addition to innovating the conventional practices.

The same Agencies involved in the control of marine space had to be involved in extensive confrontation and consulting within and across the various stakeholders. Under these threats, the fisheries organization went beyond the

⁶⁷ Morris 2012; Morris, Whitfield 2009.

⁶⁸ Lambertucchi, Speziali 2011.

⁶⁹ Buddo 2012.

traditional task and be involved in more stringent rules of ecological balance in addition to different practices in fishing activity. This widening role is calling for “social entrepreneurship” roles, implying a triggering activity and a strong momentum to maintain a disciplined action coupling an economic and an environmental as well.

See as an example The National Lionfish Management Strategy in Belize from 2019 to 2023 trying to couple two opposite targets, the defense of the marine Biosystems equilibrium and the market development of the lionfish. The environmental sustainability and the economic sustainability of the emerging lionfish market.

Recognizing that lionfish eradication is not viable the decision of the intervention the target turned to be the maintenance of the “lionfish threshold density”, that is “the tipping point between the rate at which lionfish consume prey and the rate of which new prey biomasses are created”⁷⁰.

The lionfish chasing can be practiced by amateurs through derbies, safaris and tournaments but the key role must be played by traditional fisheries that were devoted to lobster, conch, snapper, and grouper, following distinctive routines. Turning attention to different species, with a specific way of treating harmful poised pins, new fishing techniques, and uncertain economic return on consumer demand can make bankrupt the whole project intervention.

The control and monitoring through the construction of a body of intelligence and experimentations of the lionfish phenomenon are crucial for policy intervention in the regulation of the socio-economic activity disciplining the mainstream and the nitty-gritty daily operator’s activity.

3.1. *Marine authority and policy decisions*

Thanks to their mission, the regional marine authorities were at the forefront of the fight against the invasion, possessing intelligence of the evolution of the coastal ecosystem.

The lionfish invasion posed a unique threat and required innovative approaches to control. Prior to this case, Colombian institutional and ministerial bodies had already invited designers and creatives to tackle other natural disasters and environmental problems. The growing information and evidence that native fish populations can recover relatively quickly if the number of lionfish in the sea is controlled⁷¹, has accelerated the question of how to do so in effectively and on a fiscally sustainable basis. Maritime protection agencies

⁷⁰ See <<https://blueventures.org/publications/belize-national-lionfish-management-strategy-2019-2023/>>, 29.05.2023.

⁷¹ Green *et al.* 2014.

understood early on that they could not do it alone, or through voluntary organizations. It was clear early on that effective and prolonged removal will require strategies that mobilize a range of stakeholders. A key element was the development of markets that create trade incentives, and provide livelihood opportunities for fishing communities that have been directly affected by the threat. The first of these markets to be analyzed was the fisherman / seafood seller / restaurant value chain. Promoting lionfish as a food product has the dual benefit of creating commercial incentives for fishermen, while raising awareness of the invasion.

For example a new strategy, launched on 21 February 2019 in Belize City, describes how to design and implement an integrated approach to lionfish management⁷². Drawing on almost a decade of research into the effects of the lionfish invasion and the efficacy of different methods of control, this strategy was designed to help governments, conservation groups and other actors in the Caribbean region manage lionfish populations more transdisciplinary and effectively – and even turn the problem into an opportunity using market-based incentives.

3.2. Redesigning the fishery

On October 19, 2015, two Design professors and 3 MA students from *Publicidad y Diseño Industrial de la Universidad Jorge Tadeo Lozano* were invited by *Biocomercio Colombia Coralina y APCColombia la Agencia Para la Cooperación de la Presidencia* on the Island of *SantAndres* (in Colombia) to organize different workshops and activities that take place within the framework of the *Biocaribe International Fair*, on the island of *San Andrés* from November 10 to 14, and it is corresponding photographic and video record (see Figure 2).

By studying the documents shared between the Design Scholars and the local institutions, the objective of the operation was clearly highlighted: “*Taking into account that the lionfish is quite harmful to the delicate ecosystem of the Archipelago, it is essential to promote its hunting and consumption, for which the setting up of a Gastronomic Festival, and giving it visibility within this fair. The aim is to encourage the hunt for lion fish, because it is destroying everything and multiplying rapidly, with the aim of using it as a point starting point, as a tool, as an objective, to strengthen trade starting from different sectors: from hunting – to harpoon harvesting – passing through crafts – to gastronomy*”⁷³.

⁷² Chapman *et al.* 2019.

⁷³ Source: from an excerpt from the official government invitation to designers.

Starting from this request, the group of designers planned a co-design project in S.Andres Island (Colombia).

For this co-design project, four actions were planned:

1. Lion fish hunting contest;
2. Fishing art construction of harpoons and nets;
3. Community-based workshop, jewelry hand-crafts;
4. “Knowledge and Flavors” gastronomic food design workshop and food stylist competition.

The final purpose of the co-creation sessions was to meet all the needs of multi-actorial scenarios, creating a new system, service or product that meets their needs and at the same time is usable and proactive for future innovation. The use of sub-groups partly helped in the management of activities and partly in the generation of ideas. Managing a smaller entity, therefore a group of a few people, allowed everyone to participate in the design process.

Contests, competitions and challenge-based learning activities become tools for engagement, an opportunity to make every “*Raizal*” (locals) into superheroes, but not simply because of participation, but also because they are and understand the benefits that their “heroic acts” will bring to them and to future. The matrix (Figure 3) highlights and summarizes the design objectives included in the design of the various workshops and contests offered to local people: the outcomes of the various initiatives are defined by the type of “heroes.”

In a participatory and co-creation process, people with different experiential and professional backgrounds jointly explore their needs and think of solutions together: they, therefore, pass from “doing for” to “doing with” and this implies an active involvement of the various actors. Co-design provides principles and tools to facilitate collective moments of conception and development of new or better solutions. Among the tools that have been chosen for this project, challenge-based (competitive) sessions and co-design workshops were included.

In the hunting competition in S.Andres, the designers’ goal was to actively involve all the protagonists of the fish ecosystem, demonstrating how everyone could become “heroes” and face the great criticality of lionfish in the Caribbean. The strategy of giving prizes to those who caught the largest and the smallest, allowed the fishermen to experiment and challenge each other, but above all to become familiar with the fishing of the animal.

In the ‘Fishing Equipment’ Contest (construction of harpoons) fishermen were asked to design new and better weapons for hunting. The terrain and conditions of a battle were simulated. The “heroes” in this case, have become recursive and through the application of creative approaches and co-design experiments and games with harpoons, they have identified different solutions to overcome the problem of untouchable and poisonous fins, which hindered easy fishing. The result of their creative experiments has shown that if the lionfish

remains out of the water for a certain period, it loses its venom and therefore can be more easily caught and collected.

The project highlights two focal design elements:

- a) applicability: the fishing contest obtained immediate results applicable to complex socio-technical ecosystems;
- b) the method: by studying the integrated interaction models with fishing activities, it was possible for the designers to identify new opportunities for change, for action, and therefore to co-design with fishermen and fish stakeholders, innovative artifacts and new models of interactions and cultural mediations (new fish culture).

3.3. *Complementary emerging assets discovery*

Empowering regional communities to feel secure and equipped to address the challenges it faces is crucial and can be facilitated by developing new connections and methods of thinking. Community-led innovation is an inclusive, flexible and collaborative way of enabling new partnerships to understand problems and design new (or reinvigorate existing) ideas addressing community needs and interests. Co-design provides a creative approach to problem solving that aligns well with the objectives and processes of community-led innovation. Co-design has a lot of potential as a tool for community-led innovation in multiple contexts, especially with policy environments needing to have greater community relevance. It is a fresh approach for gathering people together to think creatively and differently and become inspired.

One of the complementary island's assets was its linguistic multiculturalism. The island community uses the *criole* language, which is the result of the mixture of English and Spanish. The mix of cultures (US Americans – and Native Caribbean, mixed with migrants from North Africa and other parts of the world) have for years been fertile ground in the construction of myths and legends about the lionfish. In fact, the *raizales* (native community of San Andrés – Providencia) have built their own imagination in front of the lion fish because of its poisonous spines, and for a long time they did not realize that the fish could be manipulated and useful once the spines were cut.

In the official governmental report, it is also mentioned how religious communities, and local priests have been involved without success in this process of changing the collective mindset, as some notions and information about the lionfish were included in the Sunday sermons.

The designers project considered both linguistic and cultural diversity: *raizales*, fishermen, artisans, and cooks were all involved to transform a problem, such as lionfish, into an opportunity, a fortress. In order to make the imaginations and myths built around the lionfish disappear, they co-devised solutions to activate a trade in lionfish meat and reduce the impacts of the fish

on the environment and marine biodiversity. All the sub-groups had the opportunity to imagine and devise alternative and innovative solutions.

In detail, the food design and food stylist competitions and the jewelry craft workshop allowed the *raizales* to transform routine and daily action (such as making souvenirs and jewels) into superhero actions, or activist behaviors⁷⁴. In addition to the participation and involvement of the multi-actors in the workshop, it triggered the empowerment process that allowed the self-recognition of the benefits of their “heroic” acts. The jewelry workshop helped trigger a change in behavior towards and acceptance of the lionfish in their daily routine activities. The craft workshop introduced the idea of “artistic heroes”, changing the mindset of local women and young people, fueling ever greater heroic acts, supported by the reification of an abstract concept “from a dangerous beauty, you can find and develop a precious beauty”.

Finally, the “Knowledge and Flavors” gastronomic and culinary workshop, followed by a contest on food stylists and social media promotion, completed the co-design process, making chefs discover and experiment with lion fish meat as an innovative culinary ingredient. The local chefs, called “heroes of the palate”, learned the communication techniques most commonly applied on the web and on social media for the tourism promotion of catering and hospitality, by using the lionfish ingredient for their creations and recipes.

The promotional message that eating fish would have helped the environment to the ecosystem has spread to tourist channels, as well as being consolidated locally. These co-design sessions encouraged the human food consumption of this fish, which turned out to be succulent and nutritious, as well as delicious.

4. Discussion

The case of the Lion Fish has led to interesting results and impacts in the long term: in tourism, for example, there has been an increased demand in the field of catering for dishes and restaurants serving Lion Fish (as demonstrated by several websites such as <https://lionfish.co/eat-lionfish-here/>); communities have no longer moved inland and instead have remained to inhabit the island; fishermen have found a new economic resource in the lion fish fishery. Through this design-based project, it was possible to find both environmental, but also economic, social, and political solutions.

The case described here demonstrates that to make the outcome of an innovation project lasting, it is necessary to bring all actors into the co-creation

⁷⁴ Rao 2008.

process. Through the lion fish case, we were able to analyze how it was possible to align a multilateral set of partners and how this helped circumvent bottlenecks, heroically defeating the “Lion Fish enemy”, incorporating new actors and downstream resources into the ecosystem.

The project that the designers built for Lion Fish in this Colombian island, facilitated the empowerment and involvement of multi-players: fishermen became co-creators of their fishing equipment; women put their skills to use thus facilitating innovation in the handicraft sector; restaurateurs co-created new business models, including a communication plan. Co-design is part of the co-creation process, directly involves all stakeholders in generating ideas and designing an innovation with the goal of sharing everyone’s needs and channeling them toward a common goal.

The complexity of the challenge asks for an engagement of a heterogeneous body of interactive actors and the structuration and formation of an entrepreneurial and social ecosystem.

Our analysis shows an evolutionary process with the emersion of three different stages:

1. the impact of the lionfish attack on the marine ecosystem and the role of the institution;
2. the perception/exploration of inclusive innovation and the role of a wide spectrum of agents;
3. the value creation solution tapping several communities in the exploitation of emerging opportunities.

Our narration stylizes the formation of an ecosystem-inclusive innovation path marching forward, with stop and goes stages, a sequence of nodes and interactions between public and private agents.

The formation of tighter connections of heterogeneous nodes of strong ties resulting from the learning process of new routines is confirming the importance of coupling ecosystem and network studies⁷⁵. Our study confirms the usefulness of coupling ecosystems and networks in the implementation of an organizational design open to the contributions to institutions, community and individuals, public and private, giving a distinctive evolutionary path. The linear process model is bypassed by lateral emerging practice fitting with the inclusion of new resources and capabilities and conveying new duality accomplishments.

The relevance of dormant resources and the process of opportunity recognition as a consequence of the crisis created by the lionfish invasion contributed to making the invisible visible.

The food sector is rich in of examples recycling, reusing and searching for a circular process of exploration and exploitation aiming a waste reduction.

⁷⁵ Jacobides *et al.* 2018.

The idle or reused resources mentioned by Penrose⁷⁶ were mainly targeting efficiency in the production process – using unexploited production capacity – while the sustainability perspective aims at the effectiveness of new unexploited sources or for zero waste. It is the transformation of liabilities into assets.

The phenomenon is becoming more widespread following the convergence of technologies from related or previously unrelated fields offering new solutions in different industries, from the food to the medical domain, from the chemistry to the new materials, previously neglected.

The magnitude of the lionfish project suggests widening the spectrum of our lenses to the “project ecology” as a whole, going beyond the structuration and including the role of institutions organizations, teams and communities involved⁷⁷. Therefore, investigating structures and practices takes advantage of the contributions cumulated in different research domains⁷⁸.

According to the “egg model”⁷⁹, the lionfish design project was an “emergent co-design” case: innovation is planned together with the multi-actors, who are involved throughout its development. In reactive design and proactive design, it is possible to analyze human activity through task analysis and with ethnographic observations, but in the third level of design, called emergent, alternative methods of research and co-design serve to study the interaction. between actors in the ecosystem and contribute to the co-creation of innovative cultures. The same difference in the interpretation of the meaning of the design phases occurs in the performance of evaluation activities: in reactive design the usual usability evaluations can be successfully applied to detect interaction problems; in terms of proactive and emerging design, they are inadequate since the objective of the evaluation is the evaluation of transformative actions and changes, emerging behaviors that trigger the launch of new cultures.

Furthermore, the level of interaction (weak or strong) between people and the artifacts that mediate actions can influence the co-evolutionary process of an innovative scenario. Weak interactions, conditions of human activity, where goals can only be achieved through a narrow field of action (and available resources). There is a certain state, a structured domain, and it is not possible to stray too far from that state. There are few alternatives to change the current state. The slightest disturbance in the process could lead to breakdowns and impediments.

Conversely, strong interactions are conditions of human activity in which goals can be achieved through various manipulations of resources. Situations, where there are several alternatives on how to change from the current state, define poorly structured domains. Strong interactions can be extended by

⁷⁶ Penrose 1959.

⁷⁷ Rao 2008.

⁷⁸ Sydow 2021.

⁷⁹ Marti, Rizzo 2001.

modular and interoperable resources. They are considered strong, and considerable variations with respect to the expected flow of activities are tolerated, without causing any interruption or impediment, but rather favoring the action itself more⁸⁰.

5. Conclusion

In the food scenario, dormant resources represent an opportunity to be discovered or rediscovered, recognizing the hidden assets and the underlying opportunities. The lionfish is just a complex case of creativity, design and innovation combining a variety of experiences and the convergence of different paths. The technology is already offering huge examples of recombination with traditional operating routines. This is an area open to further research from economic and social scholars.

Dormant resources can contribute heavily to the entrepreneurial field and environmental sustainability, where circularity is offering a wide spectrum of opportunities, a crossroad space in boosting the generation of new initiatives. A source of opportunities and an almost neglected chapter in creativity and entrepreneurial studies.

The future food shortage and the human nutrition for a growing population is a question mark for thinkers and politicians. Thus, we can ask how many lionfish-like opportunities exist in the nutrition domain and how can we re-discover these ecological opportunities.

The lionfish phenomenon exploration signals the involvement of several Regions, Authorities, communities, and social and economic individual players. In particular, individuals acting as triggering players, activists, “*street smart*” players, neglected peripheries, and small initiatives whose activity was not duly registered and documented. A wide research space that is worth to be analyzed.

The transformative power of culture is reflected not only in human development, but also affects the environment in which man operates. Culture plays an instrumental role in relation to the use of resources. Culture can be a powerful engine of development.

Culture affects people’s attitudes and behaviors towards the natural environment, and in particular imposes a moral obligation, which is the responsibility of nature and its resources.

Culture has another fundamental dimension: governance. It refers to the methods of functioning of the institutions, to the processes, and, above all, to the relationship between the State and citizens and other entities. Further-

⁸⁰ Rizzo 2021.

more, culture through its innovation potential can help solve problems, including challenges related to sustainable development.

There are three main limitations in this study, which could be addressed in future research. First, this study focused on the specific case of Lion Fish in Colombia. It would be useful to expand the scope of investigation to other geographic regions and assess whether other solutions have been detected in other communities. Second, the design-led activities on St. Andres Island were retrospectively analyzed by us. Our own active involvement in the design process would have provided more insights. Third, it might be valuable to identify other similar scenarios to better understand collaborative creativity and co-creation processes; it might be interesting to study in more depth the role of collaborative creativity in aligning a multilateral set of partners and bypassing bottlenecks by incorporating new actors and dormant resources into the ecosystem.

References

- Adner R. (2012), *The Wide Lens: A New Strategy for Innovation*, «Journal of Product & Brand Management», 23, n. 3, pp. 242-243.
- Adner R. (2017), *Ecosystem as structure: An actionable construct for strategy*, «Journal of Management», 43, 1, pp. 39-58.
- Adner R., Kapoor R. (2009), *Value creation in innovation ecosystems: how the structure of technological interdependence affects firm performance in new technology generations*, «Strategic Management Journal», vol. 31, pp. 306-333.
- Agarwal R. et al. (2007), *The process of creative construction: knowledge spillovers, entrepreneurship, and economic growth*, «Strategic Entrepreneurship Journal», vol. 1, pp. 263-286.
- Agarwal R. et al. (2017), *Athena's Birth: Triggers, Actors, and Actions Preceding Industry Inception*, «Strategic Entrepreneurship Journal», vol. 11, pp. 287-305.
- Agarwal V. et al. (2011), *Is Management Quality Value Relevant?*, «Journal of Business Finance & Accounting», vol. 38, pp. 1184-1208.
- Amit R., Shoemaker P. (1993) *Strategic Assets and Organizational Rent*, «Strategic Management Journal», vol. 14, pp. 33-46.
- Archer L.B. (1979), *Whatever became of design methodology*, «Design Studies», vol. 1, 1, pp. 17-20.
- Argote L. (1999), *Organizational Learning: Creating, Retaining, and Transferring Knowledge*, Berlin: Springer.
- Barney J.B. (1986), *Organizational Culture: Can It Be a Source of Sustained Competitive Advantage?*, «The Academy of Management Review», vol. 11, 3, pp. 656-665.

- Barney J.B. (1991), *Firm resources and sustained competitive advantage*, «Journal of Management», vol. 17, pp. 99-120.
- Battilana J. et al. (2009), *How Actors Change Institutions: Towards a Theory of Institutional Entrepreneurship*, «The Academy of Management Annals», vol. 3, pp. 65-107.
- Bendell J., Doyle A. (2017), *Healing Capitalism. Five Years in the Life of Business, Finance and Corporate Responsibility*, London: Routledge.
- Bendor R. et al. (2021), *Looking backward to the future: On past-facing approaches to futuring*, «Futures», vol. 125.
- Brown T. (2008), *Design Thinking*, «Harvard Business Review», vol. 86, n. 6, pp. 84-92.
- Brown T. (2009), *Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation*, New York: Harper&Collins.
- Brown T., Katz B. (2011), *Change by design*, «The Journal of Product Innovation Management», vol. 28, n. 3, pp. 381-383.
- Buddo D. (2012) *Legal and Regulatory Consideration for Lionfish Management*, in *Invasive Lionfish 2012*.
- Cattani G. et al. (2018). *Competitive Sensemaking in Value Creation and Capture*, «Strategy Science», vol. 3, pp. 632-657.
- De Bernardi C., Sydow A. (2022), *Am I an environmental entrepreneur? On the evolution of entrepreneurial identity*, «Journal of Cleaner Production», vol. 347, 1 May.
- Denrell J. et al. (2003), *The economics of strategic opportunity*, «Strategic Management Journal», vol. 24, pp. 977-990.
- Drucker P. (1993). *Managing for the Future*, 1st edition, London: Routledge.
- Dunne D., Martin R. (2006), *Design thinking and how it will change management education: An interview and discussion*, «Academy of Management Learning & Education», vol. 5, n. 4, pp. 512-523.
- Ecoteam (2016), *Monitoreo Abundancia de Pez Leon y sus Impactos sobre el Ecosistema con Énfasis en Recursos Pesqueros*, Informe Técnico CORALINA, < <http://www.cayoscochinos.hn/index.php/monitoreo-de-peze-leon>>, 29.05.2023.
- Farjoun M. (2010), *Beyond Dualism: Stability and Change As a Duality*, «Academy of Management Review», vol. 35, pp. 202-225.
- Feldman M.S., Pentland B.T. (2022). *Routine dynamics: Toward a critical conversation*, «Strategic Organization», vol. 20(4), pp. 846-859.
- Fisher M.C. et al. (2021), *Climate shock effects and mediation in fisheries*, «PNAS», vol. 118, n. 2.
- Gary G. et al. (2015), *Leading the Transformation: Applying Agile and DevOps Principle at Scale*, IT revolution Press.
- George B. (2012). *Mindfulness helps you become a better leader*, «Harvard Business Review», vol. 26, 10, pp. 21-32.
- George G. et al. (2016), *Understanding and tackling societal grand challenges*

- through management research*, «Academy of Management Journal», vol. 59, 6, pp. 1880-1895.
- Ghoshal S. (1987), *Global strategy: An organizing framework*, «Strategic Management Journal», vol. 8, pp. 425-440.
- Gioia D. *et al.* (2013), *Seeking Qualitative Rigor in Inductive Research*, «Organizational Research Methods», vol. 16, pp. 15-31.
- Green S.J. *et al.* (2014), *Linking removal targets to the ecological effects of invaders: a predictive model and field test*, «Ecological Applications», vol. 24, 6, pp. 1311-1322.
- Gulati R. *et al.* (2012), *Meta-organization design: Rethinking design in inter-organizational and community contexts*, «Strategic Management Journal», vol. 33, pp. 571-586.
- Hargadon A. (2003), *How Breakthroughs Happen: The Surprising Truth about How Companies Innovate*, Boston: Harvard Business School Press.
- Helfat C., Lieberman M. (2002), *The birth of capabilities: Market entry and the importance of pre-history*, «Industrial and Corporate Change», vol. 11, pp. 725-760.
- Iansiti M., Levien R. (2004), *The Keystone Advantage: What the New Dynamics of Business Ecosystems Mean for Strategy*, Boston: Harvard Business School Press.
- Jacobides M. *et al.* (2018), *Towards a Theory of Ecosystems*, «Strategic Management Journal», vol. 39, 8, pp. 2255-2276.
- Kan J.W.T., Gero J.S. (2011), *Comparing designing across different domains: An exploratory case study*, in *Proceedings Volume DS68-2. Impacting Society through Engineering Design*, vol. 2, *Design Theory and Research Methodology*, The 18th international conference on engineering design (15th-18th August 2011, Technical University of Denmark, Copenhagen, Denmark), edited by S. Culley *et al.*, La Vergne, Milton Keynes: Lightning Source, pp. 194-203.
- Ke Q. *et al.* (2015), *Defining and identifying sleeping beauties in science*, in «Proceedings of the National Academy of Sciences», vol. 112, 24, pp. 7426-7431.
- Kor Y.Y., Mahoney J.T. (2004), *Edith Penrose's (1959) Contributions to the Resource-based View of Strategic Management*, «Journal of Management Studies», vol. 41, pp. 183-191.
- Lafley A. *et al.* (2012), *Bringing science to the art of strategy*, «Harvard business review», vol. 90, pp. 56-66.
- Lampel J. *et al.* (2009), *Experiencing the Improbable: Rare Events and Organizational Learning*, «Organization Science», vol. 20, pp. 835-845.
- Liedtka J. *et al.* (2013), *Solving Problems with Design Thinking: Ten Stories of What Works*, New York: Columbia Business School Publishing.
- Liedtka J., Ogilvie T. (2011), *Designing for Growth: A Design Thinking Toolkit for Managers*, New York: Columbia Business School Publishing.

- Maher M.W. (2000), *Management accounting education at the millennium*, «Issues in Accounting Education», vol. 15, 2, pp. 335-346.
- Mahoney J.T. (1995), *The management of resources and the resource of management*, «Journal of Business Research», vol. 33, 2, pp. 91-101.
- March J.G. (1991), *Exploration and Exploitation in Organizational Learning*, «Organization Science», vol. 2, 1, pp. 71-87.
- Marti P., Rizzo A. (2003), *Levels of design: from usability to experience*, in *HCI International 2003 Proceedings*, The 10th International Conference on Human-Computer Interaction (Crete, Greece, June 22-27), edited by S. Constantine, Mahwah: Lawrence Erlbaum Associates.
- Martin R.L. (2009), *The Design of Business: Why Design Thinking is the Next Competitive Advantage*, Boston: Harvard Business School Press.
- Martin R.L. (2011), *The Innovation Catalysts*, «Harvard Business Review», vol. 89, pp. 82-87.
- Massari S. (2017), *Food design and food studies: Discussing creative and critical thinking in food system education and research*, «International Journal of Food Design», vol. 2, 1, pp. 117-133.
- Massari S. (2021), *Transdisciplinary Case Studies on Design for Food and Sustainability*, Elsevier.
- Masucci M. et al. (2020), *Removing bottlenecks in business ecosystems: The strategic role of outbound open innovation*, «Research Policy», vol. 49, 1.
- Merton R.K. (1959), *Notes on Problem-Finding in Sociology, IX-XXXIV*, in *Sociology Today: Problems and Prospects*, a cura di R.K. Merton et al., New York: Basic Books.
- Morris J. (2012), *Invasive Lionfish. A Guide to Control and Management*, Marathon: Gulf and Caribbean Fisheries Institute.
- Morris J.A., Akins J.L. (2009), *Feeding ecology of invasive lionfish (Pterois volitans) in the Bahamian archipelago*, «Environmental Biology of Fishes», vol. 86, pp. 398-398.
- Morris J., Whitfield P. (2009), *Biology, ecology, control and management of the invasive Indo-Pacific lionfish: An updated integrated assessment*, Beaufort: NOAA Technical Memorandum NOS NCCOS 99.
- Mutanen U.M. (2008), *Developing organizational design capability in a Finland-based engineering corporation: the case of Metso*, «Design Studies», vol. 29, n. 5, pp. 500-520.
- Nelson H.G., Stolterman E. (2014), *The design way: Intentional change in an unpredictable world*, Cambridge: The MIT press.
- Norman D. (2009), *The design of future things*, New York: Basic books.
- Penrose E. (1959), *The Theory of the Growth of the Firm*, Oxford: Oxford University Press, <<https://doi.org/10.1093/0198289774.001.0001>>, 29.05.2023.
- Perks H. et al. (2005), *Characterizing the Role of Design in New Product Development: An Empirically Derived Taxonomy*, «The Journal of Product Innovation Management», vol. 22, n. 2, pp. 111-127.

- Perrow C. (2000), *An Organizational Analysis of Organizational Theory*, «Contemporary Sociology», vol. 29, n. 3, pp. 469-476.
- Ployhart R., Bartunek J. (2019), *Editors' Comments: There Is Nothing So Theoretical As Good Practice. A Call for Phenomenal Theory*, «Academy of Management Review», vol. 44, 3, pp. 493-497.
- Rao H. (2008), *Market Rebels: How Activists Make or Break Radical Innovations*, Princeton: Princeton University Press.
- Razzouk R., Shute V. (2012), *What Is Design Thinking and Why Is It Important?*, «Review of Educational Research», vol. 82, 3, pp. 330-348.
- Redström J. (2017), *Making Design Theory*, Cambridge: The MIT Press.
- Rizzo A. (2000), *La natura degli artefatti e la loro progettazione*, «Sistemi intelligenti, Rivista quadrimestrale di scienze cognitive e di intelligenza artificiale», vol. 3, pp. 437-452.
- Rizzo A. (2021), *Ergonomia cognitiva. Dalle origini al design thinking*, Bologna: Il Mulino.
- Rowe P.G. (1987), *Design Thinking*, Cambridge: The MIT Press.
- Salvato G. et al. (2020), *Building the bodily self-awareness: evidence for the convergence between interoceptive and exteroceptive information in a multilevel kernel density analysis study*, «Human Brain Mapping», vol. 41, pp. 401-418.
- Sameti A. et al. (2022), *Are product design researchers and practitioners on the same page? The way professional product designers view creative design*, «Journal of Product & Brand Management», vol. 31, n. 6, pp. 951-970.
- Sandholtz K.W., Powell W.W. (2019), *Amphibious Entrepreneurs and the Origins of Invention*, in *The Oxford Handbook on Entrepreneurship and Collaboration*, edited by J. Reuer, S. Matusik, Oxford: Oxford University Press, pp. 541-566.
- Schön D.A. (2017), *The reflective practitioner: How professionals think in action*, London: Routledge.
- Shipilov A., Gawer A. (2020), *Integrating Research on Interorganizational Networks and Ecosystems*, «ANNALS», vol. 14, pp. 92-121.
- Sydow J. et al. (2009), *Organizational Path Dependence: Opening the Black Box*, «AMR», vol. 34, pp. 689-709.
- Sydow J. (2021), *Studying the Management of Project Networks: From Structures to Practices?*, «Project Management Journal», vol. 53.
- Veryzer R.W., de Mozota B. (2005), *The Impact of User-Oriented Design on New Product Development: An Examination of Fundamental Relationships*, «The Journal of Product Innovation Management», vol. 22, n. 2, pp. 128-143.
- Wernerfelt B. (1984), *A resource-based view of the firm*, «Strategic Management Journal», vol. 5, pp. 171-180.
- Williams T. et al. (2017), *Organizational Response to Adversity: Fusing Crisis*

Management and Resilience Research Streams, «The Academy of Management Annals», vol. 11, n. 2.

Yin R. (1984), *Case Study Research. Design and Methods*, 4th edition, Beverly Hills: Sage.

Young G. (2010), *Design Thinking and Sustainability*, <<https://zum.io/wp-content/uploads/2010/06/Design-thinking-and-sustainability.pdf>>, 10.01.2023.

Appendix

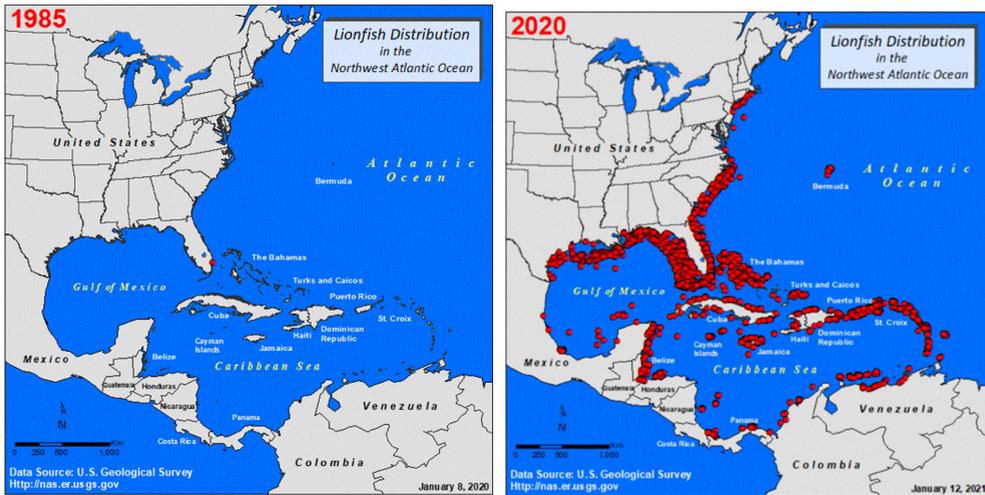


Figure 1. Source/Usage: public domain. Reported lionfish sightings. Map (1985-2020) Map created by US Geological Survey Nonindigenous Aquatic Species Database (<https://www.usgs.gov/centers/wetland-and-aquatic-research-center/science/lionfish-distribution-geographic-spread-biology>)

8 de noviembre	9 de noviembre	10 de noviembre	11 de noviembre	12 de noviembre	13 de noviembre	14 de noviembre
DOMINGO	LUNES	MARTES	MIÉRCOLES	JUEVES	VIERNES	SÁBADO
		COCTEL DE LANZAMIENTO 150 PASABOCAS PEZ LEÓN	TALLER 1 FOOD DESIGN "CÓMO COMBINAR SABERES Y SABORES"	TALLER 2 FOOD DESIGN "INTERPRETAR CONCEPTOS EN LOS SABORES" & "FOOD STYLE (REGISTRO FOTOGRÁFICO DE ALIMENTOS)"	SHOW DEMOSTRACIÓN DE COCINA JURADO	CONCURSO SEAFLOWER COOKING HERO MUESTRA GASTRONÓMICA TRIVIA PEZ LEÓN

Figure 2. This is the tentative program that is invited to the professors and students, as part of the official invitation (Source: provided by prof. Juan Jose Arango)

VISION: From the understanding of the past and present system, the vision and co-planning of intervention strategies to promote change starts						Design Project outcome: Be Heroes
MISSION: each subgroup will be carrying out a transformative action, motivating people not to participate, but to become heroes, contributing to change						
Community Subgroups	Where	Design project GOALS	Design project ACTIVITIES	Design project PHASES	Design project RESULTS	
Fisherman	Ocean	Hunting contest: o Each of the people who enter the water, faces the 'archenemy' of the Caribbean. The claim of the Aquatic Heroes is. o We don't fly, we dive.	Hunting Contest	Empathize and research	Fisherman empowerment	Caribe Ocean Heroes Aquatic Heroes
Fisherman	Beach	Fishing gear competition (harpoon construction). o They are those who will invent the best weapons for hunting, try to be equal with others in the battle. Recursive heroes o They have the thorns, we have the harpoons.	'Fishing Arts' co-design workshop and contest (Harpoon Construction)	Define the problem. Prototyping and testing	Fisherman empowerment	Island Heroes - Recursive heroes
Women (daughters and wives)	Craft labs	Craft-Workshop Competition o They will turn their weakness into strength. Artistic Heroes o From Dangerous Beauty, to Precious Beauty.	Jewelry Craft Workshop	Prototyping and testing	Community empowerment and women	Artistic heroes
Chefs	Kitchen	'Sabores y Saberes' Food Competition. o They understand the value of flavor. Heroes of the Palate. o From Poison to Goodness.	Gastronomic workshop and contest 'Flavors and Knowledge'	Prototyping and tasting	Restaurant/and Chefs empowerment	Heroes of the palate

Figure 3. Heroes matrix (Source: created by the authors)

JOURNAL OF THE DIVISION OF CULTURAL HERITAGE
Department of Education, Cultural Heritage and Tourism
University of Macerata

Direttore / Editor
Pietro Petroroia

Co-direttori / Co-editors

Tommy D. Andersson, Elio Borgonovi, Rosanna Cioffi, Stefano Della Torre,
Michela di Macco, Daniele Manacorda, Serge Noiret, Tonino Pencarelli,
Angelo R. Pupino, Girolamo Sciallo

Texts by

Simona Antolini, Sabrina Arcuri, Germain Bazin, Michele Bellomo,
Lorenzo Calvelli, Caterina Caputo, Sara Caredda, Alessio Cavicchi,
Mara Cerquetti, Stefania Cerutti, Pacifico Cofrancesco, Gian Luigi Corinto,
Cinzia Dal Maso, Rosario De Iulio, Valentina De Santi, Anabel Fernández
Moreno, Simone Ferrari, Gianni Lorenzoni, Sonia Malvica, Sonia Massari,
Siria Moroso, Emanuela Murgia, Antonino Nastasi, Paola Novara,
Silvia Orlandi, Jessica Piccinini, Miriam Poiatti, Maria Luisa Ricci,
Selene Righi, Silvia Rolandi, Mauro Salis, Francesco Spina, Gianluca Sposato,
Bella Takushinova, Sabrina Tomasi, Antonio Troiano, Franca Varallo,
Daniele Vergamini, Jairo Guerrero Vicente, Elena Viganò, Davide Zendri.

<http://riviste.unimc.it/index.php/cap-cult/index>

