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RESILIENCE IN HERITAGE CONSERVATION AND HERITAGE TOURISM

A Dissertation

by

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DOCTOR OF PHILOSOPHY

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ABSTRACT

Resilience, defined as the *capacity of a system to bounce-back, adapt or heal, from impacts, disturbances or challenges,* is becoming an increasingly important concept of academic study in a range of knowledge areas. Most research on the notion of resilience in relation to the built environment is derived from an ecology perspective. Heritage conservation and heritage tourism, two knowledge areas sharing heritage sites as their common object of study, have also made the connection with the concept of resilience. However, the use of this concept has focused on an ecology approach as well. This study develops the notion of resilience in heritage conservation and heritage tourism in order to expand its potential as an emerging concept beyond ecology concerns.

Using logical argumentation as the main research strategy, two processes are developed: First an analysis of the use of resilience in a range of knowledge fields, including heritage conservation and tourism studies, was performed in order to recognize conceptual and operational challenges for its application in relation to heritage sites. Findings allowed identifying that limitations of translating existing resilience frameworks *directly* from other knowledge areas were associated to ontological and epistemological assumptions that favor *partial* accounts of what heritage sites understood as systems *are*. Second, contributions of an integrated approach between heritage conservation and heritage tourism, and a 'new materialism' approach focused on Levi Bryant's Onto-cartography, were proposed in order to expand the potential of

the notion of resilience to address increasing challenges of diverse sort in heritage sites. Multiple case examples were discussed throughout the chapters that contributed to theoretical insights.

DEDICATION

To my mother and father.

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TABLE OF CONTENTS

Page

Page

LIST OF FIGURES

Page

LIST OF TABLES

Page

CHAPTER I

INTRODUCTION

I.1. Overview

Social and living systems are constantly challenged by change, uncertainty and increasingly complex issues such as climate change and global mobilities. Change constitutes an inevitable natural process of transformation due to the dynamic interactions between environmental, social, economic, human and cultural systems through time. Approaches to deal with change and uncertainty have evolved with the development of knowledge in each discipline and with the cross-disciplinary efforts to establish new links and insights. One approach that is being developed in order to deal with the increasing uncertainty and change that challenge long-term sustainability priorities is the notion of *resilience*.

Resilience, defined in general as *the capacity of a system to bounce-back, adapt or heal, from impacts, disturbances or challenges*, is therefore becoming an increasingly important concept of academic study in a range of knowledge areas and fields of study. Resilience as a concept has evolved from technical definitions that describe properties of materials (Haswell, 1860) and ecological systems (Holling 1973), to notions that recognize the capabilities of dynamic systems and their interactions to cope with change (e.g. urban planning; disaster management).

I.2. Problem Statement

Most research on the notion of resilience in relation to the built environment and derived from an ecology perspective (e.g. architecture; urban planning; disaster management; heritage conservation; heritage tourism) has focused on economic and environmental aspects, and "less material is found on the cultural aspects of resilience" (Abi-Hashem 2011). Heritage conservation (located within Architecture generally) and heritage tourism studies have also made the connection with the concept of resilience. However, the use of this concept has focused on environmental aspects as well derived from its influence from a disaster management approach (Spennemann 2007; Ritchie 2009).

With this imbalance that favors some aspects of resilience (e.g. environmental) and leave others out (e.g. cultural), disciplines are developing this concept as a decision-making tool (e.g. disaster management). This imbalance in relation to the development of the notion of resilience suggests a manifestation of what some authors have associated with similar omissions within disciplinary directions that privilege quantification and positivistic approaches, and also unresolved aspects of gender and ethnicity (Jamal, Camargo & Wilson 2013). In addition, other authors have recognized the difficulty of translating social and cultural aspects of resilience to 'simple measurement' (Tyrrell & Johnston 2008).

The importance of cultural aspects in relation to the notion of resilience has been suggested by Radoine (2013), as well as their interaction with other parameters (Tyrrell & Johnston 2008). Furthermore, the United Nations recognizes the necessity for "a more

visible and effective integration and mainstreaming of culture in development policies and strategies at all levels", and UNESCO[1] claims on the contribution of culture not only in reference to "quantitative economic growth (income, employment), but also of qualitative standards of equity and well-being" (Bandarin, Hosagrahar, & Albernaz 2011).

Acknowledging possible missing aspects since the early stages in the development of the notion of resilience provides the opportunity to make visible neglected parameters to improve frameworks currently in development before their use is made extensive through regulations and certifications as has been the case with the sustainability paradigm (e.g. LEED[2]). Furthermore, the current accelerated visibility acquired by the notion of resilience in diverse disciplines[3] suggests that its meaning as a concept might be in *resonance* with current conceptual shifts, in other words a manifestation of a worldview (Kuhn 1970), therefore providing opportunities for connecting or making visible unlinked parameters.

Therefore, to fully make use of the emerging notion of resilience, a process of developing this concept is required starting from the particular concerns of each discipline towards an understanding of its potentials and limitations.

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[1] UNESCO-United Nations Educational, Scientific and Cultural Organization (UNESCO | building peace in the minds of men and women.)

[2] LEED-Leadership in Energy & Environmental Design (U.S. green building council.)

[3] "In January 2013 Time magazine declared 'resilience' the buzzword of 2013" (Brown 2013:1)

Each discipline is going through this process in order to address their specific object of study (e.g. *community disaster resilience* in disaster management), and interactions among disciplines provide additional insights.

Heritage conservation and heritage tourism[4] are knowledge areas that share heritage sites as their common object of study. However, each discipline is concerned with a different aspect of the site or *destination* (how the place is referred to in tourism studies) therefore both conflicts and potential collaboration affect decision-making processes which in consequence affect the capacity of the heritage site to address challenges of diverse sort (i.e. resilience).

I.3. Objectives

The objective of this study is developing the notion of resilience in heritage conservation and heritage tourism. An integrated approach between heritage conservation and heritage tourism is proposed as necessary to address increasing challenges affecting heritage sites. Multiple case examples from Alcatraz Island (San Francisco, USA) and other heritage sites (e.g. The Alamo in San Antonio, USA) are used for insights in developing the emergent notion of resilience in an integrated approach between heritage conservation and heritage tourism.

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[4] In (Timothy 2011) a definition of *heritage tourism* refers to the act of "people visiting heritage places or viewing historical resources" where different levels of "personal connection to the objects or places being viewed" exist, as well as diverse desires "to learn something new or enhance their lives in some way". In specific, it refers to "travelers seeing or experiencing built heritage, living culture or contemporary arts". Heritage tourism is differentiated among some authors from *cultural tourism* regarding aspects such as people´s desires (intentionality) or currency of resources (recent or distant past), but in general they both include "built patrimony, living lifestyles, ancient artifacts and modern art and culture". In some cases, *heritage tourism* has been extended to include natural heritage as well (Timothy & Boyd 2006).
From a heritage conservation perspective, *heritage tourism* considers "traveling to experience the places, artifacts and activities that authentically represent the stories and people of the past and present" (National Trust for Historic Preservation, 2012).

I.4. Significance of the Study

The research problem investigated in this study is significant in three dimensions: first, at the concrete dimension of the selected case examples themselves; second at the social dimension of architectural practice; and third, at the theoretical dimension of conceptual frameworks[5].

At the concrete level, the conflicts affecting the selected case examples have been a challenge for internal and external stakeholders of Alcatraz Island in order to determine *what to do* with Alcatraz Island. *What to do* with Alcatraz Island has been a question addressed since the closing of the federal prison in 1963 and continues being a concern in its contemporary use as a National Historic Landmark and a *dark tourism* destination. Dark tourism refers to "the packaging and consumption of death or distress as a tourist experience of both distant and recent past" (Strange & Kempa 2003:387)

In addition to impacts and challenges related to environmental and physical aspects which are currently the focus of research in *resilience design* (architecture in general), the contradictions derived from the interactions between heritage conservation and heritage tourism within the context of this heritage site (as a place with a conflicted contemporary identity) constitute an opportunity to develop an understanding of neglected parameters that can contribute to a holistic resilience-oriented framework that can inform stakeholders involved.

At the level of practice, this study aims towards generating an awareness of how architecture, as a design discipline, requires a continuous reminder of its interactions

[5] Logical structure sequence from Moore (1996)

with other disciplines in the transformation of the built environment in order to balance the values that are set as priorities in design processes. A resilience-approach in heritage conservation and heritage tourism suggests a target that requires transdisciplinary efforts in order to achieve a better understanding of *what to do* with (heritage) places and the specific challenges that threaten their preservation or question their relevance (as to be preserved or not) in the first place. Advocating for balancing values and transdisciplinary efforts in the decisions of the built environment constitutes an effort to promote a critical practice in architecture[6], where the notion of resilience suggests making visible aspects that are currently diminished with priorities that focus on technology as the solution for everything.

At the theoretical level, this research aims to contribute towards developing the notion of resilience in order to contribute towards establishing its potentials and limitations to address challenges in heritage sites. In order to claim that this study will be a significant contribution to the field, I must demonstrate, on one hand, how current disciplinary developments in the notion of resilience are not sufficient to address the challenges posed in heritage sites, and on the other hand, how a resilience-oriented approach suggests new elements lacking in existing frameworks (e.g. sustainability). The claim is therefore that developing the notion of resilience to address challenges in heritage sites requires an integrated approach between heritage conservation and heritage tourism that will contribute towards understanding disconnected and often neglected parameters. A transdisciplinary effort of developing resilience as an emerging concept is

[6] From Moore (1996:8)

expected to activate new interactions with current understandings in other disciplines, therefore enriching the ongoing construction of this concept as a collective endeavor for knowledge development and its practical applications.

Furthermore, the contributions of emerging theoretical approaches under a 'new materialism' are discussed.

I.5. Methodology

In order to develop the notion of resilience in heritage conservation and heritage tourism, "logical argumentation" is used as the main research strategy. Logical argumentation, as explained by Groat & Wang (2002), is used to frame a conceptual system that has a wide explanatory applicability taking a set of previously disparate factors, or previously unknown and/or unappreciated factors, and interconnecting them into a unified framework. In order to support the explanatory process through logical argumentation for theory building, two research strategies are used as complementary: Interpretative-historical and case studies.

Interpretative-historical strategies are used in order to understand "social-physical phenomena within complex contexts, with a view towards explaining those phenomena in narrative form and in a holistic fashion" (Groat & Wang 2002).

Multiple case examples are selected that contribute to theoretical insights for elaborating the emergent theory of resilience in heritage conservation and heritage tourism (Eisenhardt & Graebner 2007). Multiple case examples are selected where every case serves as *instrumental* for specific purposes within the theoretical insights developed (Yin 2009).

Crystallization is used as a methodological framework "developed for bringing together not just different forms of data and analysis (as in multi-method research), but also different genres and forms of sense making within interpretive methodology" (Ellingson 2009).

Analysis is performed by *weaving* these references with interpretative accounts through "writing as a method of inquiry", referenced by Ellingson (2009) as being introduced by sociologist Laurel Richardson. *Weaving* in this context resembles processes that show the connection between unlinked parts, and use metaphors and analogies, to explain and clarify it.

New Technology and Social Media

During the period of development for this dissertation (2011-2015), several topics related to the emerging notion of resilience in architecture were in continuous development making the objective for developing a conceptual framework a moving target. However, new technology and social media enabled having access to discussions and developments world-wide as they occurred. Technology interfaces (e.g. Institutional Web Sites, Facebook, Blogs, etc.) provided spaces for interactions at a faster pace than traditional scholarly references (e.g. journals, books, etc.) enabling new forms of organization that allowed spontaneously generated collectives to produce and disseminate approaches and actions as they occurred (Bryant 2013)[7]. Some of these topics are:

[7] See Levi Bryant's lecture on Onto-Cartography in York University (2013).

First, the notion of resilience in general which has different stages of development among knowledge areas ranging from those with a developed conceptual and operational frameworks in process of improvement (e.g. Disaster Management) to those in their initial stages of conceptualization (e.g. Architecture).

Second, on-going processes in case examples in heritage conservation that give opportunities to follow-up discussion and actions as they occur which manifest unsolved issued for decision-making under existing frameworks (e.g. Alcatraz Island and The Alamo in the United States; heritage sites and disasters in Japan).

Third, events that occurred during the development of this research (e.g. Sandy Storm in the United States 2013; Nepal Earthquake 2015) were linked to the increasing attention of resilience as a problem-solving approach in planning and design, and to the emergence of both profit and non-profit organization using this concept to promote at a global scale localized actions (e.g. Rockefeller Foundation; Architecture for Humanity; etc.).

Fourth, current discussions, on one hand, in theory of architecture referring to approaches towards frameworks "based upon science" for design decisions and design research (e.g. Evidence-Based Design; Salingaros 2013), and, on the other hand, approaches in philosophy that promote a "return and renewal of materialism (Bryant 2014). Both approaches have in common an ethical approach based on *traceable* relationships between entities (*machines* in Bryant) within post-humanist frameworks[8]:

[8] In order to overcome "the bias of human exceptionalism" for Bryant (2014) previously addressed in Bryant (2011) "The Democracy of Objects"; and as deemed by intuitive observation for Salingaros (2013).

"a biological understanding of architecture" for Salingaros (2013); and what is referred as *Onto-cartography*[9] in the case of Bryant (2013). Graham Harman[10] summarizes Bryant's approach:

> Bryant's conclusion that the world is made up entirely of material rather than purely signifying or discursive realities amounts to a vision of "units or individual entities existing at a variety of different levels of scale… that are themselves composed of other entities." This leads him to formulate a *machine-oriented ontology*…
>
> Entities are machines because they "dynamically operate on inputs producing outputs." Further, this theory becomes a cartography insofar as it develops "a map of relations between machines that analyzes how these assemblages organize the movements, development, and becoming other machines in the world." (Bryant 2013: x).

These approaches in theory and philosophy have found in the availability of web-based technologies a favorable platform of egalitarian nature (online communities) to promote and reach extensive audiences rapidly generating non-institutional forums for

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[9] "Onto-cartography" – from "onto" meaning "thing" and "cartography" meaning "map" (Bryant 2014). Bryant's name for a map of relations between machines, which he argues are what worlds are entirely composed of. Types of machines: discursive, physical, organic, technological, and inorganic.

[10] Graham Harman is co-editor of "The Speculative Turn: Continental Materialism and Realism" (2011) with Levi Bryant and Nick Srnicek. The making of this book (essays by key figures in present-day continental philosophy) is an example of emerging trends (counterpoints to the 'Linguistic Turn' by speculating "on the nature of reality independently of thought and of humanity more generally") enhanced by digital technology capabilities (blogosphere; online booksellers; open access). Bryant et al. (2011:1;3).

conceptual production (instantly) that refuse drawing divisions between disciplines opening to unpredictable collaborative results[11] (Bryant 2011: 6).

Fifth, following developments in digital technologies and their applications in heritage conservation (e.g. preservation management models).

Sixth, I was fortunate to present during the years 2014 and 2015 some of the initial ideas developed here for diverse audiences which allowed invaluable input to recognize how the notion of resilience as an emerging concept was being understood at the given time and to start exploring the interest of preservation audiences in integrated approaches with heritage tourism under the notion of *dark tourism*, the category used to select the case examples for this research. The audiences ranged from an emphasis in the material aspects of heritage to intangible aspects in terms of the relationship between heritage and society. Presentations with a material concentration were performed for the Association for Preservation Technology International (APT) where I presented as a student scholar in Quebec City (Canada) on initial ideas for using the notion of resilience in an integrated approach between heritage conservation and heritage tourism[12]; and the National Center for Preservation Technology and Training (NCPTT) where I presented on behalf of Robert Warden (Director of the Center for Heritage Conservation at Texas A&M University) on "Technology, Preservation Education and Managing Change in

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[11] Each of the editors of The Speculative Turn authors one or more philosophy blogs. Respectively, these are: Bryant (Larval Subjects), Srnicek (The Accursed Share and Speculative Heresy), and Harman (Object-Oriented Philosophy). (Bryant et al. 2011:6).

[12] Manrique, C., Warden, R. Jamal, T. "Resilience in Heritage Conservation and Heritage Tourism" (abstract refereed). Presented at the Association for Preservation Technology International (APT) as one of the selected *Student Scholars 2014*. Quebec City, Canada, October 27-29 2014.

The Alamo"[13]. Presentations on aspects related to the relationships between heritage and society were performed for the Society of Architectural Historians (SAH) in Austin (Texas) where I presented on "Dark Tourism Issues in the Preservation of Alcatraz Island"[14]; for the Heritage & Healthy Societies Conference in Amherst (Massachusetts) on an integrated approach between heritage conservation and heritage tourism to resilience in Alcatraz Island[15]; and for The Texas Old Missions and Forts Restoration Association in Wichita Falls (Texas) in 2015 where I presented a comparative approach between The Alamo and Alcatraz Island in reference to dark tourism issues in preservation[16]. All these aspects have been simultaneously occurring during my PhD studies in Architecture, and have informed throughout these years initial questions in reference to the causes and consequences of material decisions in architecture.

Structure of the Dissertation

The logic structure proposed to develop a framework for the notion of resilience starts with an overview of the development of this concept in architecture and related

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[13] Manrique, C., Warden, R. "Technology, Preservation Education and Managing Change in the Alamo" (abstract refereed). Presented at the Preservation Education Conference – National Council for Preservation Education (NCPE). National Center for Preservation Technology and Training (NCPTT), Natchitoches, Louisiana, United States, July 15-16 2014.

[14] Manrique-Hoyos, C. "Dark Tourism Issues in the Preservation of Alcatraz Island" (abstract refereed); Presented at the SAH - Society of Architectural Historians 67th Annual Conference - *Graduate Student Lightning Talks*, Austin, Texas, United States, April 9-13 2014.

[15] Manrique, C., Jamal, T., & Warden, R. "Heritage Conservation and Tourism: An integrated approach to resilience in Alcatraz Island" (abstract refereed). Presented at the Heritage & Healthy Societies Conference University of Massachusetts Center for Heritage & Society, Amherst, Massachusetts, United States, May 14-16 2014.

[16] Manrique, C. "Alamo & Alcatraz: Dark Tourism Issues in Preservation". TOMFRA – The Texas Old Missions and Forts Restoration Association. Wichita Falls, Texas (US), April 11 2015.

disciplines (e.g. urban planning) and its relation with existing approaches (e.g. sustainability). An evaluation of contributions and missing aspects is performed. Alcatraz Island (San Francisco, United States) is introduced as a case example by presenting tangible and intangible challenges as *a design problem* in heritage conservation (e.g., *what to do* with Alcatraz?). Contributions and gaps in architecture and related disciplines are identified to approach this problem. An excavation and discussion of the use of resilience in a range of knowledge areas and fields of study outside of architecture (and related disciplines) is developed. A critical evaluation of the notion of resilience from the previous sources is performed in order to recognize positive aspects and possible gaps that can inform the use of this concept in relation to decisions in order to address challenges in heritage sites. Special attention is dedicated to heritage tourism (tourism studies, cultural tourism) as a knowledge area fundamental for addressing decisions in heritage sites in their contemporary role as tourism destinations. Case examples in Alcatraz Island are presented in order to identify contributions and gaps from these fields of study (outside architecture) to address tangible and intangible challenges introduced previously.

Second, an integrated approach between heritage conservation and heritage tourism is proposed as necessary for developing the notion of resilience for addressing challenges in heritage sites. Case examples in Alcatraz Island are referred to in terms of how preservation and tourism issues interact and make visible tangible and intangible contradictions and opportunities affecting decision approaches in heritage sites (e.g. Dark tourism issues in the preservation of Alcatraz Island).

Third, contributions of a ‘new materialism’, focused on Bryant’s Onto-cartography (2014), are discussed for the development of the notion of resilience in heritage conservation and heritage tourism. Case examples are used throughout the chapter for insights.

CHAPTER II

A CRITICAL APPROACH TO RESILIENCE

II.1. Overview

Resilience is currently a concept used in diverse disciplines in order to understand and manage change. The development of the notion of resilience is a consequence in the development of knowledge in diverse disciplines which have contributed to understand the complexity of dynamic systems and their interactions. Current efforts in each discipline include identifying parameters and establishing indicators for measuring resilience.

This chapter is organized in two sections. The first section presents the diverse uses for the notion of resilience and is organized by knowledge areas in terms of the type of system they focus on. The second section aims towards providing an analysis in reference to the 'symptoms' suggesting the notion of resilience as a paradigm, the conceptual challenges for the development of the notion of resilience, and the operational challenges identified.

II.2. Disciplinary Approaches to the Notion of Resilience

Resilience as a concept has evolved from technical definitions that describe properties of materials (Haswell 1860), and ecological systems (Holling 1973) to notions that recognize the capabilities of dynamic systems and their interactions to cope with change (e.g. urban planning, disaster management, heritage tourism, heritage conservation, etc.). A good example of how the concept of resilience evolves within a disciplinary area is the case of material science and structural engineering. In Haswell

(1860:386), resilience refers to a property of materials that result from a combination of two apparently opposing characteristics: “the Resilience or toughness of a body is a combination of flexibility and strength”. This concept today is used in structural design. A specific example referring to the design of shear connections uses the following understanding of resilience: “The resilience of a connection refers to its ability to withstand destructive loading conditions that accompany a column removal (caused by accidental events such as explosion, impact, and fire) without premature rupture. Providing connection resilience is considered essential to mitigating the progressive collapse in steel frameworks” (Gong 2010:1). Here, the notion of resilience has been translated from a generic characteristic of materials to a specific component under defined conditions; however, its meaning, as a capacity to absorb disturbances is still present.

Ecological Notions of Resilience

Pickett, Cadenasso, & Grove (2004) draw the technical meaning of resilience from Holling (1973) who describes two different kinds of behavior of ecological systems:

> “One can be termed stability, which represents the ability of a system to return to an equilibrium state after a temporary disturbance; the more rapidly it returns and the less it fluctuates, the more stable it would be. But there is another property, termed resilience, that is a measure of the persistence of systems and of their ability to absorb change and

> disturbance and still maintain the same relationships between populations or state variables." (Holling, 1973:14)

This use of resilience as applied to ecological systems challenged classical worldviews that focused on equilibrium states (stability) and self-contained closed systems. Holling explains that the association of stability to systems behavior has been related to the influence of mathematical analyses where simplifications are done to in order to work near equilibrium points due to the simple convenience of this approach as opposed to "the enormous analytical difficulties of treating the behavior of nonlinear systems at some distance from equilibrium" (Holling 1973:17).

Pickett et al (2004) focus on the definition of resilience in ecology using the non-equilibrium paradigm defined in Holling (1973); they refer to the equilibrium paradigm as a conceptual apparatus that is currently used only for special cases. Insights using resilience as a link between ecology and planning include natural and physical parameters (spatial heterogeneity; ecological functions; linking structure with function or process). In addition, from an urban planning perspective, other dimensions are required such as human perception, learning, and resultant actions as part of the human ecosystem; measuring and communicating ecological consequences from planning and management interventions as a tool for monitoring "the effects, not only in aesthetic or design terms, but also in terms of bio geophysical and social processes" (process referred as 'the learning loop') (Pickett et al 2004:378); and establishing mechanisms to promote participatory actions by multidisciplinary teams.

Prickett et al (2004) recognize additional gaps in such an ecology-oriented approach based on structure and function. They also identify other factors that must be included in human ecosystems such as social resources (e.g. information, human population, financial capital, and labor), social processes and cultural resources (e.g. beliefs and myths). Prickett et al (2004:377) also refer to other authors who have shown "how the unequal allocation of critical bio geophysical, social, and cultural resources is significantly affected by social order as expressed in social identity (ethnicity, age, gender, class, etc.), norms of behavior, and hierarchies of wealth, power, status, knowledge, and territory."

Disaster Management

Influenced by the technical definition of resilience from ecology, disaster management modified an approach based on the vulnerability of communities, which concentrates on weaknesses to be improved in order to resist the impact of natural events, towards *community resilience* that considers the strengths and proactive capacity for recovery after a natural events impact (Mayunga J. S. 2009). This shift opens new perspectives on the social dimension of disaster management: it recognizes the value of societal constructs such as the relationship between people and places, sense of community and identity.

Disaster management is making significant contributions to measure the relationship between community and resilience. Theoretical models are being developed that establish an interaction between biophysical systems, social systems and the built environment. Furthermore, attention is being addressed towards establishing how these

indicators can be measured in order to become an operative tool for decision making in all stages of hazard management. The approach adopted by disaster management considers natural hazards as dynamic phenomena where human actions play a role, both as victims and as contributors (Mayunga J. S. 2009). In disaster management five forms of capital are considered that a community can utilize in building resilience (Mayunga 2009): Social, Economic, Physical, Human, and Natural. The capital approach is focused on an economic view of sustainable community development. It has been widely used "in sustainable development and poverty alleviation programs" and is taken as a central focus in understanding and assessing community disaster resilience in Disaster Management (Mayunga 2007).

Tourism Studies, Heritage Tourism & Heritage Conservation

The broad area of tourism studies shares some common planning and managing interests and approaches with disaster management, such as assessing vulnerability (environmental, social and economic) and risk; developing adaptation and mitigation strategies; and using resiliency, recovery and scenario planning (Jamal 2013). In the same way disaster management made the conceptual shift from community vulnerability to resilience, tourism researchers began to recognize that while determining the causes of vulnerability was valuable, the notion of resilience might better help to seek out factors that could facilitate renewal of damaged or disrupted systems (see Farrell and Twining Ward, 2004). Jamal (2013), and Tyrrell and Johnston (2008) acknowledge the importance of approaching sustainability goals in terms of the relationships between environmental, social and cultural aspects of resilience, but little has done in tourism

research to further explore these interrelationships. As argued further below, *cultural resilience* is an important but ignored aspect of *destination resilience*. It offers a vital bridge and common ground between heritage and conservation and heritage tourism—both of which share culture and cultural heritage as common grounds of interest, both of which must be approached from an *integrated* approach if long-term sustainability is desired (McKercher and DuCros, 2004; see below).

Heritage tourism and heritage conservation (aka historic preservation) share common interests in terms of heritage management. An integrated approach to heritage conservation and heritage tourism is seen to be integral to the overall sustainability of cultural heritage destinations, from the past to the present and the future (see McKercher and DuCros, 2004; Hall and McArthur 1998; Rabady and Jamal, 2006). Heritage conservation deals with "deciding what's important, figuring out how to protect it, and passing along an appreciation for what was saved to the next generation" (National Park Service 2011). The definition of values to determine what's important has changed since the eighteenth century when the goal of protecting selected "objects and structures of the past as heritage" was defined, and are contained in the evolving approaches evidenced in the development of standards and guidelines (Jokilehto 1999:1).

The notion of resilience in relation to heritage conservation has been recognized as derived from its use from two distinct approaches: On one hand, a focus on the tangible aspects of heritage and the physical challenges (e.g. natural hazards; climate change; effects of time) affecting heritage sites (Rich 2014; Fehrenbacher 2013; Applegath et al. 2010); On the other hand, research is beginning to focus on intangible

relationships between heritage and society and emotional (intangible) aspects (e.g. community's emotional links) (Edson 2004; Rypkema 2009; Norris et al. 2008; Spenneman 2007). Within the category of physical cultural heritage (tangible heritage), specific threats affect the built heritage, such as being subjected to deterioration, ageing processes, consumption by use, new functions (e.g. tourism and impacts from visitor growth), evolution in taste or fashion, natural and human-made risks, and economic or political fluctuations. Dynamic approaches to resilience for addressing change in heritage structures, such as those produced by the effects of natural hazards, climate and time, are starting to be proposed (Melnick 2009). Here, heritage conservationists tend to use the notion of resilience based on the ecological approach developed by disaster management and urban planning. Recent developments in relation to heritage and disaster management from a tangible perspective aim towards developing guidelines for a 'resilient built environment' (Rich 2014; Applegath et al. 2010) such as: Local materials, parts, and labor; Low energy input; High capacity for future flexibility and adaptability of use; High durability and redundancy of building systems; Environmentally responsive design; Sensitivity and responsiveness to changes in constituent parts and environment; High level of diversity in component systems and features.

In addition, recent developments in relation to the built environment in a broader sense (architecture; urban design; urban planning), triggered by resilience approaches in disaster risk reduction, are also starting to address intangible aspects for the development

of principles of *resilient design*[17] such as those listed by The Resilient Design Institute (2014): Resilience transcends scales; Resilient systems provide for basic human needs; Diverse and redundant systems are inherently more resilient; Simple, passive, and flexible systems are more resilient; Durability strengthens resilience; Locally available, renewable, or reclaimed resources are more resilient; Resilience anticipates interruptions and a dynamic future; Find and promote resilience in nature; Social equity and community contribute to resilience; Resilience is not absolute.

The use of the notion of resilience as applied to the built environment and specific terms such as *resilient design* in reference to architecture and related disciplines became trending concepts in the United States after 'Sandy', the devastating super storm in 2013 (Fehrenbacher 2013). However, this concept and initiatives were already in active use by organizations (e.g. Architecture for Humanity) participating in the process of recovery and rebuilding after major disasters within and outside of the United States (Hurricane Katrina-USA in 2005; Haiti earthquake in 2010; Tohoku earthquake and tsunami-Japan in 2011).

A close exploration of the physical cultural heritage of humanity shows that it has a clear intangible dimension, such as may be seen to result "from long developments and traditional transfer of know-how in particular societies, as well as of influences and `cross fertilization´ between different cultures and civilizations" (Jokilehto 1999:1). Issues related to both tangible and intangible heritage arise from dynamic processes of

[17] Resilient design: "defined as the intentional design of buildings, landscapes, communities, and regions in response to vulnerabilities related to the event of natural disasters and climate change" (The Resilient Design Institute-RDI 2014).

change and are very important to understand in the integrated domain of heritage conservation and heritage tourism. One challenging issue, for instance, is the concept of *age value* which is associated to the natural process of degradation in materials and to cultural aspects such as perception, interpretation and values. Complex considerations arise related not just to tangible items, but also intangible interests, values and beliefs. For example, the decision as to whether decay is to be regarded as patina or rust, mildew, or dirt is considered by some authors as related to the material at hand and by other authors to the perspective of the viewer (which in the heritage tourism domain can include the interests and perspectives of a wide range of tourism stakeholders, such as destination marketing organizations, promoters, public sector (e.g., local government), private sector tourism service providers, and visitors) (see Wells & Baldwin 2012).

Such conflicting issues as noted above require evaluation and management approaches from a broad range of theoretical and empirical approaches in the social sciences and humanities. Efforts in this direction include the use of a phenomenological approach regarding heritage conservation and related matters such as significance and age value, in order to provide "empirical evidence about how everyday people actually value, perceive, and experience age as an intrinsic part of an urban environment" (Wells & Baldwin 2012:384). Not surprisingly, therefore Rypkema (2009) and other authors view the role of heritage conservation in sustainable development from an integrated approach that calls upon environmental, economic and social/cultural responsibility.

In heritage conservation the preservation of tangible and intangible heritage has been recognized as having a decisive role in the formation of a national consciousness,

in national unity, and economic and social development (Edson 2004). Edson (2004:344) refers to the "act of preserving heritage resources (real or imagined)" as an expression of resilience. Aspects connecting a community`s "emotional links" (Spennemann 2007:998) with resilience are related to population wellness, which is defined as "high and non-disparate levels of mental and behavioral health, functioning, and quality of life" (Norris, Stevens, Pfefferbaum, Wyche, & Pfefferbaum 2008:131). Additionally, the importance of including heritage conservation in the initial states of disaster recovery (in relation to the value of societal constructs in Disaster Management) has been identified, once it has been determined that the "community`s emotional links with place are resilient" (Spennemann 2007:998).

Other Perspectives on Resilience

In addition to approaches based on ecological, disaster management, tourism and heritage conservation perspectives, resilience is studied by researchers from psychology, psychiatry, sociology, and more recently, genetics, epigenetics, endocrinology, and neuroscience. The study of resilience in these areas began with the study of maltreated children, the central question being "how some girls, boys, women, and men withstand adversity without developing negative physical or mental health outcomes" (Herrman, Stewart, Diaz-Granados, Berger, Jackson, & Yuen, 2011:259). In Herrman et al (2011:259), resilience is understood as referring to "positive adaptation or the ability to maintain or regain mental health, despite experiencing adversity". Studies addressing resilience in mental health grapple with intangible dimensions such as the relationship between "levels of stress associated with excessive, persistent or uncontrollable

adversity" and the "disruptive effects on brain function (and multiple organ systems) that can lead to lifelong disease and behavioral problems" (Herrman et al 2011:259). Insights from knowledge areas such as mental health add further persuasion to better understand and address the intangible as well as tangible conditions and relationships in various systems.

II.3. A Critical Approach to Resilience (Analysis)

As this first section illustrates so far, the notion of resilience is evolving and expanding its use in diverse disciplines. The understanding of the notion of resilience and its applications has different levels of development according to each discipline. Furthermore, in architecture and related design disciplines, the concept is still in very early stages of development and there is even caution pointing out the challenges towards considering it a paradigm, a conceptual shift, or even a relevant idea that contributes with anything new at all that could become a mainstream practice as has been with the case for *sustainability* (Alexander 2013; Resilient Design Institute 2014). Despite these doubts, there are 'symptoms' that suggest a necessity for following-up closely resilience as an emerging concept and a possible *paradigm* in the design disciplines.

According to Kuhn (1970:vii), a *paradigm* refers to "universally recognized scientific achievements that for a time provide model problems and solutions to a community of practitioners". Furthermore, Kuhn (1970), refers to *paradigms* as an approach that is (1) "sufficiently unprecedented to attract an enduring group of adherents

away from competing modes of scientific activity" and also (2) "sufficiently open-ended to leave all sorts of problems for the redefined group of practitioners to resolve".

Resilience: Symptoms of a Paradigm

i) Increasing trends in the use of resilience

The first 'symptom' refers to the increasing trend in the use of the terms resilience, resilient, resiliency and closely related concepts such as *sustainability* and *future proofing*. The tool Google Books Ngram Viewer[18] was used in order to perform a search of these three concepts on Google's database of digitized books up to date in 2013 within the range between 1800 and 2008. The graph displayed by Google Books Ngram Viewer showed the following trends:

Between sustainability, resilience and future proofing, resilience showed an increasing trend visible since the 1800's. Sustainability increased its presence starting in the 1980's surpassing resilience between the 1990's.

An extended search was performed using Google Trends[19] in order to determine the *interest over time* of these three concepts for years 2005 through 2015 (forecast) which showed a consistent increasing trend for the notion of resilience.

However, a distinction must be recognized within the various dimensions of the notion of resilience, as the presence of the concept in these digital databases differs among disciplines being *psychological resilience* the predominant topic. Using both

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[18] Google Books Ngram Viewer, displays a graph showing how those phrases have occurred in a corpus of books over the selected years. http://books.google.com/ngrams

[19] Google Trends: Analyzes a percentage of Google web searches to determine how many searches have been done for the terms entered compared to the total number of Google searches done during that time. http://www.google.com/trends/

Google Books Ngram Viewer and Google Trends, the terms psychological resilience, resilient design and disaster resilience were selected to identify which areas were contributing the overall use of the notion of resilience.

ii) Resilience and conceptual shifts

The second "symptom" refers to the fact of recognizing the importance of resilience as an emerging concept as it manifests conceptual shifts currently occurring in diverse disciplines suggesting a different way of understanding the relationship with nature.

J. Craig Applegath Architect Inc. (2014)[20] refers to the conceptual shift in reference to resilience (in design disciplines for the built environment) from a "pathological parasitic relationship with the planet towards a regenerative, mutualistic, and symbiotic relationship with the natural systems".

In Disaster Management, from where the resilience approach is derived in architecture and related disciplines, a conceptual shift was produced when modifying its approach focused in the vulnerability of communities (which concentrates on weaknesses to be improved in order to resist the impact of natural events) towards community resilience which considers the strengths and proactive capacity for recovery after natural events impact (Mayunga 2009).

[20] Symbiotic Cities Network

Resilience: Conceptual Challenges

In reference to conceptual challenges for the development of the notion of resilience, the following aspects are discussed: definitions, nature of the concept and similar concepts.

i) Definitions

In reference to conceptual challenges, lack of consensus on the definition of resilience has stimulated the development of working definitions by researchers in diverse knowledge areas. This process is necessary in the initial stages of development and understanding of a concept, when the complexity of its meaning is being defined and its operative potential developed. Table-1 illustrates definitions for the notion of resilience from diverse knowledge areas.

Table 1- Definitions of the Concept of Resilience

Author	Definition
(General)	
Walker *et al* (2004)	The capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks.
Hopkins 2014)	The three ingredients of any resilience system are diversity, modularity, and tightness of feedbacks.
UNISDR (2007)	The ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions.

Table 1- Continued

Author	Definition
(Ecology; Socio-Ecological Systems)	
Holling (1973:14)	Resilience: A measure of the persistence of systems and of their ability to absorb change and disturbance and still maintain the same relationships between populations or state variables.
Pimm (1984)	Resilience is the speed with which a system returns to its original state following a perturbation.
Holling et al. (1995)	Resilience is a buffer capacity or ability of a system to absorb perturbation, or the magnitude of the disturbance that can be absorbed before a system changes its structure by changing the variables and processes that control behavior.
Lebel (2001)	Resilience is the potential of a particular configuration of a system to maintain its structure/function in the face of disturbance, and the ability of the system to reorganize following disturbance-driven change and measured by size of stability domain
Walker et al. (2002)	Resilience is a potential of a system to remain in a particular configuration and to maintain its feedbacks and functions, and involves the ability of the system to reorganize following the disturbance driven change.
Folke et al. (2002)	Resilience for social-ecological systems is related to three different characteristics: (a) the magnitude of shock that the system can absorb and remain in within a given state; (b) the degree to which the system is capable of self-organization, and (c) the degree to which the system can build capacity for learning and adaptation.
Resilience Alliance (2002)	Ecosystem resilience is the capacity of an ecosystem to tolerate disturbance without collapsing into a qualitatively different state that is controlled by different set of processes. Thus, a resilient ecosystem can withstand shocks and rebuild itself when necessary. Resilience in social systems has the added capacity of humans to anticipate and plan for the future.
Millennium Ecosystem Assessment (2005)	Resilience refers to the amount of disturbance or stress that a system can absorb and still remain capable of returning to its pre-disturbance state.
Applegath et al. (2010)	The capacity of an ecosystem to tolerate disturbance without collapsing into a qualitatively different state

Table 1- Continued

Author	Definition
(Disaster Management; Community Disaster Resilience)	
Timmerman (1981)	Resilience is the measure of a system's or part of the system's capacity to absorb and recover from occurrence of a hazardous event.
Wildavsky (1988)	Resilience is the capacity to cope with unanticipated dangers after they have become manifest, learning to bounce back.
Buckle (1998)	Resilience is the capacity that people or groups may possess to withstand or recover from the emergencies and which can stand as a counterbalance to vulnerability.
EMA (1998)	A measure of how quickly a system recovers from failures.
Mileti(1999)	Local resiliency with regard to disasters means that a locale is able to withstand an extreme natural event without suffering devastating losses, damage, diminished productivity, or quality of life without a large amount of assistance from outside the community.
Comfort et al.(1999)	The capacity to adapt existing resources and skills to new systems and operating conditions.
Comfort et al.(2010)	Capacity for collective action in response to extreme events.
Adger (2000)	Social resilience is the ability of groups or communities to cope with external stresses and disturbances as a result of social, political, and environmental change.
Paton et al.(2000)	Resilience describes an active process of self-righting, learned resourcefulness and growth — the ability to function psychologically at a level far greater than expected given the individual's capabilities and previous experiences.
Buckle et al. (2000)	Resilience is the quality of people, communities, agencies, and infrastructure that reduce vulnerability. Not just the absence of vulnerability rather the capacity to prevent or mitigate loss and then secondly, if damage does occur to maintain normal condition as far as possible, and thirdly to manage recovery from the impact.
Pelling (2003)	Resilience is the ability of an actor to cope with or adapt to hazard stress.
Godschalk (2003)	A resilient city is a sustainable network of physical systems and human communities.
Walter (2004)	Resilience is the capacity to survive, adapt and recover from a natural disaster. Resilience relies on understanding the nature of possible natural disasters and taking steps to reduce risk before an event as well as providing for quick recovery when a natural disaster occurs.

Table 1- Continued

Author	Definition
(Disaster Management; Community Disaster Resilience)	
UNISDR (2005)	Resilience is the capacity of a system, community or society potentially exposed to hazards to adapt, by resisting or changing in order to reach and maintain an acceptable level of functioning and structure. This is determined by the degree to which the social system is capable of organizing itself to increase this capacity for learning from past disasters for better future protection and to improve risk reduction measures.
Paton & Johnston (2006)	Resilience is a measure of how well people and societies can adapt to a changed reality and capitalize on the new possibilities offered.
Maguire & Hagan (2007)	Social resilience is the capacity of social entity e.g. group or community to bounce back or respond positively to adversity. Social resilience has three major properties, resistance, recovery, and creativity.
(Mayunga J. S., 2009).	The capacity of communities and their built environment to mitigate, prepare for, respond to, and recover quickly from disasters, and adapt to new circumstances while learning from past disasters (Community Disaster Resilience)
(Urban Planning)	
Rich (2014)	About the development of urban social-ecological systems: urban futures that are more resilient and sustainable require an integrated social-ecological system approach to urban policymaking, planning, management, and governance
(Tourism)	
Tyrrell & Johnston (2008)	Ability of social, economic or ecological systems to recover from tourism induced stress.
(Heritage Conservation/Historic Preservation)	
Radoine (2013)	The concept of resilience, in relation to cultural heritage, means the capacity to recover dormant dynamic cultural resources, in order to contextualize contemporary urbanism. It is the ability of a city to regenerate its latent cultural memory and image. This cannot be achieved solely through formal preservation projects, but rather through social patterns, which maintain codes and values that are seldom fully in tandem with modern urbanism's forms and spaces.

Table 1- Continued

Author	Definition
(Mental Health; Community Resilience)	
Herrman et al. (2011)	positive adaptation or the ability to maintain or regain mental health, despite experiencing adversity"
	"the protective factors and processes or mechanisms that contribute to a good outcome, despite experiences with stressors shown to carry significant risk for developing psychopathology"
	"an interactive concept that refers to relative resistance to environmental risks or overcoming stress or adversity"
	"a dynamic process of positive adaptation in the context of significant adversity"
	"multi-dimensional characteristic that varies with context, time, age, gender and cultural origin, as well as within an individual subject to different life circumstances"
Abi-Hashem (2011)	"Resilience refers to the capacity of an entity or system to maintain and renew itself particularly in the presence of stressors, that is, when…challenged or threatened. Resilience can be observed as a dynamic phenomena [sic] in a variety of systems" (Neill 2006 para. 1).
Abi-Hashem (2011)	Bouncing back, enduring toughness, coping nicely, hanging-in-there, surviving well, recovering adequately, exhibiting strength, weathering tribulation (without cracking), being resourceful, springing forward, and overcoming. Other more technical terms to described resiliency may include: Hardiness. Elasticity. Toughness. Flexibility. Resurgence. Invulnerability. Tenacity. Resourcefulness. Pliability. Robustness. Mastery.
American Psychological Association (2015)	The process of adapting well in the face of adversity, trauma, tragedy, threats, or even significant sources of stress… Resilience is ordinary, not extraordinary… The road to resilience is likely to involve considerable emotional distress… Relationships that create love and trust, provide role models, and offer encouragement and reassurance help bolster a person's resilience.
Kulig (2000)	Community resilience: the ability of a community to not only respond to adversity, but in so doing reach a higher level of functioning.
(Material Properties)	
Haswell (1860)	The *Resilience* or toughness of a body is a combination of flexibility and strength.
Gong (2010)	The resilience of a connection refers to its ability to withstand destructive loading conditions that accompany a column removal (caused by accidental events such as explosion, impact, and fire) without premature rupture.

Filtering the commonalities and differences among definitions, the following structure is recognized:

Resilience is the capacity (type of capacity)

of a system (type of system)

to *bounce-back/respond/adapt/recover…etc.* (type of re-action)

from *impacts/disasters/disturbances/challenges…etc.* (type of action)

This general structure, present throughout the definitions for the notion of resilience, provides a series of ranges that must be clarified in order to make use of this concept. Table-2 summarizes the ranges to which each aspect is subjected and illustrates the differences among knowledge areas (e.g. the type of system; the scale addressed) but also different views within it (e.g. capacity as an inherent trait or as a constructed process).

In addition to these differences, establishing the type of actions affecting the system defined (e.g. impacts; disasters; disturbances; etc.) which in general refer to change, require considering both internal and external actions (e.g. the internal aging process of the human body and the external effects on the same body due to interactions with environmental conditions). Internal and external considerations link the initial system considered to apparently unrelated systems and also connections in terms of scale variations (e.g. a building component to a building to a district to a city, etc.).

Finally, the type of re-action (e.g. bounce-back; recover; adapt; etc.) will vary within the range of an equilibrium state (return to initial state) to a non-equilibrium state (a transformation occurs) which includes sequence of responses (in increasing order of transformation) from bouncing-back, recovery, adapting, healing, etc.

Table 2-Definition Ranges

Resilience is the capacity		
*What type of *capacity*?		
Inherent trait	<---------->	Constructed Process
of a system		
*What type of *system*? (A matter of scale; complexity; etc.)		
Micro	<---------->	Macro
to		
*What type of *re-action*? (Bounce-back; respond; react; recover; heal; etc.)		
(A) Recover (back-to a previous state) (B) Adapt (blend-in with change) (C) Heal (D) --		
Equilibrium approach (return-back to initial state)	<---------->	Non-equilibrium approach (transformation)
from		
*What type of *action*? (impacts; disasters; disturbances; challenges; changes)		
internal	<---------->	External

Each of these levels of ranges in the structure of definitions are tied to broader aspects: a) *Complex Adaptive* Systems; b) *building* capacity; c) Actions; d) Reactions.

a) (Complex Adaptive) Systems

The type of system defines the boundaries and scales of the object of study in resilience frameworks. The three terms involved in 'Complex Adaptive Systems' establish three characteristics: complexity refers to the presence of interconnected working elements; adaptability refers to the constant change that occurs; systems refers to the broad range of scales in which its elements interact. These three characteristics lead to three properties: unpredictability (hard to predict non-linear behavior),

contagiousness (things spread rapidly due to high connectivity) and modularity (systems are interconnected in sub-sets that not necessarily relate to others) (Stockholm Resilience Centre TV 2014).

The notion of resilience, originated in reference to ecological systems with Holling (1973), has expanded to understand systems where people and nature interact known as socioecological systems – SES (Carpenter et al. 2001). As stated by Anderies (2014:131), "the resilience concept emerged in response to failed resource management policy from the 1970's to the early 1990's" where coupling between social and ecological systems were neglected in understanding ecosystem dynamics. Furthermore, the effects of increasing scale of human activity is being considered as the "dominant driving force for earth system dynamics" suggesting a new geological era referred to as the Anthropocene (Anderies 2014:130).

As stated by Anderies (2014) resilience frameworks aim towards recognizing how these social-ecological systems involve *self-organizing* processes at *multiple scales* governed by *feedbacks*. Self-organization refers to how systems are "composed of independent agents interacting at local scales", and how the challenge for understanding change in a system depends on recognizing how these processes emerge and their effects (Anderies 2014:132). Multi-scale relationships are enhanced by globalization (local settlements and ecosystems linked in a global network) posing both opportunities (connectivity; networks) and challenges (uncontrolled dispersal of diseases; information). Scales refer in both temporal and spatial aspects. Feedbacks refer to the

"outcomes of the patterns of interaction between actors in the system and between actors and the environment that result from the incentives they face" (Anderies 2014:136).

b) (Building) Capacity

Resilience approaches aim towards (1) *mapping* the sequence of actions and reactions (learning-loop) in order to (2) *make visible* the multi-scalar interactions among elements of the system and its network of influence, and (3) *generate mechanisms* for building capacity to address challenges of diverse sort.

Once the mechanisms proposed are applied in the system, the cycle starts again by mapping how these mechanisms modify the actions-reactions chain, making visible interactions that emerge from these changes, and generating the appropriate mechanisms that enhance the capacity to cope with the new conditions.

The terms *address* and *cope* are chosen with the purpose of keeping the objective of how to respond to change in neutral terms. It is a result of the process of *mapping* and *making visible* what provides the understanding to define the type of reaction (or combinations) to pursue (e.g. survive; recover; adapt; heal; etc.).

Therefore, the most general definition of resilience would refer to 'the capacity of a system to address change', or 'the capacity of a system to cope with challenges of diverse sort'. The advantage of a general definition is that it recognizes the ranges presented in Table-2 (from inherent traits to constructed process) which acknowledges the notion of resilience as flexible rather than an automated result from modifying parameters in a map. This range will vary according to the scale (micro to macro) and type of system defined, as well as the lens (knowledge area) through which it is

approached. An example of this is concrete (the material, the structure) and how its capacity to perform through change (entropy; seismic events; etc.) can be improved through its overall form (architecture and structural design), the interactions among structural components (structural design), and recently as far as *healing itself*[21] (material science and engineering; biotechnology).

Capacities are therefore the boundaries in terms of what things *are.* Identifying what are the limits determine *what to do* with the system in terms of what it is capable to do. (Building) capacity aims towards identifying what are the potentials (not yet manifested) of what the system can do; testing the boundaries of what it can do before becoming something else (when it *becomes* something that is no longer what the thing *is*).

Current resilience frameworks move between defining inherent traits for the system as absolutes (what cannot change) to constructed (what changes as a result of a process of interactions). Developments in our access to things that exist are continuously challenging how we define this range and the boundaries of what things *are*. *Self-healing concrete* is an example of this as (building) capacity becomes a possibility at the constitutive level (micro) of *what the thing is*. Is concrete becoming an organic being? Does this make it something else?

In this sense, (building) capacity of a system would also depend on the purpose defined for that system. The capacity *for what/to do what*?

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[21] The Self Healing Concrete project aims towards using bacteria (calcite-precipitating bacteria) in the concrete mixture to develop self-healing abilities in the material that can lead to more durable and economic ways do design concrete structures (Delft University of Technology 2015).

c) Reactions

Resilience frameworks aim towards developing mechanisms for building capacity of systems *to perform in certain ways* (reactions) when *subjected to certain conditions* (actions). These reactions and actions are ranges as well. For resilience frameworks, developed from an equilibrium approach, reactions will refer to the process of bouncing-back or returning after a disturbance to the state or condition the system was before it occurred. Most resilience frameworks however, recognize that in every disturbance affecting a system there is always a transformation involved and it is not possible to return to the exact point before its occurrence (non-equilibrium approach).

Within this spectrum (from equilibrium to non-equilibrium), the kind of reaction is defined according to an initial evaluation of the capabilities of a system, but this can change as mechanisms of building capacities are identified after a *learning loop* of actions and reactions has been tracked. In this way the kind of reaction can range from responding, recovering, adapting, healing, etc. Each of these kinds of reaction, when defined, marks the purpose towards which mechanisms for building capacity to aim for.

Continuing with concrete (and reinforced concrete) as an example, the kind of reaction is defined by what we keep learning about what we know of this material (capacity) and its relation to actions that affect it. *Responding* or *withstanding* lateral loads in reinforced concrete structures was the purpose of a rigid, strength-based structural design approach; *Recovering* while controlling damage from lateral loads in reinforced concrete structures has been the purpose of a performance-based design approach (a balance between strength and ductility is the aim where acceptable levels of

damage are defined). *Adapting* concrete and reinforced concrete structures are the aim of form-based approaches developed by architecture and structural design where the behavior of the material is optimized as "finding good forms for structures" (Allen & Zalewski 2010). *Healing* is the approach in current research towards adding self-healing capabilities to the concrete mixture as mentioned previously (TUDelft 2015).

Defining the purpose is a planning/design decision that will define the mechanisms to build capacity which will in consequence feed the learning loop of what a system can do. From a holistic approach a system can involve all processes simultaneously (or a combination of them).

d) Actions

Actions and reactions are inextricably bounded. As a stimuli affecting the system, this aspect is also defined as a range: from internal to external conditions that provoke a change in the system. These conditions of change are better understood under the concept of *entropy*.

In thermodynamics, entropy refers to the dispersal of matter and energy. The Second Law of Thermodynamics states that "in an isolated system (closed system isolated in the universe), entropy never decreases". This means that ΔS (the change in entropy over time) is always going to be positive. "In other words, matter and energy are going to become disperse over time. In other words, randomness increases over time" (Andersen 2014).

This tendency of gradual decline into disorder constitutes the struggle in the real world. "In the real world (where things have a high amount of order), we can decrease

the amount of entropy in an isolated system but as we do we are increasing the amount of entropy of the surroundings" (Andersen 2014).

Development of the built environment is an example of this 'real world' behavior of entropy. The construction of the city (increasing order) is done at the expense of increasing entropy of natural resources from which materials are obtained. In order to maintain the order of cities (decrease entropy), entropy increases in surroundings.

Heritage sites are constantly deteriorating and when the rate of ΔS (the change in entropy over time) is positive, the efforts to restore to a defined state increase the entropy somewhere else.

An approach in disaster management connecting entropy and resilience is explained by Comfort et. al (2009) towards comparing the *rate of change*, of both the conditions that enable (resilience) and those which inhibit (entropy) the capacity of communities to respond to disasters in order to identify "the threshold at which communities can maintain sustainable management of risk". This study develops *network maps* in order to track interactions among organizations involved in the response phase after Hurricanes Katrina (2005) and Gustav (2008). The objective was identifying changes in either "strengthening collaboration" (resilience) or "declining interactions" (entropy) through time among organizations responsible for response operations. Findings suggested increasing resilience in response to Hurricane Gustave from lessons after Hurricane Katrina but showed increasing entropy as time passed and memory faded from the disaster occurrence (as previous experience had shown as well). Authors conclude on the importance of testing the balance between resilience and

entropy as conditions change over time, and refer to the role of improved information technology for continuity in management of information and networks maintaining an active balance between "the capacity to act to reduce disaster risk" (resilience) and "the shift in attention away from disaster risk over time" (entropy) (Comfort et al. 2009:310;317;322).

ii) Related concepts: Resilience, sustainability and future-proofing

As stated by Carpenter et al. (2001:765), "resilience has multiple levels of meaning: as a metaphor related to sustainability, as a property of dynamic models, and as a measurable quantity that can be assessed in field studies of socioecological systems (SES)".

In relation to sustainability, the notion of resilience in architecture and related design disciplines is in the initial stages of attracting groups that recognize a different way of addressing increasingly complex challenges in the built environment (especially in relation to climate change). From the web searches referring to symptoms of resilience as a paradigm, the trend towards attracting "an enduring group of adherents" is suggested as the first symptom. In reference to attracting them "away from competing modes" is suggested in the second symptom. The aspect related to the fact of being "sufficiently open-ended" is currently the case (there is not even a consensus on a definition) which generates the majority of confusion and suspiciousness among skeptics (to the point of being referred to as a buzzword). A fact that adds to this confusion is the use of aspects established already as describing sustainable practices as referring to resilience as well, e.g. from Applegath (2010) local materials, low energy input,

environmentally responsive, etc. Therefore what is being suggested is that a resilient approach must be sustainable as well. Or, in other words, sustainability is a requirement for resiliency. A system is not resilience if it is not sustainable.

Despite, the experience with clearly unsustainable cases such as the preservation of ruins in heritage conservation as being able to endure the pass of time and change for long periods of time in history, resilience of these cases becomes highly dependent on extraordinary efforts at the expense of economic and environmental costs (e.g. Restoration of the Parthenon in Athens, Greece). While these flows of energy and matter exist (as well as the political decision to make such investments), unsustainable system are able to respond to change (this could explain the emphasis of disaster management in an economic approach to resilience). This is however a fragile condition that a resilient approach will attempt to solve (develop mechanisms to improve the sustainability of the system).

Sustainability, a paradigm in Kuhn's terms, was defined in the Brundtland Commission Report in 1987 in 'intergenerational terms' (Tabb 2013): "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs"[22]. This open-ended definition did not set rules or established a metrics but defined a philosophical approach that made resonance with a reaction to "unintended adverse consequences to the environment" and

[22] *Report of the World Commission on Environment and Development: Our Common Future* from 1987 Retrieved from UN Documents: Gathering a Body of Global Agreements.

"dependence on fossil fuels" that started to be manifested in the 1960's as an "awareness of holistic environmental thinking" (Tabb 2013:1).

Developments until today in architecture aim towards working out solutions to develop rules and metrics in a stage where the paradigm is being adjusted (Kuhn 1970: 53). A subsequent (on-going) stage constitutes reaching the point where the paradigm becomes a default (Kuhn 1970:53) or reaches an ethical approach are referred by Elliot (1993) as *environmental ethics* in general. Furthermore Delancey (2004:147) refers to environmental ethics as providing "something new to architecture: decisive ethical design criteria".

Design criteria based on a sustainability approach have evolved as "an ongoing process and continual refinement toward greater architectural and urban responses to the environment" referred to by Tabb (2013:179) as the *greening of architecture*. This "evolutionary process" informed by "significant world events, climate change, environmental theories, movements in architecture, technological innovations and seminar works in architecture and planning", has moved from the 1960's with remediation approaches due to the awareness of environmental problems to approaches towards holistic models of architecture in the 2000's (Tabb 2013).

Another term closely related to resilience and sustainability (in architecture) is *future-proofing*. Future-Proofing, a concept used mainly in contexts outside of the United States and only recently used (past twenty years) in architecture, engineering and construction (AEC) industries, is understood as "the process of anticipating the future

and developing methods of minimizing the effects of shocks and stresses due to future events, can help guide the rehabilitation process to optimum results" (Rich 2014:33).

Key aspects from other disciplines referring to the use of this concept that are related to the notion of resilience are (Rich 2014:34):

- From electronics industry: "Ability of a system to be reused and to be flexible in order to continue competing in the marketplace" (Thomas et al. 2003:150)
- From water management: "Forward planning for future development and increased demands on resources" (Bloomer and Page 2012:i-vi)
- From industrial design: to encourage people to acquire fewer products by creating objects that hold more value for the purchaser; *atemporal* degree in products (Kerr 2010).

In regards to existing buildings Rich (2014) refers to the notion of future-proofing as used in reference to 'sustainable preservation strategies' (Cassar 2009):

- Incorporating *durability* as a metric for evaluating buildings in sustainable rating systems.
- Engaging historic buildings in the process of 'adaptation to climate change', lest they become redundant and succumb to 'environmental obsolescence' (Cassar 2009:7).
- 'Long life, loose fit' strategy to managing historic buildings' (Cassar 2009:8): sustainable design protocols adapted to particular circumstances of each building.
- 'Heritage must adapt to changes, physical and intellectual, within its environment' (Cassar 2009:10).

Also in Rich (2014) a reference is made to a proposed set of principles of future-proof buildings from CMS (2013): Smart energy use; Increased health and safety; Increased lifecycle duration, Increased quality of materials and installation; Increased security; Increased sound control for noise pollution; Adaptable spatial design; Reduced carbon footprint.

Similarities between *future-proofing* and *resilience* in reference to existing buildings (heritage) as referred to in Rich (2014:37) are summarized in the following concepts: "redundancy, diversity, flexibility, durability, adaptability, and local resources such as materials and labor, to anticipate systematic shocks in a changing future."

Resilience: Operational Challenges

i) Parameters and indicators

Operational challenges refer to the identification of parameters and indicators and their interactions within each field of study. Establishing how these parameters and indicators are defined and measured, as well as establishing how they interact with each other is also defined according to the approaches and methods specific to each knowledge area (or specific views of it). Table-3 summarizes the key approaches identified within different disciplinary areas in reference to resilience.

Table 3- Approaches to Resilience from Various Areas of Study

Areas of Study	**Concepts and Foci**	**References**
Physics (resilience in material properties)	Combination of flexibility and strength.	Haswell (1860)
Ecology (engineering resilience)	Focuses on efficiency, control, constancy, and predictability; stability and equilibrium. Self-contained closed systems. Homogeneity.	Holling (1996)
Ecology (ecological resilience)	Focuses on persistence, adaptivity, variability, and unpredictability; non-equilibrium; Open systems; Heterogeneity.	Holling (1996)
Structural Engineering	Focuses on properties to withstand destructive loading conditions without premature rupture.	Gong (2010)
Urban Planning	Uses natural and physical parameters from ecology. In addition includes human ecosystem, social processes, and participatory mechanisms.	Herrman et al. (2011); Pickett et al. (2004)
Disaster Management (Community Disaster Resilience)	Capital approach focused on an economic view of sustainable community development. Five forms of capital a community can utilize in building resilience: Social, Economic, Physical, Human, and Natural.	Mayunga J. S. (2007); Islam, Merrell, & Seitz (2010)
(Mental) Health	Focuses on positive adaptation; dynamic developmental process; protective factors. Recognizes Personal, Biological, and Environmental-Systemic Factors and their interactions.	Herrman et al. (2011); Montpetit et al. (2010)
Tourism	Focuses on social, economic and ecological systems. Other approaches include human-environmental relationships that include ethnic and cultural aspects.	Farrell (2004); Tyrrell & Johnston (2008); Cochrane (2009); Jamal (2013)
Heritage Conservation	Focuses on environmental, economic and social aspects. Recognizes the value of culture, community´s emotional links, societal constructs, identity and wellness.	Milligan M. (1998); Edson (2004); Spennemann (2007); Rypkema (2009)

ii) Relationships between parameters

Three different ways of understanding how intangible (corporeal) and tangible (incorporeal) parameters interact are recognized in resilience frameworks.

The first one referred to as a *divide approach*, where relationships between tangible and intangible aspects of a system are addressed separately (a divide is manifested).

The second one referred to as a *collaborative approach*, where relationships between tangible and intangible aspects of a system are recognized as coexisting and collaboratively affecting the system overall without affecting each other.

The third one referred to as a *symbiotic approach*, where relationships between tangible and intangible aspects of a system are recognized as affecting each other (mutualistic relationships) and the system overall.

All three approaches can coexist in a resilience framework as subsequent stages for mapping relationships as different types of information is gathered from each one, and also associated to different kinds of reactions defined.

II.4. Case Example: The Alamo (San Antonio, USA)

An example of the type of information that can be gathered from each type of relationship is the case of the use of preservation technology in the on-going project for the development of a preservation management model in the Alamo San Antonio de Valero Mission (Texas, US). This discussion was presented under the title "Technology, Preservation Education and Managing Change in the Alamo" (co-author Robert Warden) at July Conference of the National Council for Preservation Education (NCPE) co-

sponsored by the National Center for Preservation Technology and Training (NCPTT), held in Natchitoches, Lousiana on 2014.

This conference paper presentation, aimed to contribute towards understanding the role of current developments in documentation, recording and monitoring technologies in the emerging efforts in preservation education towards managing change in heritage sites. The development of a preservation management model for the Alamo historic mission (San Antonio, Texas) using cutting-edge documentation equipment and computer-aided design software by a team from the Center for Heritage Conservation (CHC) at Texas A&M University in collaboration with other institutions was presented. The CHC leads the effort to create digital models to track erosion due to rainwater and the effects of temperature changes on the structure, reconstructing how the Alamo existed in three representative historical periods (1836, 1885 and 1961), and providing a database to help keep track of preservation work and maintenance issues currently in development.

The Alamo was used as a case example in order to show how state of the art preservation technology enhances the capabilities for managing change in heritage sites and contributes towards developing new trends in preservation education that, on one hand, embrace tangible remains as dynamic and prone to continuous reinterpretation, and on the other hand, recognize an increasing role of digital resources as improving the public accessibility to heritage knowledge and triggering the potentiality for integration of developing technologies in diverse disciplines.

A discussion introducing the preservation technologies relevant to recording, documenting and monitoring used in the Alamo was performed in order to establish a state of art and the contributions of this particular case. The various preservation technologies involved are then explained as integrated within the preservation management model developed, and their role in providing new opportunities for managing change and expanding the impact of preservation education is explained.

Technology, Preservation Education and Managing Change

Recognizing change as part of the process by which heritage is continuously transforming constitutes a key concern today. From a tangible perspective, efforts in heritage conservation focus on mitigating the effects of these uncertainties in the material by making use of advanced developments in technology which are applied from the stages of recording, documenting and monitoring, all the way to stabilizing and repairing actions.

The developments in preservation technology and complementary innovations in other disciplines such as structural analysis and material science, as well as increasing capabilities in tools such as photography, photogrammetry, 3D laser scanning, Computer-aided-design, etcetera, are providing an exponential growth in the amount and quality of data that becomes available. Therefore, each heritage site constitutes vessel that contains potential unlimited information and acts as a canal that connects past with future through our partial and limited but continuously evolving understanding of the present.

The notion of change, then, is a *key* here as well. On one hand, changes in the social, economic, natural and built environments that interact and affect heritage sites. On the other hand, changes in the technology available that enhances our senses in order to understand these phenomena. The use of heritage sites as potential containers and canals of information/knowledge is therefore the role of preservation education acting as an interface in order to understand the diverse dimensions of change. Each case study constitutes a potential database and is used to transmit the knowledge that from it is produced.

However, this process that is traditionally a method in preservation education encounters challenges due precisely to the nature of the notion of change. Change is unstable and dynamic. Unforeseen relationships and interactions occur among tangible and intangible aspects in heritage. Therefore, any effort in preservation education must, in first place recognize that preservation actions, as a design discipline, also impact the heritage site; therefore, on second place any interface must be flexible and open enough as to incorporate and recognize new variables taking place. In other words, preservation education must be active in *generating mechanisms* to include, through understanding, the evolving consequences of change from diverse sources.

The Alamo (San Antonio, Texas)

The Alamo San Antonio de Valero Mission was established at the present site of San Antonio-Texas by laying the cornerstone of the chapel in 1744. Founded for the purpose of Christianizing and educating Indian converts, the mission has a history of continuous changes. Its purpose as a mission began to wane after 1765 and was

abandoned in 1793. In 1836 the siege and final assault on the Alamo constitute the most celebrated military engagement in Texas history. "For many Americans and most Texans, the battle has become a symbol of patriotic sacrifice" (Hardin 2014)[23].

After the fall of the Alamo, the building was practically in ruins. Other uses after the 1836 battle include its role "as U.S. Army Quartermaster Depot warehouse and eventually a memorial to Alamo defenders" (TGLO 2014). These changes in uses constitute the subsequent alterations on the material remains of the Alamo complex.

"More than 2.5 million people a year visit the Alamo complex which houses exhibits on the Texas Revolution and Texas History". In its contemporary function as a heritage tourism destination, the Alamo is "dedicated to educating all visitors, either online or in person, about the history of the Alamo and its importance to Texas and the nation" (TGLO 2014).

i) The Alamo Challenge

From a preservation perspective, the problem in the Alamo is *multi-faceted*. The Alamo is a living-dying, changing structure (as all heritage is) that requires constant care and maintenance. Current conservation efforts are in charge with not only identifying the necessary maintenance required but also in detailing historic questions that remain from the building.

Over the last few years the Alamo has hired conservator Pam Rosser to assess, conserve and document the conditions of the historic buildings, while overseeing long-term preservation projects. The assessment of the Alamo church includes examination of

[23] TSHA – Texas State Historical Association

the condition of the limestone, mortars and plasters from the Spanish mission period to present. The process of registering this information is done by hand through detailed damage maps in order to identify and locate material and historical evidences on the fabric.

Problems with this methodology are, on one hand, the possible loss of all this information due to the fragility of the media used to document which is paper. On the other hand, the data registered provides limited accessibility by other disciplines involved in preservation efforts simultaneously as it is a very personalized record. Furthermore, the addition of subsequent information to the initial registries becomes problematic as the media is static and closed.

Therefore, two challenges that can be observed are: on one hand, the necessity to integrate the diverse and extensive amount of data that is produced within the Alamo as a case study in order to make use of this information as knowledge for decision-making. On the other hand, the transformation of knowledge into accessible resources for the diverse type of audiences related to the heritage site.

ii) The Alamo Project

In order to address these challenges, a team was formed composed by the Center for Heritage Conservation from Texas A&M University, Texas A&M University at Kingsville, the University of Texas at Austin and the University of Texas at San Antonio. The overall concept proposed by this team was to develop and organize a digital repository of information that would be non-proprietary (not tied to a particular software) and be web-based in order to be accessed by diverse groups of people. The

purpose is developing an online searchable database to help keep track of preservation work and maintenance issues currently in development.

The Alamo digital database being proposed is inspired by digital databases that are capable of managing great amount of data, linking diverse types of information and are designed for easy access throughout a visual interface. One example is Google Earth. An application of the concept for a digital database is provided by the Arches Project. "Arches is a new open-source geospatial software system for cultural heritage inventory and management, developed jointly by the Getty Conservation Institute and World Monuments Fund." (WMF 2014).

In order to address the Alamo Challenge, the CHC at Texas A&M University evaluated the idea of using Arches considering its characteristics as a common platform, easy to use, customizable, and open-source software system. Furthermore, its specific design to serve the heritage field seemed appropriate for the Alamo project. However, after an initial assessment, the team determined that Arches would not fit exactly the type of data handled for the Alamo due to the size and type of files obtained from the use of technologies such as the 3D laser scanner, Giga-pan, photogrammetry, etc.

Therefore, the team proposed developing a digital database system based on the Arches Project but made specific for the size and type of information handled. In the same way Google Earth and Arches Project are systems with a database that is continuously renovated, and provides a visual interface for easy use, for the Alamo Project, the same purpose was the goal: providing a *friendly* system for current preservation works to be documented in visual and text form.

iii) Three levels of information (knowledge)

Three levels of knowledge can be identified from the process developed for the Alamo Project: The *first level of knowledge* (a) refers to the data obtained through processes of documentation in the Alamo using different types of technologies and processes such as photography, 3D laser scanning, photogrammetry, etc. The *second level of knowledge (b)* refers to the information obtained by integrating first level data in the preservation management model proposed. The *third level of knowledge (c)* refers to the information developed by making the Alamo digital database and the process by which it is made available as an open source that is transferrable for new trends in preservation education.

a) First level of information (knowledge): 2D and 3D

One of the sources available are drawings from the Historic American Buildings Survey (HABS) archive. The Center for Heritage Conservation is currently checking and adding information that is available today through the use of high resolution photography. For example, overlapping photographs on current CAD software, drawing stone-by-stone in the facades is being done.

Currently the conservator is checking stone-by-stone of the west façade in order to classify the types and levels of erosion in order to locate in elevations and include as data for the digital database. A question that arises from this process is why drawing it if you have photographs? For the Alamo Project, drawing what is already available in photographs is done in order to make easier the process of recognizing subtle differences between stones and plaster and other characteristics which are difficult to recognize from

photos. Another reason is generating a baseline recording what is there now for tracking changes in the future.

One of the technologies used to obtain the high resolution photographs that enable zooming in and out without losing the quality of details is the Gigapan. "Gigapans are gigapixel panoramas, digital images with billions of pixels. They are huge panoramas with fascinating detail, all captured in the context of a single brilliant photo" (GigaPan 2014).

From the panorama view of the west façade, zooming in the high resolution image provides still high quality details. The capability of zooming in and out without losing quality provides many uses for the database such as documenting a visual inspection, using as a template to draw stone-by-stone for completing the existing HABS drawings, or locating where mortar samples have been taken.

The CHC leads the effort to create digital models to track erosion due to rainwater and the effects of temperature changes on the structure, reconstructing how the Alamo existed in three representative historical periods (1836, 1885 and 1961). Digital models are being created using 3D sketchup.

3D models obtained directly from documenting the existing complex are obtained through the use of photogrammetry and 3D laser scanning.

A difference comparing the Alamo digital database from Google Earth is that the data from the building is collected as a complete entity (with exterior and interior), therefore providing additional information such as the width of a wall. A challenge for the development of the database refers to the selection of how to present this information

as 2D and 3D provide each different benefits and complications. Until now all information is being gathered in 3D but is being presented in 2D considering that the conservator is specifically interested in the wall plane. For future purposes in the case of the west façade, the 3D information of the erosion in the surface would be available for monitoring purposes.

b) Second level of information (knowledge): Preservation Management Model

The preservation management model for the Alamo, based on the concept of an open source digital database, provides in its vision a second level of knowledge due to its capabilities to integrate the data obtained from the diverse disciplines involved in current preservation projects in the site.

The 2 and 3D highly detailed models currently in development are integrated with information regarding erosion due to rainwater and the effects of temperature changes on the structure. For the ongoing conservation works, this digital template will allow including observations from cleaning efflorescence; locating and characterizing discoveries from pieces of polychrome that date from different periods, graffiti (painted, carved and scratched), plaster types and locations, paint types and locations; etc.

These aspects are referred as a second level of knowledge due to the expanded opportunities for making integrations that provide new information. For example, for the mortar analysis being developed parallel to the models, locating and characterizing in the models within the digital database these findings, enhances the capabilities of the information that is triangulated to recognize easier possible patterns in the material

composition that might be related to other aspects registered such as historical records of possible repointing, replacement of stone, etc.

In the same way, thermal imaging simultaneously performed and located in the models within the database can be easily visualized as providing information about water penetration issues that can be connected as well to changes made on the wall (such as an infill that is invisible to the naked eye).

The possibilities of an endless triangulation of information and visibility of connections become available. For the conservator is the opportunity for enhancing her capacity of observation by zooming in and out as required.

Finally, this system provides a link between past, present and future. A baseline is set with the current state and the 2 and 3D models linked with continuously updated data becomes an ongoing database to add-on and track the behavior of material and structure. As well as allowing to include future discoveries. Even simulations can be developed in order to speculate about the future by modifying parameters.

c) Third level of information (knowledge): Reaching the community

Despite the technological-oriented nature of the preservation management model for the Alamo, the capabilities of this system to reach increasing amount of public generates an opportunity for preservation education to increase its role in promoting awareness for the value of this heritage site and to interpret the feedback from its users. Disciplines such as tourism studies and sociology are continuously providing insights by considering the relationships between heritage and society. Furthermore, keeping in mind the contemporary role of The Alamo as a tourism destination visited by more than

2.5 million people a year becomes a baseline for the education impact of the site and the importance of updated information that obliges reinterpretation of the past.

The vision in the future for the preservation management model to become a web-based resource for Open Access (OA) to the public transforms this peer-controlled database into an interactive interface where unforeseen relationships can develop. The digital Alamo database open to the public not only for transmitting knowledge but as an opportunity for feedbacks.

II.5. Conclusions

Resilience is currently in advance stage of development in areas where parameters and indicators, and their relationships have been defined. In architecture (and areas that focus on the built environment) it is rapidly growing triggered by challenges related to climate change and disasters. Using the sustainability paradigm (still in development) as an example, a list of stages of overall development can be identified:

(1) First, a concept emerges that 'makes sense' within a worldview (e.g. relationship with nature)

(2) Second, the concept is defined (a definition is produced with a specific realm).

(3) Third, parameters and indicators (metrics are defined), and the relationships among them are established within the system defined once the paradigm is considered secure.

(4) Fourth, a set of guidelines are produced for decision-making (e.g. environmental design)

(5) Fifth, regulations and certifications are produced to control and/or encourage its practical and extended use (e.g. LEED).

(6) Sixth, its extended use becomes the default and adjustment of the paradigm is completed to the point it changes a previous worldview (e.g. relationship with nature).

Sustainability as a paradigm continues in the iterative process of refreshing each of these stages, and has indeed reached all six of them, e.g. "Environmental Ethics" (Elliot 1993). The continuous revision of the paradigm for the design disciplines "is informed by significant world events, climate change, environmental theories, movements in architecture, technological innovations and seminal works in architecture and planning throughout each decade over the past 50 years[24]" (Tabb 2013).

Based on similar reasons and triggered by the occurrence of natural disasters which have affected cities with a high impact such as New Orleans (Hurracane Katrina in 2005) and New York City (Super storm Sandy in 2013), an 'anomaly'[25] has been detected despite all efforts achieved through sustainable design, which found some sort of relief under the promises of the emergent notion of resilience being used in diverse disciplines.

However, exactly what the anomaly is and what solutions a resilience approach in architecture and related design disciplines are, is currently in discussion (stages 1

[24] 1960-2010.
[25] Anomaly is used in the way Kuhn (1970:52) refers to "the recognition that nature has somehow violated the paradigm-induced expectations that govern normal science".

through 4). In other words, resilience in these disciplines is still in a pre-paradigm period characterized by "frequent and deep debates over legitimate methods, problems, and standards of solution" (Kuhn 1970:48). Which does not mean it is in a latent state; it is quite the opposite, continuous decisions are being made in terms of promoting the concept such as the campaign "100 Resilient Cities" pioneered by the Rockefeller Foundation which 'explores city resilience' from four dimensions: (1) health & wellbeing; (2) Economy & Society; (3) Leadership & Strategy; (4) Infrastructure & Environment. This global initiative addresses not only challenges related to natural hazards (e.g. earthquakes, fires, floods, etc.) but also "the stresses that weaken the fabric of a city on a day to day or cyclical basis (e.g. high unemployment; overtaxed or inefficient public transportation system; endemic violence; chronic food and water shortages; etc.) (Rockefeller Foundation 2015).

Furthermore, supported from this initiative are the reports on a "City Resilience Framework" by ARUP International Development (2014) developed to give cities "a tool to understand their resilience; to shape urban planning, practice and investment" Da (Silva, J., & Morera, B. 2015). In this report the stages of overall development for resilience as a paradigm head to reaching the point achieved by other disciplines such as disaster management which are already in the point where resilience as a paradigm is secure and efforts are focused on testing the reliability of models for measuring indicators. In these reports a definition of resilience is established referred to as "an accessible, evidence-based definition of resilience" (city resilience); four parameters of resilience are established (health & wellbeing, economy and society, leadership and

strategy, systems and services); and twelve indicators are used. Arup announces further improvements in order to create the City Resilience Index: "which will introduce the variables through which city-scale resilience can be accurately measured" (Silva, J., & Morera, B. 2015).

This process of development of the paradigm for planning follows the path from Disaster Management, with models that use the Community Disaster Resilience Index (Mayunga 2007; 2009) in order to compare cities and establish the areas in which investment and specific actions are required.

Among the design related disciplines, planning, whose methods and scale are closely related to disaster management, is at the forefront of consolidating resilience as a paradigm. At the scale of (historic) buildings and (heritage) sites, resilience is closely tied to references in relation to sustainability and 'good building practices' aiming towards durability (service life; building to last) (Rich 2014). Rich (2014) also refers to "adaptive design" in the sense of identifying and promoting "synergies between adaptation and mitigation, as well as aspects for "reducing non-climatic sources of stress and adapting to the adverse consequences of climate change"[26], which start to suggest additional considerations beyond sustainable aspects.

In the scale of building components, Rich (2014) cites Cassar (2008) who refers to "damage mitigation strategies for materials and assemblies" (which again refers to aspects of durability). Rich (2014) refers to this aspect as considerations for both resilience and future proofing, and the truth is, 'durability' is also a characteristic of a

[26] In Rich (2014) from UNESCO (2007:11)

sustainable approach. Therefore, so far at the scale of architecture (building and sites), the confusion of a pre-paradigm stage is more evident.

For resilience in heritage conservation we are witnessing a process that relate to developments in architecture in general promoting “resilient design” currently in the process of identifying parameters to address solutions for recovery and prevention in hazard prone areas. Design disciplines related to the built environment are therefore simultaneously advancing within the first three steps of overall development towards a resilience framework for decision-making.

Figure 1. View of The Alamo from the Emily Morgan Hotel (Manrique 2013)

CHAPTER III

INTEGRATED APPROACH TO RESILIENCE IN HERITAGE CONSERVATION AND HERITAGE TOURISM

III.1. Overview

Heritage tourism and heritage conservation (aka historic preservation) share common interests in terms of heritage management. An integrated approach to heritage conservation and heritage tourism is seen to be integral to the overall sustainability of cultural heritage destinations, from the past to the present and the future (see McKercher and DuCros 2004; Hall and McArthur 1998; Rabady and Jamal 2006).

Jamal (2013), and Tyrrell and Johnston (2008) acknowledge the importance of approaching sustainability goals in terms of the relationships between environmental, social and cultural aspects of resilience, but little has done in tourism research to further explore these interrelationships. As argued further below, *cultural resilience* is an important but ignored aspect of in managing change in heritage sites. Cultural resilience offers a vital bridge and common ground between heritage and conservation and heritage tourism—both of which share culture and cultural heritage as common grounds of interest, both of which must be approached from an *integrated* approach if long-term sustainability is desired (McKercher and DuCros 2004).

III.2. Cultural Resilience within a Resilience Framework

Heritage conservation (HC) and heritage tourism (HT) are integral considerations in the management of cultural heritage sites, and must be addressed as a joint effort. The use and conservation of cultural goods (including cultural heritage goods) is a common

ground to HC and HT and the differences in approaches from each knowledge area can enable opportunities as well as challenges for sustainable heritage management. Tourism is a source of significant impacts on the material fabric of heritage sites, in addition to the natural challenges (e.g. environmental) and physical processes of decay (e.g. durability), decision making on tourism development and marketing must be done in close collaboration with HC managers and professionals. Similarly, HC decisions can generate significant challenges for tourism managers when preservation decisions are made unilaterally without partnerships and collaboration with key public-private stakeholders in tourism, enabling more effective consideration of visitors and the use of the heritage site in its contemporary function as a tourism destination.

An integrated approach to resilience in HC and HT therefore starts with the process of recognizing a range of intangible and tangibles values within the HT-HC system itself and in relationship to other knowledge areas or dimensions (e.g. community disaster resilience in risk management). The literature review of resilience studies presented earlier shows there are important parameters that cross-cut many of the knowledge areas mentioned (natural, physical, economic, human, social, etc.), However, indicators and methods are being developed within generally mutually exclusive, isolated knowledge domains despite some obvious common ground and the potential to develop mutually valuable resilience parameters among knowledge areas. An integrated approach to HC and HT helps to transcend such ‘disciplinary’ exclusivity and better identify and address the tangible and intangible aspects of culture and heritage that are of common concern. The field of Architecture and HC studies have advanced mechanisms

and tools for long-term sustainability and are starting to address resilience, but little is understood in both these areas about how best to address intangible cultural heritage from a sustainability and resiliency perspective. The notion of *cultural resilience* is used to commence a discussion on this important parameter. The term *cultural resilience*[27] is used broadly at present to encompass intangible as well as tangible cultural, historic and heritage aspects of the destination, but defining this term is a work-in-progress, noting that definitions of resilience are currently evolving and changing in various study areas, and culture is dynamic and imbricated in broader social-ecological systems" (Crane 2010; Picon 2005). It cross-cuts human and social parameters in resilience frameworks (see Table-4) from both a tangible (e.g., built heritage) and intangible (e.g., oral traditions, shared values and ethics) perspectives.

Important contributions on understanding complex relationships between heritage, culture and society are provided by diverse knowledge domains such as Anthropology (Adams 2005). The study of mental health mentioned earlier recognizes how tangible and intangible aspects of a system not only relate to each other (as in a correlation) but actually *modify* structures and relationships with the system, therefore affecting its overall capacity to address challenges of diverse sort. New learnings of *complex adaptive* systems from ecology as well as tourism studies can help to understand how intangible aspects of culture (e.g. values and meaning) interact with

[27] A definition of cultural resilience is provided by Crane (2010:2) in relation to social-ecological systems "as the ability to maintain livelihoods that satisfy both material and moral (normative) needs in the face of major stresses and shocks; environmental, political, economic, or otherwise."

tangible, material structures to influence or change each other, thereby affecting the resilience of a heritage site for instance, the state in which the material fabric in a ruin is maintained, etc. are a physical manifestation of values underlying preservation and tourism approaches. These relationships are complex, dynamic, organic and political. Visitor participation in the heritage destination contributes to the alteration of the material but the opposite is true as well, the alteration of the material by heritage conservation interests can modifies the perception of the participant. This mutual interrelationship and alteration of parameters is an important consideration in understanding the capacity of the heritage site to address short-term systematic and long-term sustainability challenges.

An important first step lies in transcending 'disciplinary' barriers, drawing on various knowledge domains that are studying resilience and developing an integrated framework for addressing resilience in the HT-HC system. Heritage conservation studies and Architecture in general already collaborate with knowledge areas such as engineering, conservation sciences, etc. in order to address problem-solving related to the tangible aspects of heritage sites. Examples of not doing so have been widely exposed as catastrophic mistakes (e.g. structural collapse of historical constructions). However, much needs to be done in HC to address human-environmental and other intangible cultural heritage that are often closely related to material heritage and other physical built structures and material landscapes. A similar challenge lies in the area of HT studies, where 'integrated' or sustainability discourses in the past have focused on built heritage, stakeholders and policy, visitor management and marketing, for instance

(see Chabbra 2010; McKercher and DuCros 2004; Hall and MacArthur 1998), while the intangible cultural heritage, human-environmental relationships, ethical perspectives, etc., continue to be poorly recognized and therefore under-studied.

The rich base of knowledge that is being gathered in various academic areas on the study of resilience is currently encouraging complex understandings of systems and offering new ways to address common challenges (e.g. climate change). This exploratory study of resilience in several knowledge domains that appear helpful to better understanding the HT-HC system has led to identify an important bridge between these two knowledge domains (HT and HC). The argument here is that developing the notion of *cultural resilience* helps to bring to light the importance of an *integrated* approach to HC and HT planning, development, and management, as: (i) The intangible and tangible aspects of culture and cultural heritage can be better identified and included in the framework of destination resilience; and (ii) The importance of a collaborative, integrated approach to the use and conservation of cultural heritage becomes even clearer when *cultural resilience* is identified as a key parameter of *destination resilience*, to be studied along with the economic, social, physical, natural and human parameters identified by other areas of academic study as was presented in Table 3 - Approaches to resilience from various areas of study (Chapter-II) . It should be noted that the literature review as summarized in Table-3 was limited in range, but it does, however, reveal some useful insights and parameters for developing such an integrated approach for cultural resilience in the HT-HC system.

Developing an Integrated HT-HC Resiliency Approach

Table-4 offers additional support to this important endeavor. The components, items and indicators shown in Table-4 are drawn from the well-established literature on resilience in disaster management studies, where research has been undertaken in terms of developing resilience to increasing environmental impacts and threats from climate change at the site level. This area of common concern to both HT and HC is used to illustrate how a resilience-based framework might be compiled, drawing from relevant knowledge domains. Items within Table-4 can be used as components and indicators to address each key parameter of *destination resilience*: Natural, Physical, Social, Economic and Human. However, as Table-4 shows, the disaster management literature has tended to address resilience primarily from an economic and quantitative (measurable) perspective. Qualitative items and intangible impacts and issues related to resilience, or even ethical issues that may be related to it, are 'invisible' or are sometimes addressed quantitatively. In Mayunga (2009:55, 218, 223, 227), for example, the component 'religious participation' is measured using as indicator the amount (number) of 'religious organizations'; or 'community attachment' is measured using as indicator the amount (number) of 'owner-occupied housing units'.

Table-4 shows solely items from the literature review conducted on resilience; it does not include general items common in the tourism literature as this would be best left to future research. Of course, future development of an integrated HT-HC framework for destination resilience should include 'culture' as a new parameter when

expanding Table-4. Review of the resilience literature thus far has uncovered this to be a vital yet under-studied dimension.

Table 4 – Resilience Items Drawn from Disaster Management (Mayunga 2009)

Parameter	**Key Items**
Natural	Natural resources (water, minerals and oil), land to live and work, ecosystems that maintain clean water, air and a stable climate.
Physical	Construction services (Building construction establishments; Heavy and civil engineering constructions; Highway, street, and bridge construction establishments; Architecture and engineering establishments); Environment; Land and building regulations; Planning; Property insurance.
Social	Volunteerism; Sociability; Civic and political participation; Religious participation; Community attachment; Connections in work place (professional organizations, business organizations). Networks; norms; social trust;
Economic	Income; Employment; Home value; Business; Health insurance; Financial resources: savings, income, investments, and credit.
Human	Working capabilities of population to sustain economic production. Education; Health; Construction services; Environment; Land and building regulations; Planning (Population employed in: landscape architecture and planning services); Property insurance; Mitigation plans.

Indeed, various authors have recognized the difficulty of translating social and cultural aspects of resilience to ‘simple measurement’ (Tyrrell & Johnston 2008), or have acknowledged how the literature on resilience “implicitly privileges the material,

both in terms of ecosystem functions and human-livelihood outcomes" (Crane 2010:2). The importance of cultural aspects in relation to the notion of resilience has been suggested by Radoine (2013; see also Tyrrell & Johnston 2008). The United Nations recognizes the necessity for "a more visible and effective integration and mainstreaming of culture in development policies and strategies at all levels", and UNESCO[28] claims on the contribution of culture not only in reference to "quantitative economic growth (income, employment), but also of qualitative standards of equity and well-being" (Bandarin, Hosagrahar, & Albernaz 2011:1). An important task lies ahead to build on such acknowledgement of the 'missing' dimension identified as a valuable bridge for an integrated approach to resilience in the HT-HC system. A small start is presented towards undertaking this challenge with a few items for consideration in Table-5. Table-5 indicates that tangible and intangible dimensions and processes must be addressed, i.e., not just physical measurable items, but also cultural, relationships, values, and the meaning held by cultural sites, places, things and relationships.

The relationship of *cultural resilience* to sustainability can be observed here in terms of the capacity (as process) of the site to respond to change over time, where change is considered not only in terms of tangible, quantitative items and values (e.g., what is being sustained in physical terms, economic costs, built and material heritage and tourist revenues), but of also intangible cultural goods (oral traditions and customs, practices, etc.), and qualitative aspects that are especially hard to identify, such as issues

[28] UNESCO-United Nations Educational, Scientific and Cultural Organization (UNESCO | building peace in the minds of men and women.)

of cultural and heritage meaning, relevance, significance; ethnic, community and national identity, etc. Including both intangible and tangible cultural items in destination resilience is crucial, for they are not only records that are vital to cultural survival and ongoing cultural and heritage conservation, but are also vital to the task of post-disaster reconstruction and long-term destination sustainability. The often conflicting values of diverse heritage, multiple stakeholders (who may hold divergent views and interests), ethnic conflicts, embodied knowledge, issues of right and belonging, etc., become more visible aspects during the decision making and management of the cultural and heritage tourism site every day and during post-disaster reconstruction, in the same way economic, physical and natural components are considered during those circumstances.

Items and parameters such as shown in Tables 4 and 5 can be drawn upon to develop a more robust framework of destination resilience to inform decision-making related to HT-HC management, planning and design. Much greater attention is clearly needed to develop the notion of *cultural resilience* within destination resilience, both with respect to substantive content and with respect to process, but Table-5 helps to acknowledge not just the dynamic and tangible-intangible characteristics of culture, but also the political nature of culture and heritage. The participation and involvement of key stakeholders in resiliency planning (just as in hazards mitigation, disaster planning and post-disaster recovery) is crucial, especially of those who inhabit the destination and those whose cultural heritage is being used for tourism. Consider, for instance, the well-being of disempowered, oppressed minority ethnic groups in a destination—who will take up their cause in post-disaster recovery, if they are not visible in resiliency

planning? (Both in the substantive content of resiliency frameworks and approaches, and also in the planning process).

Table 5 – Dimensions and Processes to Address in Cultural Resilience

Dimensions: Ethics; Values; Aesthetics; beliefs, symbolic meanings and myths; knowledge; conceptions of nature; interpretation; built and natural heritage; tangible (architecture, arts, etc.) and intangible (living culture, lifestyles, etc.) heritage; human-environmental relations; social practices; meaning; identity; belonging; sense of place;	Processes: participatory processes; collaborative planning; local control; involvement in decision-making; cultural equity; cultural justice; cultural change; conservation of built structures; visitor walkways; way finding signs; management interpretative exhibits; Education.

III.3. Case Example: Alcatraz Island (San Francisco, USA)

Case examples in Alcatraz Island (San Francisco, US) were used to discuss the intertwined relationship between heritage conservation and heritage tourism[29].

Dark Tourism Issues in the Preservation of Alcatraz Island

Dark tourism constitutes a challenge for historic preservation due to its definition as "the packaging and consumption of death or distress as a tourist experience of both distant and recent past" (Strange & Kempa 2003). The interpretations of the past

[29] The complete version of this text was presented for the Graduate Colloquium Series 2013-2014 hosted by the Melbern G. Glasscock Center for Humanities Research at Texas A&M University.

influence decisions in preservation by the intervention of external stakeholders, storytellers and the pressures of an audience with dark experience expectations. These influences interact with traditional problems in preservation related to heritage tourism such as sustainability, and the ways the past is presented using elements of culture as contributions to societal esteem and "memory as an active shaping force" (Graham, Ashworth, & Tunbridge 2000).

One of the most popular types of dark tourism destinations are former sites of incarceration. Alcatraz Island (USA) is one of the most famous historic penal sites and exemplifies "the multiple ways in which dark tourism is represented, marketed, and consumed" (Strange & Kempa 2003).

An interpretative-historical approach was applied to multiple case examples in Alcatraz Island in order to understand how the presentation of the island's past has changed over time and how interpretation of the site has been "shaped and reshaped" by the conflicting intervention of internal and external stakeholders under the dark tourism umbrella. My research includes the identification, organization and analysis of evidence from archival sources and bibliographical references along with physical and experiential empirical information gathered from direct observation at the site. The analysis of evidence, from both dark tourism and historic preservation perspective, is performed to understand the interactions between human values and material decisions in the creation of specific place identities in Alcatraz Island.

Two groups of case examples formed the core of the project: The first group includes buildings and structures affected by the Native American occupation (1969-

1971) that constitute "tangible and symbolic" resources for remembrance and have been interpreted "not as evidence of mindless destruction, but as witnesses of an event that changed the course of history of civil rights" (Strange & Loo 2001). The second group includes buildings and structures associated with the federal prison which are promoted as "the hellhole that contained America's worst" (Strange & Kempa 2003), constituting a brand name for commercial purposes. These case examples have been selected in order to understand contemporary interactions between dark tourism and preservation activities within its real-life context. The aim is to collect evidence from each case example that exhibit different levels of decision making related to the preservation process, and to identify the possible conflicts between dark tourism and those same preservation decisions, such as determining the period in which each building is to be preserved considering the interpretation of both past and contemporary uses.

i) *Study Methods*

Fieldwork entailing site visits, archival and bibliographical research, and participant observation was undertaken at Alcatraz Island between 2012 and 2013. A first site visit was performed in June 2012 as part of an invitation made by the Concrete Industry Management (CIM) program at California State University-Chico, to the Center of Heritage Conservation (CHC), and the departments of Geology and Geophysics from Texas A&M University, in order to develop a preservation plan for the recreation yard at Alcatraz Island. During this visit, inspection and documentation of the material conditions in the recreation yard were performed in order to establish "what should be done to preserve the recreation yard" (Warden, Komas, Everett, DeSmet, Billingsley, &

Hagin 2013). A second visit was performed in August 2013 for visual inspection of selected case examples in addition to the recreation yard. In both visits, participant observation entailed walking through the various exhibits and tours (audio tour and night tour) offered at the site. Archival research was performed at the National Archive at San Francisco (San Bruno) in regards to the RG269 General Records of the General Services Administration, "Records relating to Disposal of Alcatraz Island, 1961-73".

ii) *Brief history of Alcatraz Island*

Alcatraz Island, originally called "Alcatraces", was named after the Brown Pelican seen in the area by Spanish explorers (Glassner). Alcatraz Island is located 4 miles east of the entrance of San Francisco Bay. It is a 22.5 acre island characterized by a relatively low temperature range and affected by heavy moisture conditions. The bay area is also subjected to earthquake threats. The isolation of the island affects the provision of vital resources for inhabitation. The lack of electricity and a fresh water source have always been issues to be solved by current tenants. The geographic location and the environmental conditions of the island, contribute to promoting the site as a natural destination for its gardens, tide pools, nesting birds, and bay views (Golden Gate National Parks Conservancy).

Alcatraz Island has a diverse history of uses that has contributed to its designation as a National Historic Landmark in 1986. The island`s period of significance is identified from 1847 to 1973 when it was open to the public after being added to the newly created Golden Gate National Parks in 1972. The main aspects the Island is promoted as a tourist destination include its condition as a military fort in the 1850`s, as

the site of the West Coast`s first lighthouse (since replaced by the current lighthouse), as the former maximum-security federal prison that once held recognized gangsters like Al Capone, and as the birthplace of the Native American "Red Power" movement (sparked by an occupation of Alcatraz from 1969 to 1971) (Golden Gate National Parks Conservancy).

The following is a timeline of uses in Alcatraz Island:

- Pre European Presence: Occupied Periodically by Native Americans
- 1775: First European Presence: Spanish Lieutenant Manuel de Ayala
- 1848: Construction of fort begins after Mexican-American War
- 1898: Stop for soldiers on their way to Philippines for Spanish-American War
- 1933: Maximum Security Federal Penitentiary
- 1963: Federal Prison closed due to high cost of maintenance and operation
- 1969-1971: Occupied by Native Americans after abandoned in 1963
- 1972: Became Managed by the National Park Service
- 1986: Designated a National Historic Landmark (NHL)

iii) *Preservation of Alcatraz Island*

Alcatraz Island is formed from sandstone rock, from a geological perspective, and subsequent layers of human-made interventions have transformed its organic body into regular structures, made of clay and concrete, that represent a desire to control natural and social conditions that have changed throughout history (Golden Gate National Parks Conservancy). Tangible heritage is subjected to the effects of change in environmental, economic, social and cultural aspects. Each material has specific life

cycles that require different approaches for its treatment from a technological point of view. Furthermore, each material and architectural element are viewed and interpreted differently according to current set of values in each society.

Alcatraz Island has been recognized "as a nationally significant historic place: due to its possessing exceptional value and quality in illustrating the heritage of the United States." (Mundus Bishop - Architecture and Planning 2010). In terms of the National Historic Landmark (NHL) program, Alcatraz Island is nationally significant under several NHL themes:

- Theme 5 (Political and Military Affairs), subthemes 5b (1830-1860) and 5c (1865-1941).
- Theme 7 (America at Work), subtheme 7j (Engineering), facet 5 (Military Fortifications)
- Theme 9 (Society and Social Conscience) Subtheme 9b (Social and Humanitarian Movements), facet 2 (Humanitarian Movements), subfacet c (Prison Reform).

In essence, the significance of Alcatraz Island for the National Register of Historic Places (NRHP) and National Historic Landmark (NHL) nominations are associated to the fact of being "the site of events that have had an important impact on the nation as a whole from before the Civil War through an Indian Occupation of the 1970s" (Mundus Bishop - Architecture and Planning 2010).

Additional aspects Alcatraz Island may also be eligible for the National Register are (Mundus Bishop - Architecture and Planning 2010):

- Criterion B (association with a person or persons) for its association with infamous criminals Robert Stroud ("Birdman of Alcatraz"), Alfonse Capone and George Kelly Barnes ("Machine Gun Kelly"), incarcerated at Alcatraz during the Federal Penitentiary period.
- Criterion C (characterized by distinctive construction or design) for the Citadel that housed soldiers and officers during the military fortifications period. Additional research is required to ascertain the Island's significance under these criteria".

Considering the above, Alcatraz Island is considered significant as a heritage site for being "a stage" of events that represent some aspects in the evolution of American thought. Events continue their development in Alcatraz Island currently as a heritage tourism destination. For its past and present importance, Alcatraz Island has needed continuous actions in order to preserve the materiality of this stage.

> "The hardship of maintaining flaking concrete and rusting steel caused Alcatraz to be abandoned as a federal prison in 1963, and the decay has accelerated in the ensuing four decades" (McHugh 2001).

At present, the National Park Service is in control of the heritage management of Alcatraz Island. Several Historic Preservation projects have been developed in the last decade in order to stabilize landscape elements, restore buildings, shape habitats for nesting birds, upgrade structures to building codes, etc. Sustainability efforts to reduce carbon emissions are also a priority (National Park Service - U.S. Department of the Interior).

iv) *Tourism in Alcatraz Island*

Alcatraz Island as a National Park and tourist destination, offers guided tours during the day that focus on the following products for visitors: the islands natural history, the views from and to San Francisco Bay, the civilian life of correctional officers, the escape attempts from the federal prison and the restored historical gardens. The tours at night offer special programs (Golden Gate National Parks Conservancy). However, promoting attractions on Alcatraz Island has been performed outside administration of the park and has been strongly done from books, films and TV series. These media focus on the stories associated to the history of the island as a federal prison through topics related to former prisoners, their lives in prison and their attempts to escape.

Furthermore, souvenirs offered in the gifts shops in San Francisco port and within Alcatraz Island comply with the commercial image in relation to the prison's past and relate with motivations of tourists to acquire objects that have the purpose of *looking like the original* but are made with contemporary materials and current sustainability considerations such as the use of stainless steel for the food-grade tray that is a replica of the trays used during the federal prison period, and all-natural and organic materials for the case of the generic soap used by inmates (Golden Gate National Parks Conservancy, 2014). Other products that are offered include books that tell the stories of the American Indian Occupation, and the guards and their families who lived in the island. Even though the island offers stories and attractions for a variety of interests, a type of visitor

can be distinguished is the Hollywood tourist. The main attraction for this type of visitor is the *Walk-in prison experience:*

> "Step behind bars into the depths of a maximum-security cell house. See where prisoners ate, slept, exercised, or did time in the isolation of the *Treatment Unit*, or worse still, in the complete darkness of the *Hole*. Learn how some of the convicts made their escapes." (Golden Gate National Parks Conservancy)

This can be observed in the images former tourists publish through personal blogs that emphasis the act of standing behind the bars, accentuating the misery of a locked-in condition with a pose or taking the picture with reference to the landscape that can be viewed from within the cell or from the windows of the prison building itself. Another focus of attraction of this type of tourist extends to the interest in details that can be found throughout the island that accentuate the darkness image associated to the site such as cracks in the walls, decayed material of doors and fences, ceramic tiles covering confined spaces, and carvings and graffiti. In addition, the marketing potential of the attraction of Alcatraz Island as a dark site is currently being used commercially. An example of this is the event held by Red Bull once a year since 2010 called King of the Rock (a one-on-one basketball tournament) (Red Bull 2013).

Case Examples in Alcatraz Island

The case examples selected are organized in three stages that coexist and are represented by current preservation initiatives: Preservation of the Recreational Yard and Preservation of the Warden's House; Rehabilitation of the Puppy Stairs and Restoration of the Water Tower Graffiti; Restorative Justice and We Hold the Rock exhibits.

i) Recreational Yard and Warden's House

A first stage is represented by examples that illustrate decisions that focus on the tangible remains "as found" of historical events and their effects on the material fabric: The Warden's House burnt during the Native American occupation, and the Recreational Yard which has been a stage for federal prisoners, the Native American occupation and recent commercial activities. Both examples face the pressures on the material due to the environmental and physical conditions of the site that jeopardize the feasibility of efforts to maintain a ruin state indefinitely. In addition, the increasing deterioration of the fabric interacts with the perception of visitors whose expectations are motivated with a commercialized dark experience despite the efforts of heritage managers to present other layers of history.

a) Preservation of the Recreational Yard

Preservation actions in the Recreational Yard in Alcatraz Island focus on the conservation, maintenance and repair of walls, floor and catwalks in reinforced concrete. Actions comply with the general description of this type of treatment in the sense that it reflects the building's continuum over time since it was completed in 1912 (for walls and catwalks) and 1930's for the floor. All types of layers are observed in the surface of its architectural elements: the decay of the material, the isolated patches for its repair, the marks of oscillating rusted and falling fences, the carvings of former prisoners, the stains from commercial uses, the growth of vegetation, bird excrement, etc. All this marks on the material reflect the successive occupancies of former prisoners in the past, and tourist and commercial uses today. Furthermore, patches had been made in sections of

the floor to repair concrete that according to the definition of this treatment, could be considered “respectful changes and alterations” because they are limited to the damaged section and are clearly differentiated from the unaltered areas. In other words, it reflects the value of material authenticity and the value of historic layers, have guided the approach until today. However, in practical terms, the Recreational Yard is constantly degrading towards a state where this approach seems hardly sustainable.

In terms of the building´s historical significance (relative importance in history), the prison buildings are not individually listed in the National Register. Therefore, the Recreational Yard allows considering other options that are more flexible in regard to alterations and are not focused on material authenticity. However, some aspects of the material that are related with the historical significance refer to evidence on the material fabric such as carvings on the wall and floors, and lines that where painted to organize prisoners or define sport courts. Therefore, preservation or restoration of these elements must be considered through thorough documentation processes to either replicate (e.g. lines of paint), or mark for their conservation.

Aspects related to the physical conditions are the most critical in this case. The existing condition of the reinforced concrete walls, floor and catwalks, is of deteriorated surfaces due to lack of regular of maintenance; localized cracks that need repair and are potentially increasing due to possible foundation displacement (south-west corner); localized cracks due to corrosion of rebars possibly due to the type of aggregates used (such as brick), the type of water used in the mix (sea water), thickness of the concrete cover under specifications for maritime environments, etc.

In addition, extensive repair and replacement of rebars, missing and rusted poles, fences, barbwire and door are required. In addition, a preservation approach in this case cannot keep pace with the accelerated deterioration of the material. In some areas where damage is extensive (e.g. catwalks), the cost of repair maintaining the remaining sections becomes higher in comparison with approaches that consider replacement of sections. Furthermore, in some areas (e.g. walls), the damage seems related to material composition which suggests the necessity of an approach that solves the problem in its core rather than one that aims towards keeping as much as the material possible (because the material itself *is* the problem).

Conflicts however, arise in regard to the dark tourism image that attracts many visitors and is enhanced precisely by that decayed image of the material fabric. Therefore the proposed use constitutes a major challenge for treatment decisions considering that the recreational yard will not be used as it was historically, but is currently used as a touristic site for regular visitors, special marketing events (Red Bull 2011) and special cultural activities (Films). From a tourist perspective an image of deterioration is accepted under this context even though these layers do not correspond to the periods from which the site is recognized as significant. The conflict arises when a continuous state of decay prevails and the memory of the site in relation to its significance fades in relation to a more recent image. The construction of this new image, the image of a decay-state, becomes then a new layer to be preserved under the current treatment approach. This new layer, which has nothing to do with the significance of the site in the first place, becomes a commercial image that is used. With

time, the origin of this new layer of history will not to be important and a decay-state will prevail and replace the others.

A decay-state image in a dark tourism site facilitates continuing with conservation approaches that focus on material authenticity but encounter the challenge of a deterioration process that surpasses a limit where the fabric is unrecoverable. A preservation approach requires a continuous process of maintenance and repairs when the material has still a sound condition and accurately represents the layers of history to be conserved. When the site does not have the capacity to keep the pace with a consistent program of repair and maintenance, a more aggressive approach should be considered (e.g. reconstruction or rehabilitation, or a combination of both).

Furthermore, the conservation approach selected must be in agreement with tourism management approaches that contribute to enhance the experience of visitors and might require alterations in the material fabric. A balance must be found here as well. Possible examples of tourism management strategies that will require negotiations with conservationists are describe as following: The site (recreational yard) has the potential of increasing the interaction of visitors by promoting activities in site that resemble the games and sports played by former inmates of the Prison. Provided the conditions, the site can inspire various events such as cultural festivals (Native Americans; San Francisco diversity, etc.) that connect the Island with the present history of evolution of ideas in American culture (See Richard Oaks expression "Alcatraz is not an Island" in Strange & Kempa 2003). Adapting the reinforced concrete walls and complementary architectural features to its contemporary use and requirements will

require a preservation approach that allows the use of contemporary materials and cultural interpretations in order to enhance the character-defining aspects (color, texture, carvings, historic paint, etc.) of what is considered a dehumanizing space.

Mandate code requirements will finally trigger drastic conservation treatment decisions in the Recreational Yard. Some elements such as fences and poles are in risk of falling, structural cracks in south-west corner suggest a possible foundation displacement, portions of the catwalks are detaching, and the accessibility through stairways for visitors requires some repairs as well. Any of these elements require extensive repair and possible reinforcement to comply with contemporary building codes, therefore a preservation approach is not appropriate. Rehabilitation and Reconstruction approaches provide a framework where replacement of deteriorated fabric is allowed.

Figure 2 Recreational yard: Damage and Repair (Manrique 2013)

b) Preservation of the Warden's House

The Warden's House served as the residence of the commandant of the military prison and the wardens of the Federal penitentiary (1934-1963). The house was one of the buildings burned in a series of fires during the Native American occupation (1969-1971), and "accounts differ as to whether the fires were accidental or were set" (The New York Times 1996). Preservation efforts have focused on reinforcing the house by "bolting braces of structural steel tubing inside the walls" (The New York Times 1996) and stabilizing the slope below the has been slowly receding (National Park Service). From a tourism perspective, the ruins of the Warden's House constitute "a favorite photographic subject for the 1.2 million tourists a year who visit the island" (The New York Times 1996).

Similar considerations described for the recreational yard affect the preservation of the Warden's House. In addition to the sustainability issues of the material decay continuously degrading the remains of this building, conflicts are associated to preserving the Warden`s House as a ruin therefore linking a destructive action with an event that aimed towards a construction of an ethnic identity.

Figure 3 Warden's House (Manrique 2014)

ii) Puppy Stairs and Water Tower Graffiti

A second stage corresponds to the necessity to act on the material as it does not endure the reality of environmental and physical conditions of the site. Such reality has obliged transcending traditional preservation approaches that focus on material authenticity. Examples for this stage are the rehabilitation of the Puppy Stairs and the Restoration of the Water Tower Graffiti. The reinforced concrete Puppy Stairs has been repaired by matching colors and textures of the existing remains in order to maintain a decayed-aesthetic image. In 2012 the Water Tower Graffiti was restored as exactly matching the hand painted inscription made by Native American activists during the occupation.

a) Rehabilitation of the Puppy Stairs

Using different stains and pigments with decorative concrete, the objective is repairing and maintaining the historical aesthetic image matching colors and textures of the existing remains of the reinforced concrete stairs. The project is a partnership between the National Park Service, the Concrete Industry Management program (California State – Chico) and the chemical company BASF. In words of the director of Cal State Chico program, "If it weren't a national landmark, you'd probably demolish and replace it. Instead, the group will leave in place as much of the original concrete as possible and construct new areas around it - kind of like putting a puzzle back together" (Reed-Guy 2011).

Rehabilitation as a preservation approach has various possibilities. In this case, the approach selected favors a *Decay-State Approach,* which means to reestablish a significant historic period including the state of decay (considered as historic layers). This approach is debatable under the following considerations (National Park Service 2001):

According to its relative importance in history, even though the site is not designated as a landmark considering its architectural or construction characteristics, attention must be paid to avoid losing character-defining features of the stairs that represent the events associated with the area as a prison and not so much the consequences of a lack of maintenance.

According to its proposed use, this aspect is the most conflicting because it considers the stakeholders involved in the site as a tourism attraction. Further research

should be performed in order to determine visitors' preferences in relation to the image displayed by the walls with a decay state image.

For the Puppy Stairs, favoring a decay-state approach evidences a change from depicting a previous period in history associated to the events by which the site is recognized as a historic landmark towards a present state that recognizes the layers of decay as significant and complying with visitors' expectations for a dark experience. Conflicts of this approach relate to the sustainability of maintaining subsequent levels of decay, and the intangible consequences of preferring a decay-state image over one related to the historical events by which the site is considered significant.

b) Restoration of the Water Tower Graffiti

During the Native American Indian occupation, graffiti was painted at various locations, including on the water tower that reads: "Peace and Freedom. Welcome. Home of the Free Indian Land". The water tower is the tallest structure in Alcatraz Island and it was refurbished by a process that included coating it in paint resistant to moisture. Before covering the graffiti with the paint, a full documentation of it was performed in order to paint it back on using the same color of paint. A spokeswoman from the Park Service emphasized in the fact that this is the only example the Park Service has regarding "re-creating graffiti". Furthermore she adds that "It is historically significant and an integral part of the story of Alcatraz" (Prado 2012). A Golden Gate National Recreation Area spokesperson explains why it was a priority for officials to preserve the graffiti: "The painting on the water tower is one of the few remaining remnants of the occupation that are in areas open to the general public". An important

consideration is that “members of the family of Richard Oakes, one of the occupation's ringleaders, were invited to come to the island and assist with the repainting” (Sankin 2012).

This last statement suggests that the community directly related to this heritage feature (graffiti as expression) was involved only in the execution phase of the Historic Preservation treatment, and not in the previous steps of planning and definition of the most appropriate approach which require complex interpretation issues rather than the straightforward procedure of repainting. Furthermore, the reaction of the visitors to this new image of a *new* historic graffiti is still to be expected.

Despite the efforts to provide an “exact replica” from documentation records and the participation of Native Americans tracing “the final block letters” conflicts related to the causes and consequences of this preservation approach must be considered. Following the same purpose as the preservation of the Warden House, restoring the graffiti provides a tangible reminder of the Native American occupation for visitors. The participation of Native Americans in the process of reconstructing the act of tracing the graffiti recognizes de importance of including this group as a symbolic contemporary presence in the site. However, the meaning of this act is somehow a paradox: an “antigovernment graffiti restored, courtesy of government” (Wollan 2012).

Figure 4 (a) Puppy Stairs; (b) Water Tower Graffiti (Manrique 2014)

iii) Restorative Justice and We Hold the Rock

A third stage is suggested by some of the exhibits in display throughout the island such as the "Comic Book on Restorative Justice: An Alternative to Prison" and "We Hold the Rock" on the American Indian occupation (Alcatraz Cruises, LLC. 2013).

The "Comic Book on Restorative Justice: An Alternative to Prison" exhibit is displayed in the cell house. Developed by James Breeden, an interpreter for the Golden Gate National Parks Conservancy on Alcatraz Island, and David Belden, a volunteer

with the Insight Prison Project as a restorative justice facilitator in San Quentin Prison, "Making Sense of a Senseless Act: A Comic about Restorative Justice" compares the consequences of the criminal justice system vs. an alternative restorative justice applied to a case where a woman is "hurt in a scuffle with a young male intruder in her home" (PM Press 2014). In relation to Alcatraz Island, the exhibit addresses the following concern as stated by Breeden:

> "Alcatraz was America's first supermax prison, but is society best served by Alcatraz's model of punishment and deterrence? (Alcatraz Cruises, LLC. 2013)

Furthermore, this concern is not an isolated one, as "the Bay Area is home to a strong set of restorative justice programs" (Alcatraz Cruises, LLC. 2013).

As an effort to include an account of the history of the Native American Occupation and set in context its importance in the history of civil rights, "The award winning video/exhibit, "We Hold The Rock", produced by the National Park Service and the Golden Gate National Parks Conservancy, is shown continually in the China Alley exhibit behind the main theater area near the dock."(Alcatraz Cruises, LLC. 2013).

This exhibit also sets a framework to inform the context in which contemporary activities in the island have a historical significance and relevance. The International Indian Treaty Council (IITC) sponsored in 2013 "The Indigenous People's Thanksgiving Sunrise Gathering" around a bonfire on Alcatraz parade grounds:

> Sponsored by the International Indian Treaty Council, the event is an opportunity to give "thanks for lives, our peoples and ways of life and the gifts we continue to receive from our sacred Mother Earth." The gathering also honors tribal elders

with speakers and traditional and "fancy" dancing taking place against the backdrop of the San Francisco skyline at sunrise.

The gathering also commemorates the 1969-1971 occupation of then-vacant Alcatraz Island by representatives of many different Indian tribes" (Los Angeles Time 2013).

The "Restorative Justice" and "We Hold the Rock" exhibits illustrate active expressions that suggest "healing" processes that are still in construction in relation to the contemporary role of the site and the memorialization of historic events.

Figure 5 (a) We Hold the Rock; (b) Restorative Justice (Manrique 2013)

Alcatraz Island is challenged by change produced by environmental characteristics (e.g. Weather and seismic conditions), physical conditions (e.g. state of buildings and infrastructure), economic constraints (e.g. dependence of funding sources for operating and maintenance), a history of social conflicts (e.g. diversity of stakeholders involved), and human aspects (e.g. history of events and actors involved). Heritage managers in Alcatraz Island strive to enhance the capacity (as process) of the site to adapt to these changes (resilience) using planning and management strategies that focus on maintaining physical assets, optimizing available resources (e.g. installing solar panels) and promoting activities to engage and attract tourism (e.g. diversity of topics; marketing of Alcatraz as a commercial brand).

Overlapping stages that coexist in Alcatraz Island, manifest the different levels in which change (environmental, physical, natural, economic, cultural, etc.) affects the tangible and intangible aspects of heritage, and also how it conditions the different approaches from decisions in historic preservation and heritage tourism initiatives in the site.

From a tangible perspective in historic preservation, heritage built with modern materials and construction techniques "demand different treatment, appreciation, and consideration than the treatment of traditional building construction" (Prudon 2008). Conservation of modern materials poses questions to the acceptance of weathering that is appreciated on traditional architecture but constitute "an indication of poor performance for more modern buildings" (Prudon 2008). Furthermore, a depleted state in conservation of heritage from the recent past is challenged by sustainability issues,

and the effects in the development and valuation of the urban context in which the heritage is inserted.

From an intangible perspective, an aspect such as place identity is affected by the different ways in which the site is interpreted. Alcatraz Island is no longer a fort, nor a prison, nor Indian land. However, all aspects of its contemporary function as a cultural & heritage tourism destination focus on partial accounts of these fragmented identities. Alcatraz is not any of these identities but it is also all of these identities together and something else in its current function as a tourism destination. Since the federal prison was closed in 1963, the debate towards defining an identity for Alcatraz Island started and is still affecting its state today, as the different approaches of what Alcatraz should be are manifested in many of the conflicts the site faces today affecting its capacity to adapt to change (resilience). In addition, further developments such as the Native American Occupation (1969-1971) add layers to the challenge of interpretation and construction of place identity in the site. Difficulties to address identity discussions rely on the different values considered by the diverse stakeholders related to the site. The predominance of some values over others has determined decision-making processes by heritage managers. Decisions of stakeholders are manifested in the reality of the site today.

Case examples illustrate how preservation approaches have required moving from a material authenticity focus (Recreational Yard and Warden's House) in a first stage, to a approaches take into account contemporary requirements (sustainability, tourism, etc.) and stakeholders in a second stage (Puppy Stairs and Water Tower

Graffiti). Both stages exemplify approaches that respond to changes as they occur in a reactive-oriented way focusing on solutions from a technological point of view.

However, keeping up the pace to respond and react to change in Alcatraz Island is becoming a titanic struggle. Even though preservation decisions in Alcatraz Island comply with the Secretary of Interior Standards, make use of the most recent developments in preservation technology (e.g. Concrete repair and documentation techniques), are increasingly taking into account the diverse interests of stakeholders (e.g. visitors, natural conservationists, etc.), and sustainability approaches are being developed (e.g. Solar panels), questions regarding the role of this heritage site and its contribution to society suggest an active and open process.

"*What to do* with Alcatraz" has been a question addressed since the federal prison was closed in 1963. The third stage exemplified by the Restorative Justice and We Hold the Rock exhibits suggest a conceptual shift is required in heritage management approaches that address place identity issues that are pending and advocating for changes that transcend the island limits. How would preservation actions look like when addressing a conceptual shift from a reactive approach towards generating conditions that connect tangible interventions to an identity in process of consolidating?

Under this perspective, "success" or "failure" of preservation decisions will require additional parameters than those referring to material authenticity, sustainability, proposed use, mandate code requirements, relative importance in history, etc., as well as considering new relationships among values, as defined in the Secretary of Interior

Standards, such as the values of meaning and historical significance, documentation, reversibility and adaptive technological upgrade.

Rethinking historic preservation suggests integrating the different pressures in materials and change (environmental, economic, social, cultural, etc.) with the process by which individuals and society come to terms with violence and tragedy by creating "memory places". In other words, what is at stake is the capacity of the site to recover its relevance in regard to its contemporary role as heritage. Therefore historic preservation must generate mechanisms by which the site can proactively address change beyond reacting and adapting type of approaches.

The notion of resilience, currently in development, can inform about new parameters and relationships required for a conceptual shift in preservation approaches in dark tourism sites such as Alcatraz Island. A resilience-oriented approach can therefore contribute to recognize interactions between tangible and intangible aspects that give new opportunities for heritage sites for being "not simply a historic or scientific luxury" but a contribution to the improvement of the society to which it pertains (Michael 2012).

III.4. Conclusions

This chapter argues for a new sustainability paradigm in heritage conservation and tourism studies that addresses *cultural resilience*. Culture and cultural heritage share common ground in heritage tourism and heritage conservation, and *cultural resiliency* is a vital bridge towards an integrated approach to heritage conservation and heritage tourism. Resilience, a non-linear process of responding to change, depends on

understanding natural, physical, economic, human, social and cultural parameters and their interactions. Each knowledge domain we examined in our literature review has been identifying components as well as mechanisms to operationalize resilience for decision-making, and the importance of addressing intangible as well as tangible dimensions is evident in many study areas. The long-term sustainability and well-being of tourism destinations and their cultural heritage depends on a collaborative, integrated approach to destination resilience and the intangible as well as tangible dimensions of *cultural resilience* in heritage tourism and heritage conservation studies.

Case examples in Alcatraz Island associated to the category of *dark tourism* contribute to understand the intertwined relationships between heritage conservation and heritage tourism in an integrated approach to resilience to manage change in heritage tourism destinations.

CHAPTER IV

RESILIENCE IN HERITAGE CONSERVATION AND HERITAGE TOURISM

IV.1. Overview

Throughout the process of this research, existing resilience frameworks in diverse knowledge areas have provided a broad range of applications and approaches. These frameworks are used as precedents for developing a resilience framework in heritage conservation (HC) and heritage tourism (HT) to a certain point. The problem for using *only* these frameworks as reference are due to them being partial accounts limited by the boundaries of each knowledge area. Furthermore, each knowledge area has rapidly incorporated resilience as a metaphor and adjusted it for its practical use according to its own way of understanding what things *are* (ontology) and their *access* to them (epistemology).

In the process to determine the nature of the concept of resilience and its possibilities for addressing change in heritage sites, sustainability as a paradigm suggested similarities with the process in which resilience is emerging as a new paradigm as described in Chapter-I.

In addition to these precedents for the development of the notion of resilience in heritage conservation and heritage tourism, two broader conceptual frameworks are identified that provide additional insights: *Evidence-Based Design – EBD* (Hamilton & Watkins 2009) and *Onto-cartography* (Bryant 2014).

Evidence-Based Design (EBD) has been defined as:

"a process for the conscientious, explicit, and judicious use of current best evidence from research and practice in making critical decisions, together with an informed client, about the design of each individual and unique project" (Hamilton & Watkins 2009:vii).

"Onto-cartography – from "onto" meaning "thing" and "cartography" meaning "map" – is the name proposed by philosopher Levi Bryant for a map of relations between things, entities, etc. (*machines* in Bryants' terms) "that analyzes how these assemblages organize the movement, development, and becoming other machines in a world" (Bryant 2014:7). "Machines" for Bryant are the individual entities or units (existing at a variety of scales and themselves composed of other entities) that compose the worlds that exist. Machines in Bryant's framework refer to different types: Discursive, physical, organic, technological, and inorganic" (Bryant 2014:9).

Evidence-Based Design and Onto-Cartography are both overarching conceptual frameworks that provide insights of a *structure* for developing the notion of resilience in heritage conservation and heritage tourism. However, both frameworks are of a different nature.

Evidence-Based Design has been proposed as a conceptual framework claiming for more rigor in architectural design to address increasing challenges in professional practice through the use science-based data to support decision-making. Despite not agreeing with its proposal of relying on acknowledging as *credible*, *robust* and *rigorous* knowledge for architectural design mostly in terms of *scientific* findings, this framework

does provide and explanation for the necessity of a *process* for decision-making that is able to organize, track and provide feedback to improve our understanding of how the built environment relates to nature and human beings.

Onto-cartography, on the other hand, provides a framework for understanding what things *are* (ontology) that does not favor any particular thing over another (machine, being, entity, etc.), nor gives preference to any specific *access* to these things (it is open to include them *all* as each is considered a partial account of what a thing *is*). This ontology bases its claims on recognizing the different entities that exist and the necessity of mapping their interactions. Both frameworks aim towards organizing and mapping our understanding of the world with the purpose of changing things for improvement.

It is not a coincidence that the notion of resilience in heritage conservation and heritage tourism resonates with these frameworks. In all three cases, efforts aim towards a better understanding of what things *are* making use of developments in our *access* to things in order to address increasing challenges of diverse sort.

This chapter is organized in two sections. First, an overview of Evidence-Based Design (Hamilton & Watkins) and Onto-cartography (Bryant) is presented, and the connection of both frameworks to the development of the notion of resilience for heritage conservation and heritage tourism is explained. Second, insights for a resilience framework in heritage conservation and heritage tourism are discussed.

IV.2. Evidence-Based Design (EBD)

Evidence-Based Design (EBD) promotes "a new level of rigor" in architecture practice that is *science-based*, *logic* and *fact* oriented, etc. which is valuable for organizing the process to address increasing challenges in complex building typologies (being heritage buildings and sites one of them) making use of "the best available research findings" (Hamilton & Watkins 2009:5).

As expressed by the authors, this direction is not new in architecture (e.g. A Pattern Language by Christopher Alexander) and it is also manifested in current approaches such as the sustainability paradigm in design. Furthermore, architecture practice itself has always been based on diverse sources of evidence according to the stage of development of the profession (e.g. standards, technical guidelines, building codes, etc.). Evidence from scientific-findings constitute *one* of the types of sources.

Evidence-Based Design is based on the assumption that design decisions must be able to be explained as a "chain of *logic*" that connects "*credible* research findings", "critical analysis" and the resulting "design concept" (Hamilton & Watkins 2009:12).

Despite the bias towards a scientific approach to understanding what things *are* and how we *access* it, Evidence-Based Design is proposed not as a product (as in a manual of standardized, global and rigid rules) but as a process (individual, idiosyncratic and unique design solutions). As a process it defines a set of criteria which aim towards changing from a "traditional relatively unstructured approach to design-related decision-making" towards a method that guarantees being able to address increasing complexities in architecture problems (Hamilton & Watkins 2009:19).

Hamilton (2009:28) establishes a "4-level model of evidence-based design" as a set of criteria for evolving levels in the EBD process for professional practice in terms of increasing 'rigor' procedures. Each level entails attitudinal approaches such as staying current with updates in the field and evolving research, and avoiding reporting successful experiences only; and action-oriented activities such as producing work that contributes to the advancement of design, sharing information beyond the team and publishing findings in peer-reviewed journals.

Evidence-Based Design and Sustainability

Sustainability, as an increasingly mainstream approach in architecture, has derived its success due to its ability to justify design decisions based on correlations with evidence that demonstrate improvements in terms of economic, environmental and building performance criteria.

Approaches under the notion of sustainability were not new when the term was established (in the same way it is not new that architecture uses evidence of diverse sort for design decisions). However, what is new (in the same sense as Evidence-Based Design) is that this approach is becoming a *mandatory* requirement for architectural design (and other knowledge areas as well) in the same way as the minimum Vitruvius' triad (Firmness, Commodity and Delight) is expected as default aspects to be *solved*. Furthermore, considering the development in sustainability related topics and the increasing challenges in climate change, complexity of building typologies and economic crises, sustainable design requires a method for incorporating all these variables and their interactions. Sustainability in the way it has aimed in architectural

design towards a focus on economic and environmental aspects (building performance) complies exactly with the scientific-based approach promoted by Evidence-Based Design.

Evidence-Based Design and Resilience

Resilience in architecture on the other hand, can benefit with the claim from Evidence-Based Design towards the general criteria of a method for "acquiring a more robust and rigorous degree of knowledge for the design of buildings" (Hamilton & Watkins 2009:19). Resilience approaches should be careful with falling in the epistemological bias of what *reliable* or *credible* evidence is for EBD (scientific-based), in order to prevent this emerging concept to lose its opportunities in addressing other parameters (e.g. cultural aspects as has been discussed in Chapter-III).

Despite this bias, EBD encourages the necessity for interdisciplinary teams in order to address the topics outside of the architecture domain, therefore it is expected that future collaborations will contribute to acknowledge "other understandings of what counts as knowledge and how it can be produced" along the range "from positivism to radical interpretivism" (Ellingson 2009:30).

Another important contribution of EBD related to notion of resilience is the emphasis in developing knowledge-based databases result of the lessons from experiences, projects, etc. This learning-loop constitutes the main resource for building capacity of systems. Resilience as a frameworks suggests this need and EBD provides examples of considerations to take into account applied for design-decisions.

Evidence-Based Design and Heritage Conservation

Heritage conservation (aka historic preservation) addresses challenges with a strong reliance on evidence from diverse sources (historical surveys, documentation, structural analysis, material evaluation, etc.). As stated in Hamilton & Watkins (2009:184), heritage conservation relies on an Evidence-Based Design (EBD) approach more than any other field in architecture due to its requirement for a rigorous and methodic evaluation of the existing conditions of already highly complex buildings, structures or heritage sites. However, heritage conservation makes use of a wider range of epistemological approaches than the assumed by EBD as *reliable,* considering that each case study depends on the participation of transdisciplinary teams from STEM (Science, Technology, Engineering, and Mathematics) areas, to art and architecture historians and experts from tourism studies as discussed in Chapter-III.

Furthermore, compared with other fields in architecture, heritage conservation must follow standards and guidelines that provide a framework for deciding preservation treatments (e.g. Secretary of the Interior's Standards in the US). Despite controversies between agreements in the effectiveness and pertinence of these standards and guidelines, a baseline exists for establishing a set of criteria for preservation approaches in historical constructions (referred to as *treatments*[30]).

Despite these considerations, EBD as a method encourages increasing rigor in learning from each case study developed in heritage conservation that can provide

[30] Four treatments are defined in the standards and guidelines of the Secretary of Interior's Standards: Preservation, Restoration, Rehabilitation and Reconstruction.

feedback for increasing complex projects and can contribute towards a knowledge-based database.

As discussed with the case example on The Alamo (San Antonio, US) in Chapter-II, heritage conservation is constantly incorporating the most recent developments in technology (digital, communications, etc.) in order to address increasingly complex projects (scale, location, etc.). However, the process of management of great amount of data obtained continues to be the main challenge. Current developments in preservation management models aim towards integrating data to correlate information from diverse sources to inform preservation decisions in heritage sites. EBD suggests a further step of generating a learning-loop by integrating data and results from each project in a knowledge-based database for future projects and cross-collaboration among the network in preservation practice, as well as developing feedback mechanisms reaching the community.

In heritage conservation as well as in any complex field in architecture, much knowledge derived from each project is lost due to lack of resources available for organizing and processing this information in a learning-loop cycle. As information, digital and communication technologies evolve, EBD's suggests a cultural shift where heritage conservation moves towards more rigor in methods for managing knowledge derived from each project for the advancement of the professional practice.

Furthermore, developing a systematic community-based and knowledge-based feedback in each project in heritage conservation and its allied knowledge areas such as tourism studies as discussed in Chapter-III, establishes opportunities for increasing the

recognition of various levels of complexity in relationships among entities (e.g. community and heritage site) as explained for the case example on The Alamo with the three levels of information (knowledge). These three levels associated with increasing complexity in the relationships between tangible and intangible aspects of a system (divide, collaborative, symbiotic) require a method to map these interactions and develop mechanisms for decision-making to improve the system traced.

IV.3. Onto-Cartography: An Ontology for Resilient Design

In regards to the mapping (and measurement) of interactions among entities being the aim of resilience frameworks in diverse knowledge areas, philosopher Levi Bryant's Onto-cartography (Bryant 2014) provides a broader conceptual framework that suggests a set of rules by which *reality* is understood (ontological assumptions).

Knowledge areas in general fail to clearly state the underlying rules to which their frameworks abide at an *ontological* level. This is the case in general for any process of understanding and decision-making. Unless a purposeful search for understanding the underlying ontology for understanding a problem is pursuit, action is guided by a worldview which is not acknowledged. The importance of the awareness of ontological assumptions in frameworks to be used for decisions in architecture is recognizing possible biases (as mentioned for EBD) that reduces the potential of a concept (resilience) or a process (rigorous feedback).

The lack of a clear ontology by which existing resilience frameworks have been developed so far is what makes difficult a direct translation of each model to new cases. For example, as discussed in Chapter-II, intangible aspects of heritage (incorporeal in

Bryant's terms) are considered in terms of their tangible and quantifiable values (e.g. economic) which constitute a partial account in the interactions that are possible. Even if the lens under which a map of interactions was based on an economic view, this partial analysis will miss indirect relationships.

For example, this can be observed in the cases where heritage sites have a clearly defined agenda for displaying stories only relevant to a specific ethnicity associated to the place. From a strictly commercial-economic perspective, this approach boosts the support of the privileged group reaching points of elevating the heritage site to a sacred status. This aspect guarantees a support network that is bound to the place with fervor and devotion manifested in concrete financial investments to preserve it under this agenda. In this way, there is a direct relationship linking intangible aspects of heritage to quantifiable consequences that can be traced back in a map of interactions (e.g. donations; number of institutions supporting a specific typology). However, the effects of a political agenda in the neglected ethnicity historically associated to the heritage site, is not as easily tracked in a map under an economic-based lens. A quantifiable relationship would be evident in the extreme case of a direct action of destruction damaging the material fabric as a protest making visible a conflict, therefore measurable in terms of economic loss (e.g. multiple examples in history regarding destruction of heritage under political, religious, ethnic wars). Otherwise, the interaction of the neglected ethnic group with the site would require other type of lenses to trace a map such as the changes produced by the ways new generations interact directly and indirectly with the place.

In this regard Bryant proposes an ontology that is broad enough as to allow it being used for a variety of epistemological approaches. Bryant refers to *onto-cartography* as able to allow diverse 'political preoccupations'[31] and open to expand opportunities to produce change in the world through understanding "how power functions and devise strategies so as to overcome various forms of oppression" (Bryant 2014:8). In regards to heritage this understanding is relevant in the sense of providing a framework to trace a map that makes visible often neglected aspects as mentioned in relation to the discussion on an integrated approach between heritage conservation and heritage tourism (HC-HT) required for developing the notion of resilience.

Bryant's Onto-cartography (Bryant 2014) proposes a series of premises that provide a framework for the development of the notion of resilience in heritage conservation and heritage tourism, that liberates from partial accounts as manifested in existing resilience frameworks: a) Principle of the inhuman; b) Flat ontology, anarchic ontology; c) Renewal of materialism.

a) Principle of the inhuman

Prior to the development of onto-cartography (Bryant 2014), Bryant and others initiated what has been called "The Speculative Turn" as a reaction to the *project of critique* which privileges the subject in addressing the question of ontology of what beings *are*. For Bryant, in the project of critique things *are* in relation to what they are

[31] Bryant's list of political preoccupations include: Marxist critiques of capitalism; Anarchist critiques of authority and power; Feminist critiques of patriarchy; Deconstructive critiques of essences; Critiques of ideology; Queer theory critiques of heteronormativity; Ecological critiques of environmental practices; Post-humanist critiques of human exceptionalism; Post-colonial critiques of racism; etc. (Bryant 2014:8).

for-us (Bryant 2011). In the project of critique, the presence of the subject is manifested in different forms: the *a priori* structure of mind in Kant, reflexivity and intentionality in Phenomenology, power and discursive constructions in Foucault, language in Derrida and Lacan, history and social forces in Marx, etc. (Bryant 2011:262).

In "The Speculative Turn: Continental Materialism and Realism", Bryant (2011) states the Principle of the Inhuman in his "Outline of an Object-Oriented Ontology" with the claim that "*to be* is to make or produce a difference" ("beings are and become through their differences") referring to an ontology that does not subject *being* as linked to a relation to humans (subject, consciousness, language, etc.) or any other subset of being derived from that relationship (the sociological, the cultural, the semiotic, etc.), but to the 'things themselves' (not *our* relationship to things) (Bryant 2011:263;264;267). In this way, the Principle of the Inhuman situates humans among all beings (that are beings because they make differences in the same way humans do) without assigning this subset a privileged place with respect to other beings which make differences too.

Derived from the Principle of the Inhuman Bryant refers to the Ontological Principle – Flat Ontology where "all beings are ontologically on equal footing or that they all *are* insofar as they make a difference" (Bryant 2011:270).

b) Flat ontology, anarchic ontology

In Bryant's approach, worlds are *ontologically flat* in the sense that *every* machine (or entity) is open to being affected by some other entity, as opposed to a hierarchical or *vertical ontology* where "some beings such as God or Platonic forms are able to affect all others, without themselves being affected in turn" (Bryant 2014:115).

For Bryant "A world is an ecology of loosely coupled machines linked by machines without any of these machines totalizing world" (Bryant 2014:104). Machines do not totalize a world due to what Bryant refers as *void*. *Void* allows movement or change. It refers to emptiness within machines (machines are composites made of other machines) and "that within which machines reside" (Bryant 2014:115). "What onto-cartography maps are relations between machines or networks of machines composing a world" (Bryant 2014:111).

Under this approach Bryant refers to a flat ontology as *anarchic* in the sense that there is no single governing principle acting on a network of machines (entities). Therefore, what exists are "only immanent planes of machines affecting and being affected by one another without a supplementary dimension that structures all their interactions" (Bryant 2014:116).

c) Renewal of Materialism

In Bryant's onto-cartography, *machine* is the name "for any entity, material or immaterial, corporeal or incorporeal, that exists. *Entity*, *object*, *existent*, *substance*, *body*, and *thing* are all synonyms of machine" (Bryant 2014:15). Corporeal and incorporeal machines are differentiated in that the former refers to machines made of matter occupying a discrete time and place, and existing for a duration (e.g. rocks, human bodies, institution, etc.); and the latter refers to machines "defined by iterability, potential eternity, and the capacity to manifest themselves in a variety of different spatial and temporal locations at once while retaining their identity" (e.g. numbers, equations, scientific and philosophical theories, cultural identities, etc.). However, in the machine-

oriented ontology, incorporeal machines require a corporeal body in order to exist in the world (e.g. numbers must occur in brains, computer data banks, chalk, etc.). Both corporeal and incorporeal machines impact each other: speech and writing enabling mathematics; Dietary codes shaping the body (Bryant 2014:26; 28).

Based on this renewal of materialism proposed under a machine-oriented ontology, Bryant defines onto-cartography as "a geophilosophical framework for social and political thought":

"Geophilosophy argues that only the material and natural world exists, that societies and cultures are assemblages within the natural and material world, that the broader natural world plays a key role in how social assemblages come to be organized, that there is no social assemblage that doesn't draw on material flows for energy to resist entropy, and that causally the form socially assemblages take is overdetermined by a variety of different machines" (Bryant 2014:10).

Onto-Cartography and the Problem of Entropy

Bryant's use of *entropy* comes from 'information theory and biology': "Entropy refers not to the tendency of closed systems to lose energy or their capacity for work, but to a measure of *probability* among elements within a system". In this context, "A system is *highly entropic* if an element of that system has an *equal probability* of appearing *anywhere* in that system" (Bryant 2014:93). Bryant uses the example of a gas enclosed in a plastic bottle which starts with a *low entropy* when the gas is pumped in the bottle (there is a *low probability* of atoms appearing anywhere in the rest of the bottle at that point), and then disperse (increase entropy) occupying all the volume (at this point, *any*

atom of the gas will appear *anywhere* in the bottle). On the other hand, "A system is *lowly entropic* if there is very *low probability* of an element appearing at a particular place within the system. In other words, a low entropy system is a system where information about one element enables inferences about others. Such a system is organized and structured" (Bryant 2014:94). Bryant uses the example of a stratified society where the differentiation between classes, identities, functions, etc. is equivalent to "a *low probability* that people will *indiscriminately* appear *anywhere* in the social system" (low entropy). Low entropy states can only be maintained through a series of *operations* performed to perpetuate order. A system that engages in active operations to maintain a state of low entropy across time is referred to as *negentropic* (Bryan 2014:95).

Although it would seem from the example of the stratified society that low entropy is 'good' and high entropy is 'bad', Bryant emphasizes that "entropy cannot be treated as *normative* category" (Bryant 2014:103). Bryant refers to entropy, low entropy and negentropy as "phenomena of being, not moral *preferences*". An example presented by Bryant is the case of political oppressive systems characterized by low entropy and negentropic operations, where emancipatory political struggle will aim towards introducing *more* entropy into the system so as to loosen up a rigid structure opening "to new and different forms of life and existence" (Bryant 2014:104). Furthermore, Bryant refers to how systems characterized by too little entropy respond very poorly in relation to the environments they are embedded in as their rigidity will prevent the development of "new operations for responding to the new and unexpected" (Bryant 2014:105).

In Bryant's terms, *machines* (entities that compose the worlds) face the problem of *entropy* (potential disintegration) and in order to persist across time, "they must engage in perpetual operations that allow them to maintain their organization" (Bryant 2014:9). Under these terms, Bryant (2014:105) refers to *plastic* machines as machines that are not rigidly organized, therefore having "degrees of freedom that allow them to develop new forms of openness to their environment, as well as new ways of operating on the inputs that flow through them". Bryant refers to *plasticity* being unique (at present) to organic, cognitive and social machines[32], and degrees of plasticity being determined by "the sort of machine it is" (Bryant 2014:46).

Under this context, Bryant's onto-cartography aims towards the investigation of the negentropic operations by which machines "stave off entropy and forestall dissolution", either to improve the machine (e.g. increase durability of a building) or to destroy it (e.g. political struggles against totalitarian regimes) (Bryant 2014:107).

Onto-Cartography and Resilience

Bryant does not refer to the notion of resilience (explicitly) in the relationship between machines and entropy. Furthermore, he does not refer to resilience at all even though climate change is a central concern in establishing the necessity of 'thinking ecologically' where it is understood that humans are embedded in a broader natural

[32] As referred to in Chapter-II with the example of current developments in towards self-healing capacities in man-made materials such as concrete, plasticity is also becoming a property of corporeal machines. In general technology and design initiatives are adding plasticity properties to corporeal machine assemblages based on inspirations based on approaches inspired on nature. Current initiatives are focused on the micro-scale (material components), and the principle is transcending what Bryant refers to plasticity defined by "the sort of machine it is".

world and that "non-human things have power and efficacy of their own" regardless of our presence or acknowledgment of them (Bryant 2014:4).

However, efforts for developing resilience frameworks seem to be aiming towards making operative (partially as limited by the focus of each knowledge area) the process of mapping the interactions between entities (machines) that compose a system (other machines and worlds) in order to understand how it functions and depending on the case, *severing* relationships between machines (what Bryant refers to as *deconstruction*) and/or *adding* new machines (what Bryant refers to as *terraformation*), to open or create "new paths of movement and becoming" respectively (Bryant 2014:273). The objective of these interventions is that of improving a machine or assemblage of machines (what Bryant refers to as *worlds*) in response to the threat of entropy.

As discussed in Chapter-II, resilience approaches aim towards 'generating mechanisms to build capacity of systems in order to address challenges of diverse sort'. 'Generating mechanisms to build capacity' (resilience) and 'creating new paths of movement and becoming' (deconstruction and/or terraformation) aim towards the same objective: to "provide us with the means to constructively intervene in worlds so as to produce better ecologies or assemblages" to address change, entropy, etc. (Bryant 2014:256).

The difference between both approaches, resilience frameworks as developed in each knowledge area and Bryant's onto-cartography, is that the former constitute partial accounts of what exists according to the boundaries defined in each knowledge area in

terms of ontological and epistemological assumptions, type of system, etc., and the latter proposes an umbrella ontology where the partial contributions from knowledge areas to access *what things are* can be included as to contribute in the same way Bryant suggests it being able to benefit from partial accounts of reality derived from the methods of analysis of cartographies in the *project of critique* (Kantians, Phenomenologists, Foucauldians, etc.).

The similarities between both approaches (resilience frameworks and onto-cartography) in addition to the general objective of providing the means to intervene in worlds (systems), refer to the process itself:

Resilience frameworks first define the type of system, and the types of actions and reactions it aims to address; the parameters and indicators established according to the methods of access to *what* we can know and *how* we can know it (questions of what is considered knowledge and the access to it – epistemology); and how parameters interact between them (types of relationships that are measured and compared to an index defined). Second, the critical aspects affecting resilience are identified in terms of their effect in the overall index established. Finally, mechanisms to intervene on these critical aspects are proposed in order to improve resilience (as *mechanisms to build capacity*).

Onto-cartography (Bryant 2014) proposes three general steps that are similar to the resilience framework process described above: *cartography*, *deconstruction* and/or *terraformation*.

First, the cartographical analysis consists in the inventory of the machines (entities, things, etc.) that compose a world (assemblage of machines, system, etc.), identifying their functions and interactions in producing *gravitational transformations*. *Gravity* in Bryant's onto-cartography refers to the way in which machines (entities) influence the movement, becoming and interactions between them. Four (4) types of maps are to be produced from this analysis: *topographical, genetic, vector* and *modal*.

Second, *deconstruction* refers to the process where machines from existing worlds are "*severed* to open new paths of movement and becoming" (Bryant 2014:273).

Third, *terraformation*, "or the building of worlds", refers to the process by which new machines are "*added* to existing worlds to create new paths of movement and becoming" (Bryant 2014:273).

The similarities in both processes (resilience frameworks and onto-cartography) in terms of objectives and procedures are substantial. Additional coincidences refer to the origins related to concerns regarding current challenges such as climate change which have exposed anomalies (in Kuhn's terms) in existing frameworks as discussed in Chapter-II. Coincidence or not, the development of both frameworks constitute additional arguments towards the consideration of resilience as an emerging paradigm.

In the same way the on-going process for incorporating the notion of resilience in architecture and related disciplines was discussed in Chapter-II, Bryant's Onto-cartography (and previous concepts introduced in "The Democracy of Objects" Bryant 2011) is currently an emerging approach in its initial stages of discussion in relation to architectural design. In March 9th 2015 Levi R. Bryant presented his lecture "Machine-

Oriented Architecture: Oikos and Ecology"[33]. This lecture constituted an opportunity to reflect on the concepts in the process of formation under Bryant's ontology outside of philosophy using architecture, for the first time, as an outside encounter to reflect on.

From this lecture, the relationship between resilience and Bryant's ontology started to seem relevant when thought of in terms of an ethical approach. Resilience suggests an approach towards improving a capacity to address challenges of diverse sort from a systems perspective that recognizes the complex network of relationships among parameters (natural, physical, social, etc.) interacting at diverse scales in a system (worlds). Bryant's ontology suggests a *geophilosophy* (term borrowed from Deleuze and Guattari but developed in reference to onto-cartography as stated by Bryant) understood as "a philosophy necessarily of the earth and restricted to the material world[34]" where corporeal (material) and incorporeal (iterable) machines interact through corporeal bodies (machines as well) (Bryant 2014:233). Both approaches rely on making *good* maps of interactions among parameters (resilience) or machines (onto-cartography) in order to enable the *best possible* understanding on how the system (resilience) or world (onto-cartography) work, to develop the *best possible* interventions (design decisions in architecture) to improve a system or world. Providing the tools for decision-making (*what to do*) is the ultimate aim in both frameworks, and its effectiveness is dependent on how *truthful* the maps of relationships are in terms of showing (making visible)

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[33] Guest lecture part of the Department of Architecture Lecture Series at Texas A&M University invited by architect and faculty Gabriel Esquivel.

[34] In Bryant incorporeal machines exist but are considered as requiring "corporeal machines to travel throughout the world" (Bryant 2014:233)

things that exist, their interactions, their movements and their becomings, as well as in complete accounts of those things in the proposal of interventions (subtracting or adding machines). Truth in onto-cartography as a flat ontology entails abiding to the claim discussed in Bryant's "The Democracy of Objects":

"…all objects[35] equally exist while they do not exist equally. The claim that all objects equally exist is the claim that no object can be treated as constructed by another object. The claim that objects do not exist equally is the claim that objects contribute to collectives or assemblages to a greater and lesser degree" (Bryant 2011:19).

Onto-cartography in this sense provides an ontology under which a resilience framework for heritage conservation and heritage tourism can be developed. Under this ontology, the neglected aspects of 'culture' identified and discussed in Chapter-III or any others that might be missing in this study, ought to be identified as any other of the machines interacting within Bryant's framework if a complete map of the world (system, assemblage of machines, etc.) is made, and complete accounts are considered in proposals of improvement (subtracting or adding machines) to address challenges of diverse sort.

The rest of the chapter will be dedicated to develop the notion of resilience in heritage conservation and heritage tourism (HC-HT). Throughout the process, case examples from Alcatraz Island (San Francisco, USA) will be used for insights. The process follows the steps proposed by Bryant's Onto-cartography inserted in the

[35] Objects in "The Democracy of Objects" (Bryant 2011) are referred to as machines in "Onto-Cartography: An Ontology of Machines and Media" (Bryant 2014)

structure used in Chapter-II in order to provide a symmetry that enables a feedback between both chapters.

IV.4. Resilience in Heritage Conservation and Heritage Tourism

As presented in Chapter-II, four aspects ought to be clarified in order to establish a definition for the notion of resilience as being used in a knowledge area: (a) type of *system*; (b) type of *capacity*; (c) type of *reaction(s)*; (d) type of *action(s)*. I will refer to (a) and (b).

Insights for a resilience framework using Bryant's machine-oriented ontology are discussed for an integrated approach between heritage conservation and heritage tourism (HC-HT). An integrated approach to resilience in HC-HT aims towards generating mechanisms to build capacity of heritage tourism destinations to address challenges of diverse sort.

(Complex Adaptive) System

The type of *system* (a) refers to the assemblage of machines (world) identified within and related to the heritage site itself that exist in diverse type of scales.

Resilience frameworks group entities (machines) as parameters classified in natural, physical, economic, political, social, human and cultural. Machines classified this way identify domains of knowledge areas that provide the tools for any analysis. However a systems approach recognizes the transversal flow of inputs and outputs for each machine (and itself as an assemblage of machines as well).

An integrated approach to resilience in HC-HT brings together two interdependent entities (assemblages of machines) as introduced in Chapter-III. From an

architecture perspective (the knowledge area from which this study is performed), the intersection between HC-HT constitute the *significant* aspects of the heritage site to be preserved. The built environment in heritage sites' range is understood from the micro-scale of building components to the macro-scale of groups of buildings that conform a district, a site, or a typology (e.g. temples) that interact. This interaction in terms of scale is referred to in Bryant's machine-oriented ontology as the way each machine is an assemblage of machines itself. For example, a historic district which constitutes a machine in itself is made of an assemblage of machines such as individual buildings, which themselves are composed by machines such as building components, etc. This notion of scale is referred to in terms of *inorganic corporeal machines* (Bryant 2014:96).

However, as seem previously in reference to the discussion of "dark tourism issues in the preservation of Alcatraz Island" in Chapter-III, material decisions on inorganic corporeal machines in heritage sites (buildings and structures), entail the agency of a variety of *incorporeal (organic, cognitive, social) machines* acting on those buildings and structures as well. A heritage site, from a machine-oriented ontology view, is a world understood as "an ecology of loosely coupled machines linked by machines without any of these machines totalizing world" (Bryant 2014:104).

The tendency of knowledge areas to *totalize* a world in terms of their access to machines is referred to in Bryant as the risk of missing out the network of mediation (the world) as conditioning the "local manifestations of machines", referred to as *commodity fetishism* (From Marx in Bryant 2014:117). *Local manifestations* of machines in Bryant refer to "the product of the operation of a *power* on a particular input", where power

refers to "the *capacity* possessed by a machine regardless of whether or not that power is exercised" (Bryant 2014:42). *Commodity fetishism* refers to our tendency to relate to the thing itself (commodity) missing the entire conditions under which the thing was produced (people, legal systems, network of distribution, etc.). Criticisms in this regard are mentioned by social sciences in reference to how preservation decisions focus only in the building (tangible heritage) without considering how it embodies social and political relations (Milligan 1998; 2007). Other criticisms are related to the lack of including sustainability concerns in relation to the life cycle of materials and components involved in the production of the building interventions as well.

i) Case example: Rehabilitation Puppy Stairs (Alcatraz Island, USA)

An example to illustrate the risk of commodity fetishism in design decisions in preservation, is the case of the Rehabilitation of the Puppy Stairs in Alcatraz Island (San Francisco, USA).

As presented previously in "Dark Tourism Issues in the Preservation of Alcatraz Island", the Rehabilitation of the Puppy Stairs was an intervention developed through a partnership between the National Park Service, the Concrete Industry Management program (California State – Chico) and the chemical company BASF, aiming towards repairing and maintaining the reinforced concrete stairs known as "the puppy stairs" with the use of different stains and pigments with decorative concrete to match colors and textures of the existing remains. This preservation treatment was referred to as a Decay-State Approach as it aimed towards reestablishing a significant historic period

including the state of decay when the intervention was performed (considered as historic layers as well).

The repaired puppy stairs under the decay-state approach performed, constitutes the local manifestation of a network of machines interacting in Alcatraz Island (heritage site as a world). In one hand, the *inorganic corporeal machines* of the heritage site embodied in this case example as the reinforced concrete historic stairs. In another hand, *organic incorporeal machines* acting on the heritage site representing the diverse groups of stakeholders involved.

Bryant (2014:96) refers to two ways in which machines resist entropy. On one hand, "*inorganic corporeal machines* resist entropy through the agency of *forces*", forces refer to the physical and chemical way in which molecules "are held together or resist dissolution". These corporeal machines on their own do not perform operations to repair themselves in order to preserve their organization through time. On the other hand, *organic incorporeal machines* engage in *negentropic* operations to "reproduce their parts and maintain their organization".

The Puppy Stairs, as an *inorganic corporeal machine*, was in a high entropy state (deterioration) when the interventions started. This deteriorated state was a result of a natural process of decay of the structure due to the composition of materials, construction processes and the interaction with the maritime environment. The low capacity of this structure to withstand the threat of entropy is due to its inability to perform operations to continue its existence through time. In heritage sites therefore, when the preservation of significant inorganic corporeal machines is continuously

threaten by this condition, operations that guarantee the *flow* of matter through those machines are dependent upon the *organic incorporeal machines* through which resources for these interventions pass. In this sense, inorganic corporeal machines are highly dependent upon organic incorporeal machines in their battle against entropy when there is a specific state in which they are defined to be maintained. The state of deterioration in which the Puppy Stairs were at the beginning of the intervention constitute the local manifestations of how resources to maintain this structure as defined ceased to *flow* at some point (or are an irregular, inconsistent flow). The lack of flow of resources and matter in Alcatraz Island add entropy to the system (world) threatening its capacity to continue existing. Throughout Alcatraz Island all buildings and structures are examples of this.

From another view of interactions among machines in Alcatraz Island, the assemblage of highly entropic *inorganic corporeal machines*, constitute inputs as well for *organic incorporeal machines* interacting to maintain the site as an attractive tourism destination. As referred to in a previous chapter, *dark tourism* constitutes the category by which Alcatraz Island has kept a continuous flow of visitors throughout time. Organic incorporeal machines engage in negentropic operations to maintain this image and guarantee the flow of visitors and resources (e.g. tourism and the commercial industry derived from it). Negentropic operations aim to keep under control the structure of relations among machines within the boundaries defined by heritage management policies (which are organic incorporeal machines as well).

Eventually, as negentropic operations to maintain a system (world) fail to the limited flaw of resources (energy that enables work to be done by machines), Worlds loosen-up enabling introduction of *more* entropy into the system in the attempt for new alternatives. More entropy can enhance the *plasticity* of a system improving its capacity to interact in an environment by opening for engaging in new operations with "other machines and flows from other machines" (Bryant 2014:104). However, Bryant refers to the *risk* of this openness to an environment due to the fact of that environment being more complex than the machine itself. This entails the possibility of "a machine's operational closure and selective openness to its environment" always facing "the possibility of being blind to flows from other machines that could destroy it or of being unable to adapt to changes in its environment that would similarly bring about its demise" (Bryant 2014:104). The risk of blind flows and interactions as the unforeseen causes and consequences of technological decisions.

Alcatraz Island is an example of how negentropic operations to prevent the site from falling into a highly entropic state have failed due to the lack of input in terms of resources (matter, energy to do the work) from defined interactions with other machines involving the source of funding and support for heritage sites from the network of official institutions in charge of its management. These limitations have required opening Alcatraz Island to other machines and flows from other machines outside the established network (rigid and negentropic).

Translating this discussion to The Puppy Stairs structure, the rehabilitation process is an example of the *negentropic* and *plasticity* aspects introduced above as a

way to address the threat of entropy. Further on I will refer to other examples illustrating other aspects of plasticity in machine interactions, entropy and resilience in Alcatraz Island (e.g. @Large Exhibit 2015). The starting point as a baseline state condition for the rehabilitation of the Puppy Stairs was that of a highly entropic structure interacting with negentropic heritage and tourism management machines. In an effort to loosen-up and open to flows from other machines that offered matter and resources as negentropic operations for preserving the Puppy Stairs, the partnership between heritage tourism managers in charge of the site, an academic institution (offering technical expertise, personal, coordination, and networks), and industry (offering matter and resources) brings both known and unforeseen consequences:

An immediate consequence which constitutes a benefit for the heritage site, is that the process of high deterioration of the Puppy Stairs was controlled by reconstructing the sections completely or partially damaged. This was possible by opening the system to an environment that allowed new flows (matter, resources, etc.) from other machines (education institutions; private industry). A highly entropic inorganic corporeal machine engaged in negentropic operations, and will maintain its preserved condition while this flow of resources is guaranteed due to the inability of inorganic corporeal machines to perform operations to maintain themselves as mentioned previously.

Other benefits relate to opening the heritage site to other machines and interactions refers to expanding the themes related to the heritage site, such as the use of Alcatraz Island as a ‘laboratory’ for testing new repair and maintenance techniques in

historical concrete, preservation documentation and survey technologies, construction management procedures, etc. These new themes could become part of a feedback loop applied in negentropic operations for preservation of reinforced concrete historical structures throughout the site and extended to contribute to preservation technology knowledge in general as well. These new themes the heritage site engages in (opens to) also contribute to expand the network of support due to a diversity of topics and interests adding *new values* of *significance* (e.g. history of construction, historical concrete, etc.).

Risks, however, exist related to this openness to other machines. As soon as the heritage management machines of the site depend on external machines to slow down the entropy of its own system, their own existence starts to be jeopardized unless operations are developed to detect possible threats. In this sense, the discussion on *commodity fetishism* starts to become relevant and constitutes the warning by which identifying the kind of system is so important in developing a resilience framework in HC-HT.

Each of the new machines (academic institutions, industry) entering through the openness allowed by the Puppy Stairs Rehabilitation project, has its own way of accessing this world (Alcatraz Island) but tend to miss out the entire effects of their inputs in the Puppy Stairs as an inorganic corporeal machine interacting with organic incorporeal machines that manage Alcatraz Island in its entropy threats as a heritage site under the dark tourism umbrella (unforeseen causes and consequences). *Commodity fetishism* in this case occurs when the preservation decisions in the Puppy Stairs focus primarily in the corporeal aspects of the system only, and the process by which the

selection of a preservation approach is not a process acknowledging the conditions under which this decision was performed (causes) or the consequences of it.

The decay-state reached by the Puppy Stairs before the rehabilitation is a *local manifestation* of the highly entropic state in which Alcatraz Island is, not only in terms of inorganic corporeal machines but of organic incorporeal machines as well. Under what kind of criteria a decay-state became recognized as 'layers of history' other than in the compliance with a dark tourism image reinforced by the damage in the fabric? What does this have to do with the significance related to the site in terms of its historical events? What are the incorporeal machines that are missing in this system to explain or control this? How are the new machines benefitting from the vulnerabilities of a highly entropic system to insert themselves as part of the solution to the point of assuming the leadership in the way Alcatraz Island *will become* modifying itself towards accentuating a dark tourism image that can be used for promoting new commercial purposes of external interests? (e.g. decorative concrete industry). With a weakened capability in terms of resources (including staff) of heritage management machines in Alcatraz Island, how are aspects related to tracking the performance and sustainability of solutions implemented being guaranteed? How is the feedback loop of interventions monitored so as to recognize the alterations in the level of entropy in the system?

It is not that enabling the access of new machines as the partnership for the Puppy Stairs rehabilitation project is in itself a 'bad' solution. What is problematic is the lack of recognition of how existent and new machines interact in the system affecting the capacity of the site to address challenges of diverse sort (resilience).

As mentioned by Bryant, each machine is an assemblage of machines itself, and each one engages in selective operations with other machines. For example, the 'new machines' partnership has evolved since the Puppy Stairs rehabilitation project to be managed by the Concrete Preservation Institute[36] (CPI) for on-going projects of similar and expanding nature[37] in Alcatraz Island (and the Golden Gate National Recreation Area); in this way, the capabilities of this partnership to affect the dynamics of incorporeal and corporeal machines tend towards the control through negentropic operations in Alcatraz Island to the point of becoming machines inside the system modifying the *gravitational* relationships among machines inside the heritage site. Is this good or bad for Alcatraz Island?

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[36] The Concrete Preservation Institute (CPI): "is a nonprofit public benefit organization structured and operated exclusively for charitable purposes to provide training and education in historic preservation, stewardship, repair, and research of concrete cultural resources" (Concrete Preservation Institute 2015). During the Puppy Stairs Rehabilitation project, the coordination was a partnership between the Concrete Industry Management program at California State University, Chico, the National Park Service, the Golden Gate National Parks Conservancy and BASF The Chemical Company. With the Concrete Preservation Institute (CPI), the partnership model broadened its reach and *autonomy*, where BASF The Chemical Company and Hilti are sponsors, National Park Service and Golden Gate National Parks Conservancy are partners, and the Concrete Industry Management program at California State University, Chico acts as a cooperating organization. In this way, the CPI refers to is 'unique public/private partnership model: "not only sustains and grows its activities and impact, but also provides scholarships to worthy participants. We welcome new partners at Alcatraz and future CPI Field School locations" (Concrete Preservation Institute 2015).

[37] A fragment from the Concrete Preservation Institute (CPI) website in reference to its expanding projects in Alcatraz Island and the Golden Gate National Recreation Area (GGNRA): "In partnership with NPS, CPI's leadership and staff have lead Preservation Stewardship Field School activities since 2010 at Alcatraz Island. The Island is a national historic landmark within NPS's Golden Gate National Recreation Area (GGNRA) that receives on average 5000 visitors each day. While our activities have focused on Alcatraz, we engage in projects throughout the greater GGNRA and plan to expand the program. Due to our tremendous success in meeting our goals, including remarkable alumni job placement with world-wide leading companies, and becoming a valued NPS partner, we are in discussions to develop additional field school locations at other National Parks and historic sites" (Concrete Preservation Institute 2015).

Furthermore, in this system (Alcatraz Island) other machines are missing. The machines that regulate the heritage conservation practice itself. When analyzing if what has been exposed is good or bad for Alcatraz Island (negentropic operations) under established guidelines for preservation treatments in the United States, the openness to other machines and flows from other machines and their effects on preservation decisions comply with standards and guidelines established by these machines.

In order to "promote responsible preservation practices" in the United States, the U.S. Department of Interior published in 1992 the "Secretary of Interior's Standards For the Treatment of Historic Properties" (National Park Service).This document provides a general guidance for qualified professionals in heritage conservation who work with properties listed in the National Register of Historic Places (NRHP). The NRHP "is the official list of the Nation´s historic places worthy of preservation" (National Park Service), and it is administered by the National Park Service (NPS), a bureau of the U.S. Department of Interior.

The document promotes heritage conservation principles organized as *standards* and *guidelines*, to be used for decision making on works done in historic properties of "all types, materials, construction, sizes and use. They include both the exterior and the interior and extended property`s landscape features, site, environment, as well as related new construction" (National Park Service).

"*The Standards* are a series of concepts about maintaining, repairing, and replacing historic materials, as well as designing new additions or making alterations."

"*The Guidelines* offer general design and technical recommendations to assist in applying the Standards to a specific property" (National Park Service).

In general, the *standards* are regulatory for "all grant-in-aid projects assisted through the National Historic Preservation Fund" and in specific, the standards for Rehabilitation are regulatory "for the review of rehabilitation work in the Historic Preservation Tax Incentives program. The guidelines are advisory, not regulatory" (National Park Service).

These standards and guidelines are used by Federal agencies, state and local officials and historic district and planning commissions in the U.S. The standards provide a philosophical framework once the decision of what features of the historic property should be saved has been made and which *treatment* has been selected. The treatment approaches specified in the standards (National Park Service) are: Preservation, Rehabilitation, Restoration and Reconstruction.

The treatment approaches in the Secretary of Interior's Standards are based on the following values: value of meaning and historical significance, value of documentation, value of reversibility, value of adaptive technological upgrade.

Value of meaning, and historical character and significance:

Refers to the fact that buildings are "a physical record or its time, place and use" therefore any misleading change that creates confusion to the identification of its defined as "true" period (e.g. restoration and reconstruction) or periods (e.g. preservation and rehabilitation) is avoided. A "true" period or periods are defined as the original(s) state(s) to which material actions comply.

Value of documentation:

Refers to the meticulous process of researching available records of the historic property, as well as the registration of the state in which it is before any alteration, and any procedure performed during its intervention. The research of available records include its original design, further design modifications, construction process and any further alterations, in order to identify “distinctive materials, features, finishes and construction techniques or examples of craftsmanship that characterize a property” and should be preserved. For the treatment of Restoration this value applies as well considering the available information on the property (documents, photographs, drawings, oral history, etc.) or possible (archeological) remains in tangible form at the site.

An example of the importance of this process is the effect that construction developed in different periods has on the overall structural behavior (e.g. masonry structures). Being able to have the correct localization of where one period starts and when the other begins results in a more approximate structural model for simulation of structural behavior.

Another example refers to the necessity of obtaining information related to environmental and historical events that might have affected the building such as earthquakes, thunderstorms, flooding, bombing, among others.

Value of compatibility and differentiability:

Refers to the harmonious integration and the demarcation of new elements, with and from the "remaining character-defining features of the historic building" (From Rehabilitation Guidelines). This value seems to refer only to some of the treatments however, in practical terms, all treatments will be subjected to incorporate elements or procedures which would include contemporary building code requirements. Even the treatment of Reconstruction will require including them. Therefore, this value provides criteria to address this challenge.

Value of reversibility:

Refers to the moderate approach in the selection of the chemical and physical treatments which are selected in order to avoid those that can cause damage to historic materials. Considering that through time new techniques have been developed and also the damage provoked by some of the ones previously applied has been identified, currently a more cautious attitude is preferred where additions and interventions should be able to be removed without affecting the historic property. There is no longer an absolute trust in new technological developments; there is always a margin of doubt left for the impacts caused by innovative solutions that can only be tested as time passes. In the case of the treatment of Reconstruction, this value suggests a careful attention to documents displaying materials, features, finishes, spaces, and spatial relationships that might not comply with current building codes and standards. Therefore, the value of reversibility, will be applied in this case since the decision-making process of what and how the building will be built.

Value of adaptive technological upgrade:

Refers to the unavoidable need to improve the functionality of historic properties complying with the permanent developments in building codes (accessibility, health and safety, energy efficiency, structures, etc.), without damaging its character-defining materials or features. This means that intervention techniques are allowed to go as far as "imitating" old materials in order to keep an "image" of authenticity: "the new material will match the old in composition, design, color and texture" (e.g. preservation standards).

As can be seen, under the current values being considered in the Secretary of Interior's Standards, the operations described in the example of the Puppy Stairs should be of no concern. It is therefore at the level of standards and guidelines that a substantial modification is required in order to guarantee that values contributing to addressing the problem of entropy (and change in general) are included, as well as including sustainability[38] concerns as well. The Secretary of Interior's Standards is focused mainly in addressing preservation decisions in terms of material aspects of buildings and structures (as *isolated* entities).

The example of the Puppy Stairs in Alcatraz Island helps to illustrate how the system initially defined as a structure (reinforced concrete stairs) within the heritage site itself, expands to include machines the heritage site interacts with (e.g. NPS; Secretary of Interior's Standard; etc.) as well as new machines (academic institutions, private

[38] Sustainability beyond performance of building and structures, including a life cycle approach in reference to resources involved.

industry) that generate new operations (with its risks and opportunities). This example shows how defining the kind of system towards a definition of resilience in HC-HT includes the heritage site and the series of machines that directly or indirectly interact with it (for better or for worst).

The inventory of machines that define a system (world) is the first step in the process of mapping (cartography) as proposed in Bryant's Onto-cartography.

(Building) Capacity

Resilience frameworks and onto-cartography provide a similar process towards enabling change to improve systems. Improving a system focuses on *building* capacities to address the threats of entropy. The capacity of a machine in Bryant refers to its "powers, capacities or abilities". A machine is not defined by its qualities but "what it *can* do, not the *doing* that it happens to do under particular circumstances". In this way, the power (capacity) of a machine is always greater than its *local manifestation* at a given space and time, "under one particular set of circumstances or gravitational relations to other machines" (Bryant 2014:201). Therefore, mapping a machine and its interactions with other machines constitutes one possible arrangement manifested and does not define what the world (system) *is*. Building capacity then refers to enabling potentials to unfold what machines can *do*.

Bryant refers to machines as *objects* in terms of the possible ways in which they engage in gravitational relations (interactions) with other machines in a world. In this sense, machines can be any of six types of objects depending on the relations with other machines: *dark* objects, *bright* objects, *satellites*, *dim* objects, *rogue* objects, or *black*

holes. This characterization is not intrinsic or fixed for any machine but it relies only on the gravitational relationship it establishes with other machines under certain conditions. Machines can be one type of object under a certain assemblage and another under another assemblage. Therefore the *frame of reference* (type of system) must be specified as it establishes the conditions in which a machine acts as "a particular type of object" (Bryant 2014:197). The six types of objects (gravitational relations of a machine in a specific assemblage) are defined as following (Bryant 2014:;205;207;208;209): (a) *Dark object* is a machine that does not manifest itself nor produces gravitational effects; (b) *Bright object* is a machine that *captures "*other machines in their orbit, organizing or structuring their local manifestations, their movements, and their paths of becoming" (e.g. the sun); (c) *Satellite* is a machine captured in the orbit of a bright object (e.g. sons in parents orbit); (d) *Dim object* is a machine that faintly appears in an assemblage and exercises "very little gravity of their own"(e.g. homeless); (e) *Black hole* is a machine "whose gravitational bending of space-time is so great that nothing can escape from it"(e.g. terminal illness); (f) *Rogue object* is a machine "unattached to the gravitational field of any particular world" that goes in and out assemblages transforming relations between machines in those assemblages (e.g. earthquakes).

i) Case example: @Large Ai Weiwei exhibit (Alcatraz Island, USA)

An example to illustrate how these types of objects operate refers to the effects of the @Large Exhibit (Ai Weiwei) (For-Site Foundation 2014) as a Rogue Object in Alcatraz Island (San Francisco, USA).

The federal prison period theme in Alcatraz Island acts, under its contemporary role as a heritage tourism destination, as a *bright object* organizing most HC-HT machines interacting in the site which act as *satellites* (e.g. visitor flows, predominant stories, commercial display, preservation approaches, etc.) or *dim objects* (e.g. secondary buildings in relation to the prison theme such as the industries building; 'secondary' themes not associated to the federal prison period such as the native American occupation). In terms of how the site is used and what it offers as an experience for visitors, it functions as a *rigid* assemblage where all operations aim towards maintaining this theme relevant and commercially active (e.g. guided tours, souvenirs, books, tv series, etc.) under its association with dark tourism.

In April 26 2015, the exhibit @Large: Ai Weiwei on Alcatraz closed after running since September 27 2014 with the following indicators of success as reported by the For-Site Foundation (organizer of the exhibition with Chinese artist Ai Weiwei): 71% increasing attendance of visitors from the region and 120% increasing attendance by San Francisco residents over the previous year (For-Site Foundation 2015).

Ai Weiwei's exhibit in Alcatraz Island follows his approach to integrate art and activism. In the @Large exhibit the artist addresses the themes of freedom of expression and human rights using Alcatraz Island as a multi-layered stage for his installations in for locations: the new industries building, a group of cells in A Block, the hospital, and the dining hall, which (with the exception of the dining hall) are usually restricted to the public but were opened for this exhibition.

Within the rigid assemblage of Alcatraz Island, @Large acts as a rogue object, as it was able, through its temporary trajectory through the site, to alter the gravitational relations where some *dim objects* acquired visibility (e.g. new spaces that were opened for the exhibit and will be considered as exhibit spaces for future uses; the neglected voices of prisoners around the world; Ai Weiwei's voice outside of China), and modified through an altered experience during this period the perception of the potentials of this heritage site to address relevant topics of contemporary interest such as an expanded notion of what freedom represents for different people in different places. This exhibit provided the opportunity to explore what different machine interactions can do to expand towards new possibilities for this heritage site. In other words, this transitory arrangement of machines increased the *plasticity* of the site as it engaged in emancipatory political expressions using the latent potential of the themes by which Alcatraz Island is deemed as significant.

The expansion of themes, which attracted different types of visitors to Alcatraz Island, is also manifested in the commercial products developed.

From a heritage conservation perspective, this exhibit provided the opportunity to retrieve resources towards preservation actions. The priority given to this exhibit enabled the flow of resources to stabilize areas that were not opened to the public. Nevertheless, actions were oriented to the minimum aspects allow the exhibit to be installed, and additional challenges emerged with the effects of visitors in these areas (e.g. graffiti).

The location of the exhibit beyond the main prison building area also encouraged the flow of visitors to areas that are not usually of interest during the stay in the island.

IV.5. Conclusions

The development of frameworks presented is triggered by similar conditions: Increasing challenges that existing processes have proven to have failed addressing; the development of knowledge in diverse areas which provide *new evidence* to understand what things *are* and how they interact; and the development of technology in diverse areas which provides new processes to *access* what things are and their interactions.

Sustainability as a paradigm, Evidence-Based Design, Onto-Cartography and resilience are examples of frameworks that emerge and develop in order to guide decision-making processes. All four concepts have multiple roles in terms of their nature as *conceptual* and *operational* frameworks:

(1) In their attempts to *guide* action, they are *ethical* approaches.

(2) In their attempts to explain what things *are,* they are based on *ontological* assumptions.

(3) In their attempts to provide a way to *access* things, they are based on *epistemological* assumptions.

(4) In their attempts to *change* how things are, they are *design* approaches.

Differences among the four frameworks are in terms of scale. Onto-Cartography is the broadest framework and could include the other three *if (and only if)* they comply with its *flat ontology* approach.

Evidence-Based Design (EBD), as currently promoted, does not comply with this flat ontology as it privileges a way to *access* things (scientific-approach) over any other (epistemological bias). However, EBD is expected to include other knowledge-based

approaches as research evolves by integrating the views of other knowledge areas collaborating with architecture beyond STEM (Science, Technology, Engineering, and Mathematics) areas.

Sustainability and resilience approaches must be careful to fall into the current EBD bias and benefit with the openness of Onto-cartography. However, important lessons from EBD provide a structure and step-by-step examples of a model to address complex design challenges.

Both sustainability and resilience comply with Onto-cartography's flat ontology as they are based in a systems approach, and their concerns are common based on an awareness of social and ecological intertwined relationships. From a timeline perspective, sustainability, resilience and onto-cartography seem as complementary stages in the *evolution* of a *same paradigm*, a paradigm that aims towards a holistic understanding of what things *are* and how they interact with each other. This paradigm is a moving target that aims towards addressing entropy as a challenge. This paradigm is not a deterministic path, but is the result of a learning-loop according to what occurs (actions) and the responses to it (reactions) in the pursuit to address challenges of diverse sort that threaten the existence of things.

From a survival viewpoint, it was natural as an evolving process that we would address challenges of diverse sort that affect *us*. Therefore the aim towards understanding things in terms of what they are *for-us*. This approach was reasonable until the point where our power over things started to affect *us* surpassing the limits of

growth (sustainability) and the limits of change (resilience) in the systems we share with other things.

In terms of what we can do about this, as defined by the boundaries of professional practice, aiming towards a *more* complete account of what things *are* and how they interact with each other would correspond to our (ethical) mission. This obliges a continuous revision of our ontological and epistemological assumptions.

In order to address the increasing challenges threatening the existence of heritage sites (corporeal and incorporeal aspects), onto-cartography seems to suggest an inclusive ontology for a holistic understanding of what a heritage site *is* in first place. Onto-cartography proposes an analysis procedure to determine the entities and their interactions so as to continuously revise what this assemblage *is* at a given space and time. Onto-cartography also refers to two processes to improve this assemblage of things (*deconstruction* and *terraformation*).

Onto-cartography is not proposing something new. Evidence Based-Design either. Neither are sustainability and resilience. What these terms do is unifying and providing a structure in the form of conceptual frameworks for ways to understand the world, ways to access it and ways to change it for improvement (hopefully).

Architecture is continuously redefining what it is, what it does, what counts as knowledge and how it can be produced. This endeavor is a moving target as ontological and epistemological assumptions in which it basis its conclusions change at a given space and time.

One of the most important attempts in architecture is De Architectura - Ten Books on Architecture (Vitruvius), a treatise written by Roman architect Vitruvius as a guide for Emperor Caesar Augustus to understand existing and to-be constructed buildings. Vitruvius develops the guide as a set of rules in ten books. For defining the rules to be applied for existing and new buildings, Vitruvius establishes the assumptions in which his framework is based.

Ontologically, for Vitruvius things are made up and produced by the coming together of water (Thales), fire (Heraclitus of Ephesus), atoms or indivisible bodies (Democritus and Epicurus), and earth (Pythagoreans). Based on this assumption, Vitruvius considered buildings in terms of "the diversity and practical peculiarities of these things as well as of the qualities which they exhibit in buildings" (Vitruvius n.d. 42).

Epistemologically, for Vitruvius architecture knowledge comes from a variety of knowledge areas (geometry, music, medicine, law, etc.) and kinds of learning (from manual skill to philosophical understanding) resulting from both theory and practice; in addition, the architect was assumed to be both "naturally gifted and amenable to instruction". Based on this assumption, the architect ought to be *well armed* in order to address *all* aspects of the process: from conceiving and developing the drawings to being able to explain the historical reasons by which an ornament is done the way it is (e.g. Caryatides).

Vitruvius' treatise is a time and space specific guide (Roman Empire) which is mostly referred to today in relation to its ethical claim for a *good* building as complying

with three aspects: *Firmitas, Utilitas* and *Venustas* (translated as durability, convenience and beauty; stability, function and beauty; firmness, commodity and delight; etc.). These considerations have seemed to suffice under the notion of architecture defined for Vitruvius as in charge of "the art of building, the making of timepieces, and the construction of machinery", and building typologies consisting of fortifications and public spaces, and private spaces.

In reference to current challenges, these ontological and epistemological assumptions are limited. In architecture what a *good* building *is* requires complying with the relation of the building with the system to which it pertains. Sustainability and resilience aim towards addressing this missing aspect to self-centered approaches in architecture derived from a decontextualized understanding of Vitruvius' triad (Vitruvius also referred to economic and sustainability aspects). *Firmness, commodity* and *delight* are still required aspects towards producing *good* architecture. Furthermore, these aspects are in continuous evolution, and attempts for developing rules for each of them is a continuous attempt in the history of architecture and allied knowledge areas. Even in the development of resilience frameworks in architecture and related fields, aspects associated to *durability/firmness* have become one of the most important aspects referred to as 'resilient design', as it relates to enduring/withstanding impacts.

Therefore, in architecture's pursuit to continuously improve with changing conditions, it must clearly discuss its ontological and epistemological assumptions to be able to make visible any possible bias that might be holding it back in this attempt.

Heritage structures, buildings and sites provide opportunities to rethink assumptions due to their complex interactions with a variety of knowledge areas. Heritage conservation must move towards recognizing its limitations and biases in the assumptions that guide its practice. Through transdisciplinary efforts such as the integrated approach between heritage conservation and heritage tourism being proposed here, architecture can gain a better understanding of the opportunities from on-going and emerging paradigms such as sustainability and resilience, respectively.

Sustainability acknowledges the *limits of growth* a system can endure before it no longer has resources to exist. Sustainable approaches aim towards maintaining (or increasing) resources in the system to survive.

Resilience acknowledges the *limits of change* a system can endure before it becomes something else (for better or for worst). Resilience approaches aim towards building capacities in the system to address change.

…firmitas, utilitas, venustas… sustinere, resiliere…

CHAPTER V

TOWARDS A 'NEW MATERIALISM' FOR RESILIENCE IN HERITAGE CONSERVATION AND HERITAGE TOURISM

V.1. Overview

This chapter starts with discussing three (3) critical aspects the previous chapters have suggested so far: First, the inadequacy of a material approach in heritage conservation to address increasing challenges, and how a resilience approach suggests insights to address this problem; Second, how an integrated resilience approach between heritage conservation (HC) and heritage tourism (HT) informs a resilience approach to address increasing challenges in heritage sites; and third, how the "new materialism" (in which Bryant's Onto-cartography is inserted) informs the notion of resilience in an integrated approach between HC-HT. This chapter ends with bringing Bryant's 'new materialism' for developing the notion of resilience in HC-HT.

V.2. Contributions of Resilience to Heritage Conservation

Heritage Conservation and its Material-Oriented Approach

Heritage sites, historic districts, buildings and structures constitute a typology with complex challenges in architecture. I refer to heritage conservation (aka historic preservation) from the lens of architecture in order to encompass the problem of deciding *what to do* (as a design problem) with heritage sites as a complex typology of the built environment. The process of decisions around the question of *what to do* with a historic site, is accompanied by the questions of what can we do (related to what we know), why should we do it (ethical) and how to do it (action). From an architecture

lens, the complexities of *preserving* the built environment are of a different nature. From an ontological view, what a heritage site *is* (and therefore what is it that is being preserved) is currently being defined (charters, standards and guidelines in the western world) with a tendency towards material and aesthetic approaches (which has been criticized by areas outside of architecture as mentioned previously). Therefore, epistemological approaches to access what we know of heritage sites aim towards material-based accounts provided by scientific knowledge areas, and addressing the aesthetic dilemma of what is valuable to preserve as an inherent property of the thing itself (e.g. Adorno's 'Aesthetic Theory) or in terms of a human understanding of it[39].

The consequences of these ontological and epistemological assumptions are: (1) a focus on the *material, tangible, corporeal* aspects of heritage predominantly, which are assigned the highest level in a hierarchy of what is of value; (2) A *static* and *rigid* view of what is of value in terms of meaning (e.g. the notion of freedom), time (defined periods of significance) and space (the physical boundaries of what the thing *is* in diverse scales).

What to do, as a design problem, is therefore established under these assumptions in charters, standards and guidelines regulating the western practice of heritage conservation (Athens and Venice Charters; Secretary of Interior's Standards in the United States - SIS).

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[39] Theodore Adorno's Aesthetic Theory: "truth-content in the artwork itself" not in reference to human understanding of it (Bryant 2014:v). Adorno refers to "The re-enchantment of the world through aesthetic experience" (Brennan & Lo 2011).

For example, the values associated to the type of treatment classified in the Secretary of Interior's Standards (preservation, rehabilitation, restoration and reconstruction) refer to establishing a buildings as: "a physical record or its time, place and use" therefore any misleading change that creates confusion to the identification of its defined as "true" period is avoided. Derived from this definition of what a building *is*, the main values for all four treatments are derived: the value of documentation refers to the meticulous research of available records, and survey of existing remains; the value of compatibility and differentiability refers to the harmonious integration and demarcation of new elements; the value of reversibility refers to the moderate use of chemical and physical treatments; and the value of adaptive technological upgrade refers to the improvement of physical properties to comply with contemporary regulations (structural, functional, safety, etc.).

From a practical perspective for deciding what to do with a heritage site, these values are challenged by the context in which decisions are made (ethical conditions) which take into account, under the SIS framework, the following aspects: Historical significance, recognized as the different layers of relevant periods manifested in the material fabric; physical condition of the heritage property; proposed use; and mandate code requirements.

Values and ethical conditions defined in standards and guidelines such as the Secretary of Interior's Standards provide a framework for a material-oriented approach, focused on the tangible properties and qualities of a heritage site.

Recent guidelines regarding sustainability have been developed in 2011 for the Secretary of Interior's Standards in reference to rehabilitation as a treatment. Tangible aspects of heritage focus on the energy performance aspects of existing buildings. A common expression used connecting sustainability and heritage conservation from an architecture lens is: "The *most* sustainable building may be the one that already exists". From an ethical viewpoint, "*good* preservation practice is often synonymous with sustainability". Furthermore, for deciding what to do with a heritage site importance is given to "the building's *inherently*-sustainable qualities as they were intended" (NPS 2011:1). Under these assumptions, sustainability guidelines developed provide recommendations for technical solutions towards a balance between building's energy performance and its character-defining features to be preserved.

Challenges to a Material-Oriented Approach in Heritage Sites

Increasing challenges affecting heritage sites are caused by external agents such as climate change, resource shortages, social inequalities, wars, etc. which constitute (natural and anthropogenic) disasters for heritage conservation. The impact of these effects on heritage sites challenge any attempt for preservation efforts due to the overwhelming consequences altering the material fabric and its character-defining features. Furthermore, disasters in heritage sites add new layers as relevant periods to be considered from their occurrence on. In some circumstances, the disaster itself or the association with a negative event become the significant reasons by which a place, building or structure is recognized as heritage.

Challenges due to change under these considerations encounter limitations under a material-oriented approach in heritage conservation in terms of the following aspects:

(1) The hierarchy of values in which corporeal aspects of heritage are given priority is questioned as the effects of impacts surpass any possible material response, the voices of neglected actors are heard reclaiming visibility, unsustainable processes cannot keep up with demands, etc. A network of relevant aspects become visible where corporeal aspects of heritage is *one* among the rest.

(2) Due to these challenges and the role of heritage sites in a network of relationships, what is of value (significance) questions *static* and *rigid* boundaries in an attempt to preserve its relevance through change.

In the Secretary of Interior's Standards (SIS) a reference to the unavoidable changes affecting heritage sites is made in terms of acknowledging that "those changes that have acquired historic significance in their own right shall be retained and preserved" (NPS 2011:viii).

A broader understanding of the relationships between heritage sites and its surroundings enhanced by changes in values promoted by an environmental ethics are said to be acknowledged by the heritage conservation community in terms of how preservation of existing buildings can contribute to a sustainable future. This approach expands the focus on a justification for preservation practices beyond the building itself towards its effects towards "saving embodied energy, reducing the need for new energy, and contributing to the larger societal ethic that recognizes the limits to our growth"

(Melnick 2009). This approach nevertheless continues to base its arguments on material aspects (energy).

Contributions of Resilience to the Challenge of Heritage Sites

As discussed in Chapter-II, the notion of resilience is currently being developed in diverse knowledge areas in order to address increasing challenges that threaten the systems that exist. To the previous challenges described for preservation of heritage sites, resilience contributes with the following aspects:

(1) The notion of resilience brought to heritage conservation acknowledges the role of *diverse* parameters (tangible/corporeal and intangible/incorporeal) and their relationships (divide, collaborative, symbiotic) as defining the capacity of heritage sites to address challenges of diverse sort. Furthermore, resilience approaches recognize heritage sites as part of systems and networks of interactions (e.g. as part of a district, a city, a community, an environment).

(2) The notion of resilience contributes to the idea that heritage sites have a *power* to enhance its capabilities which are adjustable according to different levels according to the design approach established (survive, adapt, heal, etc.). Therefore, the type of treatment defined in heritage conservation has an expanded potential beyond its constrained boundaries in physical and temporal terms.

Conceptual and operational challenges were discussed in reference to the evolving process of resilience as an emergent concept in knowledge areas like architecture and related disciplines. Some of the limitations derived from these

challenges call the attention for further conceptual elaboration on the notion of resilience *before* efforts are oriented towards *measurement* of parameters and their relationships.

In this regard, Ungar (2012:54) refers two conditions that are necessary for doing measurements in relation to the notion of resilience: First, having reached a level of abstraction of the phenomenon to the level of establishing the mechanism (concepts and relationships among them), and second, having a clear conceptual framework.

Ungar (2012:54) refers to three hierarchical levels in order to understand the universe as the step towards developing the notion of resilience. The first level corresponds to the *phenomenological* level, which he refers to as the "closest to real life", or "reality as perceived by human senses". At this level what is obtained are "neurophysiological interpretations" that translated into words correspond to the first step of translating aspects of reality into abstract concepts. The second level towards abstraction is referred to as *process* level. At this level, a filtering is produced in order to select what is relevant to consider. Agreement in concepts and terminology is established for an accurate description of the phenomenon observed. The third level corresponds establishing "concepts and relationships among them" (scientific models) in order to reach the level of *mechanism* from multiple observations of the processes. At this level qualitative or quantitative properties in the concepts of the mechanism are identified from which *parameters* and *variables* of the phenomenon are obtained (only these can be measured).

Ungar (2012:54) refers to the *phenomenonon/process* level as the most useful for the notion of resilience "as a constructive piece".

Limitations in bringing existing resilience frameworks to heritage conservation refer precisely to the missing clarifications at the conceptual level before further levels of abstraction are pursued:

(1) The notion of *entropy* used from thermodynamics in terms of a tendency towards disorder, which entails that all preservation efforts must be directed towards counter-acting that tendency with increasing of order and structure. The limitation arises when the system in question is not desirable as it was in a previous state, and a re-definition is preferred (e.g. *healing* the past of an architectural heritage).

(2) Despite the recognition of processes of transformation, which are inevitable through change, the association of the notion of resilience to the property of *elasticity* restricts the potentialities of change (as a possible good outcome), and encourages preservation efforts towards pursuing unsustainable processes at *any* cost (environmental, economic, social, etc.). In this regard Ungar (2012:55) refers to the concepts borrowed from the field of physics that are closely related to the notion of resilience in addition to *elasticity*: *rigidity, plasticity, flexibility*, and *hysteresis*[40]. Despite the similarities in terms of the six concepts referring to reactions to external actions, "each one describes a different response".

[40] In Ungar (2012:55,56): (1) *Rigidity* refers to not changing under any stress (in psychology refers to the notion of *invulnerability*); (2) *Elasticity* refers to changing form under stress but returning *exactly* to its previous condition when the stress is removed without retaining any memory of the event; (3) *Hysteresis* refers to changing form under stress with a deformation pattern when the stress is gradually removed that is different from when it is applied; "the material may keep some nonimmediately apparent changes (a memory) from the stress after going back to its original state"; (4) *Plasticity* refers to changing form under stress and not recovering totally after stress is removed (a change in the form will remain); (5) *Flexibility* refers to the capacity of bending without breaking.

> Clarifying what the object of study *is* becomes determinant to the relevance of the use of these terms. For Ungar, for example, the application of the notion of resilience is intended to a psychological context; therefore, for the system of his interest (human system), resilience aims towards the system being able to function as expected within the boundaries of what is defined as normality. All other five (5) concepts become limited as processes of deformation and recovery. Resilience for Ungar entails "an expected behavior, a purpose or finality" that defines de boundaries that can be tested to determine if the (human) system is *functioning normal* or not.

These conceptual limitations suggest that in order for each knowledge area to develop the notion of resilience, clarifying ontological and epistemological assumptions must *precede* the sequence of levels of abstraction to make operative this concept. For heritage conservation, the limitations of a material and aesthetic oriented understanding of what heritage sites *are*, and the prevalence of scientific-based methods of inquiry, limit the possibilities of developing the notion of resilience in its suggested potentials.

V.3. Contributions of an Integrated Approach to Resilience in HC-HT

In the process of expanding the understanding of what heritage sites *are* beyond the boundaries, priorities and inquiry processes in heritage conservation for developing the notion of resilience, an integrated approach was proposed with heritage tourism. To the increasing challenges affecting heritage sites discussed before, the contemporary role as heritage tourism destinations suggested a transdisciplinary approach was required in

order to understand the conflicts and opportunities for decision-making under a resilience framework.

Preliminary findings of this proposed integrated approach to resilience in HC-HT resulted in the identification of how culture as parameter of resilience was absent in existing resilience frameworks despite involving social-ecological systems where heritage sites take part (e.g. disaster management). Table-5 aimed towards making visible dynamic and tangible-intangible aspects of culture (including political aspects) that ought to be considered for a resilience framework in HC-HT.

Case examples in Alcatraz Island (San Francisco, USA) were used to show the contradictions and opportunities of an integrated approach between HC-HT. The notion of *Dark Tourism* served to situate the case examples in a category characterized by extreme *sensitivity* to tangible and intangible aspects of heritage interactions. These sensitive interactions can be intuitively considered in heritage conservation, but the emphasis in a material and aesthetic oriented approach does not oblige to address them further than in a sense of ethical (social) responsibility (methods of inquiry are also not directed towards these aspects). On the other hand, heritage tourism can benefit from the aspects heritage conservation values for making preservation decisions.

For the development of the notion of resilience in HC-HT, an integrated approach must solve beforehand possible ontological and epistemological contradictions derived from disciplinary assumptions. Resilience as an emerging paradigm challenges these divisions and promotes a relational and inclusive framework in general terms. However, as discussed previously, its development has been defined from each

knowledge area making a translation from previous applications. As soon as the concept is appropriated in a field of study, it becomes restricted to the ontological and epistemological assumptions of it. The consequence is the diverse interpretations of the concept which is not a problem if each field of study clarified the assumptions it bases its applications on.

For this reason, and with the concern of a powerful concept losing its potential with partial accounts of how it could be used to improve decisions in heritage sites, the last section of this chapter is dedicated to recapitulate, with some clarifications, the contributions suggested by Bryant's Onto-cartography introduced in Chapter-IV for the development of the notion of resilience in HC-HT. Bryant's Onto-cartography is one of the lines of thought inserted in what is known as "new materialism".

V.4. Contributions of a New Materialism to Resilience in HC-HT

"New materialism" refers to a series of theoretical approaches that propose a renewal of realist and materialist thought. Diverse lines of thought inserted in a "new materialism" approach have developed independently but aim towards understanding increasing complexities and challenges triggered by the developments in science and technology (energy crises, climate change resource scarcity, etc.) which linguistic and phenomenological approaches seem insufficient to address (however recognized valuable as partial accounts). "New materialism" groups a diversity of fields[41] that aim towards "a more capacious, more complex, and more generous world-picture" (Bryant

[41] In Bryant (2014:xi): "philosophy, anthropology, literary studies, rhetoric and pedagogy, design, media and technology studies, science studies, cybernetics, cultural studies, feminist studies, queer studies, political science, art practice", etc.

2014:xi). Some of the shared ideas among the diverse knowledge areas under the 'new materialism' are (Bryant 2014):

- Promoting ecological thinking, where ecology is expanded to "investigate *relations* between entities of all kinds"; not only natural (e.g. a rainforest) or human. An interest in material human bodies and their relationships with all other things that exist (animals, technologies, etc.).
- A rejection of the nature vs culture divide.
- Openness to benefit from different knowledge areas and philosophical approaches in order to expand and enrich analytical possibilities to understand how human and nonhuman entities make a difference.
- Aim for this expanded and enriched understanding of things as "an *ethical project*" where we pay attention to what exists beyond its relation to *us* (Bryant & Joy 2014:viii). Berry (2014:120) refers to "a new level of collective responsibility", and Chandler (2013:176) states that our ethical and political responsibilities are less defined "by our personal or our public choices and more by our embeddedness in emergent chains of causality".
- An emphasis on the *plasticity* of things, referred as "the ability to *become otherwise* in a variety of different ways under a variety of different conditions" (Bryant 2014:iii).
- An emphasis on the *constructed* nature of things from a *posthumanist* view where construction is not only human-driven (social, language, etc.) but includes the contribution of the *things themselves* (without humans being involved).

Contributions of a 'new materialism' approach to the notion of resilience in HC-HT are discussed from *ontological*, *ethical*, and *epistemological* aspects drawn from Byant's (2014) Onto-cartography.

Ontological Assumptions

The *ontological* assumption being used for the resilience framework in HC+HT proposed is derived from Bryant's notion of *flat ontology* developed in "The Democracy of Objects"[42] (Bryant 2011) which considers the following aspects:

i) The Ontic Principle: "*to be* is to make or produce a difference". "…beings are and become through their differences…". "Whatever makes a difference *is*" (Bryant 2011:263;264;270).

ii) Principle of the Inhuman: The existence of these differences is "indifferent to human existence". "…difference belong to the things themselves" regardless of our relation to things. "…being of difference" does not depend on knowledge or consciousness (Bryant 2011:263;266;267).

iii) The Ontological Principle – Flat Ontology: "all beings are ontologically on equal footing or that they all *are* insofar as they make a difference". "…there is no being to which all other beings are necessarily related" (Bryant 2011:270;267).

[42] In the introduction of "The Democracy of Objects" Bryant (2011:27) refers to a list of important references for an object-oriented approach: "Among the heroes of onticology are Graham Herman, Bruno Latour, Isabelle Stengers, Timothy Morton, Ian Bogost, Niklas Luhmann, Jane Bennett, Manuel DeLanda, Marshall McLuhan, Friedrich Kittler, Karen Barad, John Protevi, Walter Ong, Deleuze and Guattari, developmental systems theorists such as Richard Lewontin and Susan Oyama, Alfred North Whitehead, Donna Haraway, Roy Bhaskar, Katherine Hayles, and a host of others".

The ontological assumption is presented before the epistemological following the idea that "what an object *is* cannot be reduced to our *access* to objects", as "our access to objects is highly limited" and conditions what objects *are* in terms of what they are *for-us.* Therefore, epistemological assumptions are preceded by ontological (Bryant 2011:18).

In relation to heritage sites, these ontological assumptions are translated as following:

A heritage site is understood as a machine interacting with other machines (e.g. community; institutions; other heritage sites in a network; etc.) and as a machine assemblage itself. A heritage site (machine and assemblage of machines) *is* more than the embodiment of a *significance* given *by-us* at a given time. This is only a partial account of what it *is*. Therefore other aspects, if not considered, could threaten its existence. Also, neglected aspects (*dim objects* in Bryant) might become relevant under new conditions redefining the relationships in the assemblage and allowing other aspects of significance to emerge (e.g. @Large exhibit in Alcatraz Island).

A heritage site (as a machine) engages in operations with other beings that have nothing to do with aspects of significance and value assigned under heritage conservation standards (e.g. the place exists regardless of being defined as heritage) or with any human participation at all (e.g. affected by and affecting the natural environment in which it is inserted). In the same way, a heritage site (as an assemblage of machines itself), is subjected to operations without any human participation as well (e.g. decay of material fabric).

From an integrated approach between HC-HT, identifying the operations in which machines engage in addition to what is associated to a heritage site's significance enables recognizing the indirect relationships which will affect a heritage site as well at some point (unforeseen causes and consequences). Interpreting Bryant's ontology as a framework for the notion of resilience in this way would derive in an ethic that is *consequentialist*. Under a consequential ethic, the decisions in heritage sites would be *right or wrong* if the consequences for it are *good or bad* (Brennan & Lo 2011). In other words, it would be all about the heritage site itself rather than it as part, *on equal footing*, with the other machines it engages in operations with. A consequentialist ethical approach for resilience in HC-HT would contradict Bryant's ontology as decisions in heritage sites would be anthropocentric-based where the heritage site is assigned an *intrinsic value* (significance) and all other machines have a value that is *instrumental* towards developing the capacity of the heritage site to address challenges that will threaten this intrinsic value (significance). However, insofar as all other machines are recognized as having an *intrinsic* value too under a resilience approach, a feedback-loop unfolds as the heritage site becomes *instrumental* towards developing the capacity of these machines to address their challenges of diverse sort as well. In this sense, as the boundaries of a heritage site expand to include other machines interacting directly or indirectly with it rather than assigning it a privileged position that conditions all actions, a sense of *responsibility, self-reflexivity, connectivity*, etc. for the network of interactions emerges (through rational argumentation) as intrinsic values that guide action (as a set of rules - *deontological ethics*.

This discussion was addressed by Brennan & Lo (2011) in reference to an *environmental ethics* where three different ethical theories (consequential, deontological and virtue ethics) were presented in terms of how their attempts to be applied in order to address contemporary environmental concerns all pose contradictions with a non-anthropocentric approach, the issue on *intrinsic* and *instrumental* values being the central focus. Brannan & Lo (2011) refer to "many traditional *western* ethical perspectives" as assigning intrinsic value (or significant greater value) to human beings over nonhuman beings. Under this perspective any decision is considered in terms of its consequences on human-beings (consequential ethics) rather than on defined set of rules that must be applied regardless as they are considered as intrinsically right (deontological). However, the definition of intrinsically right rules under a deontological ethics is also defined by an anthropocentric relationship between human beings and the nonhuman. Brannan & Lo (2011) refer to historian Lynn White, jr. (White 1967) in her discussion on how aspects of Judeo-Christian approaches encourage the notion of human beings as superior over all other beings and entitled to their exploitation. This way of thinking interactions among beings, based on a hierarchic ontology, is associated with an arrogant pursuit to control all other beings by means of *negentropic* operations being science and technology highly responsible with both good and bad consequences (as a consequential ethics would refer to it). The term *anthropocene* refers to this achievement of power and control human beings have finally reached over all other beings. Under consequential and deontological ethics based on a hierarchic ontology, resilience would serve the purpose of developing negentropic operations to maintain this power

relationships under control. Hierarchic relationships of power and control are manifested within human systems as well.

Bryant's *flat ontology* addresses all beings as having an intrinsic value, independent from our awareness of their existence and independent of their usefulness for our own pursuits. Brennan & Lo (2011) refer to this approach in terms of the relationship between humans and the natural environments as *biospheric egalitarianism,* as proposed by what was called "the deep ecology movement". Directly related to an anthropocentric view of things, is what Brennan & Lo (2011) refer from "the deep ecology movement" as the problem of considering human beings as individuals "possessing a separate essence" from nature. In this regard, the alternative is considering human and nonhuman beings as "*knots* in the biospherical net", where the "identity of a living thing is essentially constituted by its relations to other things in the world". In this regard Bryant's *flat ontology* expands this *relational* approach as recognizing that things *become* in their relations but those manifestations are not all of what things *are,* and that we will only know part of what the thing can do insofar as our access to what it does is limited and the doing itself circumstantial. Bryant also recognizes that despite a relational connectivity among things, each thing exists independently from our awareness and purposes having an intrinsic value of its own. This last aspect is related to what Brennan & Lo (2011) refer to as the feminist critics to the "deep ecological theory" as "unable to give nature its due as a genuine 'other' independent of human interest and purposes", and the central claim of non-anthropocentric approaches.

In both approaches, the essence shared refers to recognizing the connection (empathy) and identification between human beings and other things that exist. Another similarity among both approaches refers to its *inclusiveness* as frameworks allowing diverse philosophical orientations. An approach closer to the notion of empathy to other beings relates to a third approach in traditional ethics: *virtue ethics*. Virtue ethics makes an emphasis on moral reasons (e.g. justice, kindness, etc.) as guiding action rather than as demanded by rules or in terms of consequential outcomes (Brennan & Lo 2011).

A challenge foreseen refers to the coexistence of different ethical theories in reality among decision-makers (e.g. stakeholders involved from the diverse machines in an assemblage). How is the interaction for decisions in heritage sites possible between a stakeholder who considers a decision is right or wrong in relation to its good or bad consequences (consequential ethics), with a stakeholder who decides based upon "an alleged moral rule" or duty (deontological ethics)? Furthermore, how would these interactions be possible with a third stakeholder under an ethical theory that is virtue-based (virtue ethics)? This aspect adds therefore to the challenges already posed by the differences in ontological and epistemological views among stakeholders and knowledge-areas involved for a resilience approach in HC-HT. Clarifying ontological, epistemological and ethical views of each stakeholder involved should set a baseline to understand the language in which decisions are made and how arguments are to be translated from one to the other if no agreement in views on these aspects is possible in absolute terms (*transparency* as a value should be implemented). A more realistic approach would be then that of recognizing that each stakeholder makes decisions by

moving through all three ethical approaches as situations require, or through a development of a *resilience ethics* in the same way it was required for an environmental ethics.

The emergence of environmental ethics as a new sub-field of philosophy in the 1970's started as a "call for a *basic change of values* in connection to the environment" reflecting emerging concerns on the overuse of resources that would threaten life in planet earth (summed up in the *Limits to Growth* study developed in 1972; Meadows et al 1972) (Brennan 2011). Environmental ethics, as defined in Brennan (2011) "is the discipline in philosophy that studies the moral relationship of human beings to, and also de value and moral status of, the environment and its nonhuman contents".

In a similar way, the emergence of a resilience ethic is being suggested as referring to a *basic change of values* in connection to unforeseen, indirect or unintentional consequences of the operations we engage in. Chandler (2013:176)) refers to the emergence of a *relational ethics of resilience* as "premised upon our ontological embeddedness in complex chains of global interconnection".

This brief discussion on ethics provides feedback to what is being discussed in this section in terms of Bryant's ontology and its use as a conceptual framework for resilience in HC-HT. A *basic change of values* through a resilience ethics would require a revision on what thing (heritage site) being referred to *is*. If the operations of a heritage site as a machine are to include the machines it interacts with (therefore expanding and/or contracting; enhancing its *plasticity* as a value), also its definition of *significance* (the reasons it is considered heritage in the first place) should be able to expand and/or

contract as well. The value of *self-reflexivity* is therefore required if a resilience approach is implemented.

Epistemological Assumptions

The *epistemological*[43] assumption proposed for a resilience framework in HC-HT, is derived from Bryant's notion of a flat ontology and referred in terms of an *Object-Oriented Epistemology* (Bryant 2010).

Based on the assumption that things are what they do and their existence is independent from any relation to other things, Bryant's epistemological assumption refers to two aspects: first, our *access* to things (how knowledge is produced) are descriptions of their actions within a defined assemblage (relational networks); and second, our *access* to things are always partial accounts as things can interact in different ways in a different assemblage (*becoming something else* in terms of how they operate).

In relation to heritage sites, this epistemological assumption is understood as following:

A heritage site, being a machine itself interacting with other machines and being an assemblage of machines as well, requires transdisciplinary approaches in order to understand (to know) it in terms of the interactions between its own components and in relation to other machines, through multiple scales, and change in terms of space and time.

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[43] "…questions of knowledge, of how we can know, whether we can know, and what we can know…" (Bryant 2011:265)

This process of understanding (knowledge-production) is done through a process of mapping (cartography in Bryant), and maps are made with the *inclusion* of the diverse approaches to knowledge (e.g. scientific-based; social constructivism; etc.) without attempting to diminish any in terms of their relevance and contribution, or considering any as providing more credible information despite the contradictions that emerge from such diverse (and sometimes opposite) approaches.

These maps are temporary and do not give an account of what the heritage site *is*, but only about the way it is operating at given conditions when decisions are to be made on it. In other words, heritage sites as machines (and the machines that make their assemblage) are not reducible to our *access* to it. Therefore the importance of *feedbacks* as a value for a resilience approach: in order to track the different (local) manifestations on changing conditions to improve our understanding (what we know) for making decisions. This also entails that different types of maps are required so as to provide a better understanding of how things interact.

An integrated approach between HC-HT is proposed for this purpose of enhancing our capabilities to understand (to know) what the thing (heritage site) *is* under given conditions. As discussed in Chapter-III, this integrated approach aims towards making visible often neglected aspects of culture as a parameter of resilience. In addition to the aspects of *connectivity*, *self-reflexivity*, *feedbacks*, *transparency, inclusion* and *plasticity* referred to briefly until now, an integrated approach between HC-HT is meant to contribute towards *openness* and *responsibility (environmental, physical social, political, economic, and cultural)* as values for resilience approaches in heritage sites.

V.5. Towards a New Materialism for Resilience in HC-HT

Bringing Bryant's 'new materialism' approach to developing the notion of resilience in HC-HT considers the following aspects:

(1) Clearly establish the *ontological* assumptions it bases itself on.

(2) Clearly establish the *epistemological* assumptions it bases itself on.

(3) *Guide* action as an *ethical* approach to decide *what should one do*[44].

(4) *Guide* action as a *design* approach to *change* the way things *are*.

The first three aspects (ontological, epistemological and ethical assumptions) have been discussed in the previous section. Conceptual and operational aspects proposed for a resilience framework in HC-HT using Bryant's onto-cartography approach are presented as following.

Conceptual Considerations

In resilience, the capacity to address challenges of diverse sort, an integrated approach to HC-HT and the "new materialism" approach developed by Bryant under onto-cartography, provide the following *conceptual* considerations:

i) Bryant's expanded notion of *entropy* provides a way to surpass the limitations of material/technology-focused solutions in heritage sites to address challenges, and situates a material problem in a wider context.

ii) Bryant's expanded notion of *plasticity* provides opportunities for heritage sites to evolve and reinvent themselves by enhancing its potential beyond local manifestations. Generating mechanisms to build capacity aim towards a

[44] From Delancey (2004:148) in "Architecture can save the world: Building and Environmental Ethics".

balance of changes in 'form' that can be allowed to unfold and become within *plastic* boundaries that define what a heritage site *is*.

Operational Considerations

In resilience, aiming towards generating mechanisms to build capacity, finds in the process proposed by Bryant's onto-cartography the following *operational* considerations:

i) Bryant's ontocartography expanded notions of *entropy* and *plasticity* enhance the capabilities of mapping relationships among entities in a heritage sites understood as a dynamic system (evolving, inclusive, open, etc).

ii) Bryant's ontocartography expanded notion of *entropy* and *plasticity* enhance the capabilities of *deconstruction* and *terraformation* as mechanisms to build capacity of heritage sites to address challenges of diverse sort.

In reference to Bryant's maps for a resilience approach in HC-HT:

Topographical maps aim towards identifying the entities (machines) that compose the heritage site investigated; establishing how those entities are linked together; mapping the flow of resources entities require to perform (sources of energy machines rely on) as expected (engage in operations) and the actual processes that occur (work carrying out operations); mapping the (material) outputs of those operations.

Example: In Alcatraz Island, the limited flow of financial resources for a continuous process of maintenance of buildings and structures make the heritage site weak in terms of its material fabric resilience. In addition, it makes the heritage site vulnerable to depend on private initiatives that offer supplying this missing flow of

energy and matter (financial, technological, material, work personnel, etc.). This was explained for the case example of the Puppy Stairs (Chico Preservation Project). As mentioned, this project is not referred to as an initiative that is wrong; on the contrary, the opportunities are promising as an attention to Alcatraz Island is brought to a wider audience which expands the network of support a heritage site requires to evolve in terms of its relevance. However, a topographical map can provide insights towards identifying possible power conflicts that can affect the resilience of the heritage site in the future such as releasing public agencies of their responsibilities and giving control to private entities.

Genetic maps aim towards an analysis of how a system came to be the way it is. A historical recollection of how processes determined how a heritage site became the way it is contributes to establish that things could have been done differently therefore what we see today is not a deterministic process. This type of map in an integrated approach between HC-HT will provide a comparison between the interactions of preservation and tourism management decisions through the history of a heritage site in order to recognize its evolution.

Example: In Alcatraz Island a genetic map will contribute to understand how the presentation of the island's past has changed over time and how interpretation of the site has been "shaped and reshaped" by the conflicting intervention of internal and external stakeholders under the dark tourism umbrella (Strange & Kempa 2003). The analysis of evidence, from both dark tourism and historic preservation perspective, would contribute

to understand the interactions between human values and material decisions in the creation of specific place identities.

Vector maps aim to show (as a projection to the future) the tendencies, trajectories and directions towards which a system is unfolding in the present. Vector maps make visible the system as dynamic and contributes towards anticipating the consequences of interactions among entities in process.

Example: In Alcatraz Island a vector map based on the technique of "damage maps" would help to establish the tendency of decay in the material fabric due to interactions between lack of maintenance, environmental effects, material pathologies, etc and the rate in which the process unfolds. Furthermore, this maps would incorporate the impacts of visitors (e.g. flows through the site, vandalism, etc.). A second type of vector maps will entail the evolution of relationships between visitors and increasing decay; or changes in the type of visitors and how perception changes with tendency to decay; or how would visitors' behavior change if material decay is reverted or altered as to adapt to a new image (e.g. Puppy Stairs and the aesthetic-decay approach).

Example: Another type of vector map in Alcatraz Island would focus on tracking evolving tendencies towards fragmentation of territories associated to the different groups that are assuming control of diverse themes and areas: Concrete Preservation Institute (reinforced concrete structures), natural conservationists (nesting areas), volunteers (historic gardens).

Modal maps aim towards envisioning a future by establishing how it could become if changes to existing assemblages are made. This is the map of planning and

design (for Bryant the maps of activists, militants and generals). Modal maps require the *integration* of the other maps. Current developments in digital technologies are making possible integration of diverse types of information (e.g. preservation management maps). Current developments in social networks and communication technologies are making possible integration of diverse types of information *and* real-time feedback and effective interaction between the information and users everywhere (e.g. crowdfunding[45] to support preservation initiatives).

Modal maps aim for making decisions, which entails what entities (machines) have to be subtracted (deconstruction) and/or added (terraformation) in order to change the world. From a resilience approach in HC-HT this map refers to the mechanisms to build capacities of heritage sites to address challenges of diverse sort.

[45] Crowdfunding refers to current options for raising monetary contributions from a large number of people to fund a project using internet resources as platforms.

CHAPTER VI

CONCLUSIONS

VI.1. Overview

Change has always been a challenge for preservation decisions which aim to counteract the tendency of the existing material fabric to deteriorate (entropy). However, increasing challenges affecting heritage sites (e.g. climate change, economic crises, wars, etc.) constitute a current concern in heritage conservation due to the accelerated rate of deterioration in tangible heritage surpassing counteraction attempts. Furthermore, due to an increased connectivity among socio-ecological systems, the destruction of tangible heritage has effects on an extended network (e.g. tourism; economic development of communities; sustainability; etc.).

Preservation decisions in heritage conservation are therefore increasing in complexity. From an architecture lens, material-decisions in preservation have a responsibility beyond addressing technical problems in the fabric of heritage sites. The existing material fabric and the interventions to preserve it (or not) embody the predominant values at a given set of temporal and spatial conditions. These values are a result of intertwined relationships between natural, physical, social, economic, cultural, etc. aspects of the heritage site as a system and its interactions with other systems. Material decisions constitute materialized solutions of a design problem posed when established the challenge of *what to do* with a heritage structure, building or site. Furthermore, the existence of the heritage site itself is the result of layers of material decisions in reference to *what to do* with a place through time.

This is not new. What is new is the recognition of the network of interactions, in terms of causes and consequences, material decisions in heritage sites have through diverse scales of natural, physical, social, cultural, and political environments, and the way in which these interactions contribute (or diminish) to the capacity of heritage sites (understood as systems) to address challenges of diverse sort. This awareness is not unique to heritage conservation. It is currently a concern in diverse knowledge areas addressing increasing challenges in social-ecological systems (e.g. disaster management; urban planning; tourism studies) under the notion of *resilience*.

At the scale of material decisions as a design problem in heritage conservation, interactions were already suggested by the notion of sustainability in terms of the 'limits to growth' (e.g. life cycle of materials, components, buildings, etc.; limited economic resources; etc.). The sustainability paradigm continues in the process of developing frameworks towards solutions aiming for reasonable use of limited resources considering an intergenerational long-term horizon.

The notion of resilience, *the capacity of a system to bounce-back, adapt, heal, etc., from impacts, disturbances, challenges, etc.*, also refers to *relational* networks but in terms of the 'limits to change' (how much can a system change before *becoming something* else affecting its expected performance). Compared to sustainability, the boundaries of resilience in a system are from a different nature.

Boundaries in sustainability are constrained under the consideration of finite resources (e.g. The Earth), even though this finitude is being challenged by current attempts for finding new resources (e.g. other *livable* planets; new sources of energy;

new sources of food; etc.). While some knowledge areas work towards expanding the boundaries of our 'limits to growth', most fields of study work towards developing solutions within their objects of study that optimize the use of resources (efficiency, performance-based; etc.) and ideally generate additional resources to give back to the environment it is inserted (e.g. producing energy beyond consumption levels for operating).

Boundaries in resilience are of an expanding and evolving nature as this concept aims to address the notion of change by generating mechanisms to build capacities of a system to respond within the limits of what the system *is*, however, the limits of what a system *is* are also challenged by the changes the system undergoes through interactions with other systems as well and the transformations within it.

As stated in the introduction, each field of study has appropriated the notion of resilience from previous applications, and translated to its particular requirements. Initial findings allowed identifying the limitations of translate existing frameworks *directly* from other knowledge areas into heritage conservation. Limitations identified were associated to ontological and epistemological assumptions particular to each field of study that focus either on natural, economic and physical (e.g. disaster management), or social and human aspects of a system (e.g. mental health). As noted, cultural aspects of a system are missing in existing frameworks which predominantly focus on an ecological notion of resilience, or referred to in terms of quantifiable indicators that focus on tangible aspects related to culture (e.g. *amount* of religious organizations as indicators of community involvement).

In heritage conservation and heritage tourism, two knowledge areas sharing heritage sites as the common object of study, all of these aspects interact (natural, physical, social, economic, cultural, etc.); however, existing references to resilience in both areas are derived from a disaster management approach therefore favoring an ecology approach. An ecology approach to address challenges in heritage sites is necessary but constitutes only a *partial* account of what a heritage site *is*.

Fields of study developing resilience frameworks for socio-ecological systems such as disaster management continue to improve initial models in order to include initial neglected parameters with the objective of acquiring a more complete account of what the system in question is (e.g. communities). Therefore establishing what the system *is* constitutes the preceding challenge in order to establish the ways to understand it (*access* to it).

Existing resilience frameworks establish what systems are in terms of parameters: physical, natural, human, economic, etc. These are the same parameters used to describe systems in the sustainability paradigm. It is in the way in which indicators and their relationships are defined for each framework that ontological and epistemological assumptions manifest the limitations boundaries of each field of study establish to simplify what a system *is*.

Heritage conservation, from the lens of architecture, also simplifies its understanding of what a heritage site as a system *is*. This simplification is manifested, as discussed in Chapter-V, in its predominant focus on *tangible* aspects of heritage (not to say that heritage conservation does not acknowledge the importance of intangible

aspects), and in its *static* and *rigid* process of defining what is *significant* to be preserved.

Simplifications are recognized when the same system (heritage site for heritage conservation) is understood from the lens of another field of study as the same parameters (natural, physical, social, etc.) interact in different ways making visible causes and consequences of decisions that have been made. Furthermore, what the system *is* expands as neglected aspects manifest.

In conclusion, in order to make use of the notion of resilience in order to address challenges of diverse sort in a system, each field of study must 'slow down' its urge to make operative an emerging concept in order to clarify its own assumptions and recognize possible bias that can limit its potential.

VI.2. Research Question

In the introduction to this study, I suggested that in order to make use of the emerging notion of resilience in order to address increasing challenges in heritage sites understanding its potentials and limitations as a concept was required. An integrated approach between heritage conservation and heritage tourism was proposed as necessary to understand the interactions between tangible and intangible aspects of heritage, as well as to expand what a heritage site as a system *is* beyond disciplinary simplifications. The objective of this study has been to develop the notion of resilience in heritage conservation and heritage tourism.

The justification of this endeavor is to provide insights towards the use of resilience as an emerging concept that can prevent its rapid translation to measurement

of parameters (which is the urge in every field of study to make a concept operational) by simplifying what heritage sites *are* with partial accounts already in process (e.g. predominant scientific-based approaches).

Developing the notion of resilience in heritage conservation and heritage tourism has been a process of exploring the possibilities this concept suggested during the duration of this study as it emerged in both conceptual and operational aspects.

My contribution to expand the emerging concept of resilience to address challenges in heritage sites were presented in Chapters II, III and IV, and discussed together in Chapter-V: contributions of resilience to heritage conservation; contributions of an integrated approach to resilience in heritage conservation and heritage tourism (HC-HT); contributions of a 'new materialism' to resilience in heritage conservation and heritage tourism (HC-HT).

Contributions of Resilience to Heritage Conservation

The notion of resilience as developed during the initial years of this study (although some accounts of further developments have been included) suggested the following aspects to address increasing challenges affecting heritage sites:

i) Four ranges must be defined in order to establish a resilience approach: a) type of system (micro – macro); b) type of capacity (inherent - constructed); c) types of actions (internal - external); d) types of reactions (equilibrium – non equilibrium). Once defined, these four ranges describe what the system *is* (partial account at given conditions).

a) The heritage site understood as a multi-scalar *system* acknowledges interactions beyond tangible (e.g. the structure in the building in the complex in the district, etc.) and intangible (e.g. significance for preservationists vs community; significance in inter-generational terms, etc.) boundaries defined.

b) The type of *capacity* refers to the potential or *power* a system has to do what is defined as a type of reaction (recover, adapt, heal, etc.). Developing mechanisms to enhance this capacity is what a resilience approach is all about. Establishing the boundaries of this capacity is performed in terms of 'the limits to change' (how much can a system change before *becoming something else* and it is not able to perform as expected). Becoming something else can be considered an undesirable outcome for some types of systems (e.g. rigid, static and hierarchical social regimes). In these cases the type of reaction defined is closer to an equilibrium state (where transformation is undesirable). In other cases becoming something else is admissible (necessary or unavoidable) for the system to perform (e.g. as discussed in reference to mental health in Chapter-V). This second case, where becoming something else is desirable within the limits of a system to perform, constitutes a challenge for heritage conservation as preservation aims precisely to prevent this from occurring.

c) The types of *actions* constitute the acknowledgement of both internal and external influences inducing changes in the defined system. The recognition of these actions makes visible the networks of interactions within and outside the system. How these actions affect the system are understood under the notion of *entropy* (thermodynamics); in other words in terms of how these actions contribute to the tendency towards disorder challenging what the system *is*.

d) The types of *reactions* (recover, adapt, heal, etc.) constitute the purpose defined for the system; the design approach; what the system is defined to be able to *do* (perform). From a resilience approach based on the notion of entropy from thermodynamics, the ideal reaction for the system refers to the property of *elasticity*, where after any alteration the system is capable to return to an initial state. This ideal, which is not possible in most alterations, nevertheless encourages to generate mechanisms that force towards this goal. Heritage conservation has many examples of this (e.g. reconstruction of a collapsed historic building).

ii) Our *access* to how tangible and intangible aspects of a system interact has different levels: *divide, collaborative* and *symbiotic*. Each level provides a different type (partial account) of information of what the system *is*. Our access to what the system *is* exposes the necessity for *transdisciplinary* approaches for a more complete understanding of what systems *are*. Heritage conservation usually interacts with diverse fields of study as was presented in

Chapter-II with the example of the three levels of information in The Alamo (San Antonio, USA) using diverse preservation technology techniques. Due to a focus, from an architecture lens, in the tangible aspects of heritage, knowledge areas related to the built environment are usually active participants on preservation teams. The notion of resilience, in its acknowledgment of multi-scale relationships, encourages involving other areas such as tourism studies in order to understand how material decisions affect and are affected by other levels of interactions in heritage sites.

Contributions of an Integrated Approach to Resilience in Heritage Conservation and Heritage Tourism

An integrated approach between heritage conservation (HC) and heritage tourism (HT) was proposed in order to understand the interactions between preservation decisions and the contemporary role of heritage sites as tourism destinations, and to address the absence of cultural aspects in resilient frameworks being developed in both fields of studies derived from disaster management.

As discussed in Chapter-III, understanding heritage sites as a HC-HT system in itself and in relationships with other dimensions (e.g. community disaster resilience), allows for recognizing a range of intangible and tangible aspects of culture (and their interactions) to be included in resilience frameworks in development. The term *cultural resilience* was referred to as encompassing dynamic and imbricated tangible (e.g., built heritage) and intangible (e.g., oral traditions, shared values and ethics) values inserted in broader socio-ecological systems.

Relationships between tangible and intangible aspects of heritage were discussed as ‘complex, dynamic, organic and political’, and as mutually interrelated altering one another. For example, material decisions in heritage sites as physical manifestations of values underlying preservation and tourism approaches; and the opposite as well, preservation and tourism interpretations of a heritage site affected by the state (surviving remains) of the material fabric itself.

An integrated approach between HC-HT also provided insights towards recognizing the limited understanding of what heritage sites *are* from the lens of each field of study due to disciplinary boundaries, and identifying opportunities of development in poorly under-studied areas (e.g., intangible aspects of culture, ethical perspectives, etc.).

Cultural resilience, as proposed in an integrated approach between HC-HT, referred to the capacity of a heritage site to respond to change over time, where the notion of *change* itself is understood both in terms of tangible (e.g., built heritage, tourism revenues, economic costs, etc.) and intangible (e.g. oral traditions, heritage meaning, significance, identity, etc.) cultural goods.

Case examples from Alcatraz Island (San Francisco, USA) were discussed in terms of the conflicts that emerge between heritage conservation and heritage tourism in complex heritage sites associated with negative events (dark tourism). Case examples were presented in three groups classified according to stages (that coexist) suggesting different preservation approaches in terms of how the relationships between tangible and intangible aspects of heritage were addressed under a dark tourism umbrella.

Contributions of a 'New Materialism' to Resilience in Heritage Conservation and Heritage Tourism

"New materialism" groups a diversity of theoretical approaches aiming towards a renewal and expansion of materialism. The contributions of this approach to resilience in heritage conservation and heritage tourism were introduced in Chapter-IV (Bryant's Onto-Cartography) and developed in Chapter-V. The main aspects are summarized as following:

i) In reference to a *flat ontology*:

a) The Ontic Principle ("to *be* is to make or produce a difference"[46]): Understanding a heritage site as an assemblage of machines provides an approach to establish the things that exist (in a resilience approach) in terms of the series of machines that are identified and the differences they make at a given time in addition to categorizations defined as parameters (natural, physical, social, etc.). Each machine in a given assemblage is categorized in terms of what it *does* under defined conditions as a type of object (e.g. bright object, rogue object, etc.). What each machine *does* (heritage as a machine itself as well) is only part of what it *is*, as there is always the *power* of *becoming something else* (in terms of its *doing*) and its *local manifestations* in a given assemblage are only partial accounts of what the thing *is*. A heritage site as a machine interacting with other machines in a broader socio-ecological environment *exists* in terms of

[46] Bryant (2011:263)

what it *does* at a given assemblage, and this is also a partial account of what it *is*. This principle challenges *static* and *rigid* aspects of *significance* in heritage conservation and heritage tourism, as heritage sites engage in operations that are changing in relation to other machines through time. For example, in reference to the processes of change in the way people address tragedy and violence, and how this results in modifications of a place as discussed in Foote (1997)[47].

This aspect also challenges an *elasticity* approach of resilience in heritage conservation and heritage tourism as transformation necessarily occurs in a heritage site understood as an assemblage of machines with circumstantial local manifestations. An emphasis on the *plasticity* of heritage sites as machines aims towards acknowledging the potential to *become otherwise* in order to address challenges due to change. Different levels of becoming coexist in a resilience approach of a heritage site as a multi-scalar assemblage of machines (recover, adapt, heal, reinvent, etc.).

An expanded notion of *entropy* as addressed in Bryant's Onto-cartography provides resilience approaches in heritage conservation and heritage tourism enhanced capabilities for generating mechanisms to address challenges of diverse sort in heritage sites. Entropy is no longer associated to a negative tendency that requires counter-action but in some

[47] Foote (1997:7) refers to four categories representing patterns showing the relationships (and how they change) between society and places associated with violence and tragedy: sanctification, designation, rectification, and obliteration.

cases constitutes a desirable condition to be triggered in order to loosen-up static and rigid structures that diminish the resilience of a heritage site.

b) The Principle of the Inhuman: The existence in heritage sites of machines (or the heritage site as a machine itself within a broader system) that make a difference despite our acknowledgement of them (material degradation; environmental contamination; the presence in a bird migration path; the presence in a skyline or a landscape).

c) The Ontological Principle: acknowledgement that all things that exist and make a difference in heritage sites are ontologically on *equal footing* insofar as they make a difference. In heritage sites this means making visible possible neglected parameters not given importance due to disciplinary boundaries with the awareness that their interactions with other things have the potential of becoming relevant at given conditions.

ii) In reference to the Object-Oriented Epistemology:

a) *Access* to heritage sites are temporal descriptions of circumstantial assemblages of machines.

b) *Access* to heritage sites are *always* partial accounts of what heritages sites *are*.

Transdisciplinary approaches to resilience in heritage sites are necessary to provide a multi-dimensional mapping of circumstantial and partial accounts of machine assemblages. Despite a *complete* account of what heritage sites *are* is not possible,

improvements aim towards the *inclusion* of diverse approaches to knowledge, and the process of tracking *feedbacks* (learning-loop).

VI.3. Implications for Research

At the level of research, this study provides insights towards:

- Providing an expanded notion of resilience in heritage conservation and heritage tourism for recognizing its potential before the concept is reduced by simplifications due to the urge to operationalize it.
- Expanding the boundaries of what heritage sites *are*.
- Expanding the boundaries of our *access* (understanding) to heritage sites.
- Expanding the disciplinary boundaries of heritage conservation and heritage tourism.
- Connecting the notion of resilience to current theoretical approaches ('new materialism') suggesting emerging paradigms.

VI.4. Implications for Practice

At the level of practice, this study provides insights towards:

- Expanding current approaches to the notion of resilience in heritage conservation and heritage tourism that reduce generating mechanisms to build capacities to address challenges of diverse sort in heritage sites to tangible aspects of heritage (physical, environmental, and economic).
- Encouraging *transdisciplinary* approaches beyond traditional disciplinary collaborations in heritage conservation focused on tangible aspects of heritage. An integrated approach with heritage tourism is proposed as fundamental to

address the conflicts and opportunities of heritage sites in their contemporary role as tourism destinations.

- Promoting *connectivity, self-reflexivity, feedbacks, transparency, inclusion, plasticity, openness* and *responsibility* (environmental, physical, social, political, economic and cultural) as values for resilience approaches in heritage sites.

VI.5. Future Research

Future research to be developed from this study refers to:

- Developing guidelines for applying multi-dimensional and multi-scalar maps from an integrated approach to resilience between heritage conservation and heritage tourism.
- Develop capabilities in current preservation management models for integrating the maps produced and generating feedback databases.
- Test these maps in case studies. Develop a database where maps are used.
- Develop an integrated framework from existing resilience frameworks based on parameters (natural, physical, cultural, etc.) in terms of indicators and resilience frameworks based on the notion of machines in terms of operations. Test this framework in case studies.
- Develop a database of case studies identifying possible examples of resilience approaches where *deconstruction* (severing of machines in an assemblage) and *terraformation* (adding of machines in an assemblage) are suggested.

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