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A Qualitative Study on the Exploration of an Ideal Museum Model dedicated to the Mediterranean Diet

Supervisor

Prof. Stefania Maggi

Co-supervisor

Prof. Andrea Curioni

Submitted by

Atakan Demir

Student n. 1196474

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ABSTRACT

The challenge of feeding the growing world population must require strategies through multicultural and multisectoral rethinking, and it is more than necessary to generate new forms of dialogue at different specialist levels to implement sustainable production patterns driven by the promotion of more sustainable dietary models. Accordingly, Mediterranean Diet has been well characterized scientifically and its protective effect on health and the environment has been repeatedly evidenced by scientific and medical studies, along with its coherent cultural and social framework. Despite the well-documented benefits, current data show a decline in adherence to the Mediterranean dietary pattern in the Mediterranean area. As the preservation and transmission of the Mediterranean Diet to future generations is under an important threat, it is urgent and necessary to establish a facility for its enhancement. Inspired by the sustainable, holistic and systemic notion of the Mediterranean Diet, the study has been developed into a structured way to analyze the need for preservation and promotion of the Mediterranean lifestyle and cultural food heritage, and the compatibility of the museum concept for this mission. The main purpose is to search for display and interpretation guidelines for the ideal museum model and find appropriate methods of communicating with visitors via the museum's exhibits, interiors and exterior. Through case studies, an examination of various exhibits, collections and styles of museums are used to reveal their impact on society, and to explore how museums can and do play a role in promoting nutrition, healthy dietary patterns and sustainability. The framework consist a specific focus on hyper-connected museums within the areas of food, wine, nutrition and medicine. The social, behavioral, cognitive and sensorial experiences obtained during a museum visit is explored and recommendations are given regarding the organization of the museum, its activities and exhibition content; in order to guide future inter-disciplinary works to establish a museum dedicated to Mediterranean Diet. By the establishment of such a museum, the ultimate goal is to raise awareness among the public, along with the executive, legislative and judicial branches of governments in the Mediterranean area; in order to take appropriate actions to counteract food insecurity and malnutrition in the Mediterranean region, preserve and revitalize the cultural heritage of the Mediterranean Diet and build sustainable food systems.

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CHAPTER 1

INTRODUCTION

As the world population is increasing in an exponential rate with a dangerous exploitation of planet's resources, one of the principal challenges for the food and agricultural industry is to provide simultaneously enough food, in quantity and quality, to meet nutritional needs and to conserve natural resources for present and future generations. The challenge of feeding the growing population requires strategies through multicultural and multisectoral rethinking and generating new forms of dialogue at different specialist levels (Rayner and Lang, 2012). Food and Agricultural Organization (FAO) estimates that to satisfy the needs of a growing and richer population with an increased demand for animal products, food production will have to increase by 60 percent towards 2050 (FAO, 2012). However, this figure can be reduced by improving production efficiency, decreasing food losses and waste, and changing diets.

As food consumption and production patterns are among the most important drivers of environmental pressures, agro-food systems need to focus on growing within the context of a finite and sometimes shrinking resource base, and must use natural resources in a sustainable manner to preserve the ecosystems on which they rely (CIHEAM/FAO, 2015). Rather than solely focusing on primary production, such growth needs to be inclusive, target broader objectives and must include efficiencies along the whole food chain. This can be achieved through sustainable production patterns driven by the promotion of more sustainable dietary models, along with coherent cultural and social frameworks (CIHEAM/FAO, 2015).

Over a decade, FAO has been studying the concept of sustainable diets in order to design methods and indicators for their assessment in different agro-ecological zones (CIHEAM/FAO, 2015). One of the major outcomes from a scientific symposium on biodiversity and sustainable diets, organized by FAO and Bioversity International, was a consensus position on the following definition of sustainable diets:

> Sustainable diets are those diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations. Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources. (FAO/Bioversity, 2010)

1.1 MEDITERRANEAN DIET

The Mediterranean Diet is a way of life and eating based on the traditional foods of the countries surrounding the Mediterranean Sea. More than a combination of dietary patterns and eating habits; it represents the Mediterranean way of personal choices, economic, social and cultural rights, protective of human health and the ecosystem (Tarsitano et al., 2019).

The Mediterranean Diet has been well characterized scientifically and its protective effect on health has been repeatedly evidenced by scientific and medical studies since the 1960s pioneer Seven Countries Study (CIHEAM/FAO, 2015). In literature it is highlighted that Mediterranean Diet has both significant health-nutrition benefits and low environmental footprints (Dernini & Berry, 2015; Aboussaleh et al., 2017), due to principally the consumption of more plant-derived products and less animal products; in particular vegetables and fruits are the most important source of fibers and chemical compounds, like flavonoids, phytosterols, vitamins, terpenes and phenols, which give protection against oxidative processes, hence reducing the incidence of metabolic and cardiovascular diseases (Del Chierico et al., 2014). For these reasons Mediterranean Diet has been recognized as a healthier and environmental friendly dietary pattern, it has influenced numerous countries, and falls within the FAO definition of sustainable diets. It has been recognized by UNESCO as an intangible cultural heritage and selected by FAO for the assessment of diet sustainability models (CIHEAM/FAO, 2015).

1.1.1 Definition of Mediterranean Diet

According to UNESCO:

> The Mediterranean Diet constitutes a set of skills, knowledge, practices and traditions ranging from the landscape to the table, including the crops, harvesting, fishing, conservation, processing, preparation and, particularly, consumption of food. The Mediterranean Diet is characterized by a nutritional model that has remained constant over time and space, consisting mainly of olive oil, cereals, fresh or dried fruit and vegetables, a moderate amount of fish, dairy and meat, and many condiments and spices, all accompanied by wine or infusions, always respecting beliefs of each community. However, the Mediterranean Diet (from the Greek diaita, or way of life) encompasses more than just food. It promotes social interaction, since communal meals are the cornerstone of social customs and festive events. (UNESCO, 2010)

1.1.2 Nutritional transition in the Mediterranean area

Despite the well-documented health and environmental benefits of the Mediterranean Diet, current data show a decline in adherence to the Mediterranean dietary pattern in the Mediterranean area (CIHEAM/FAO, 2015). The region, along with the rest of the world, is passing through a nutritional transition in which problems of undernutrition coexist with overweight. The key nutrition challenges facing the Mediterranean region are protein–energy malnutrition, micronutrient deficiencies, obesity and nutrition-related chronic diseases (CIHEAM/FAO, 2015).

The nutritional transition is alarming as it has negative impacts not only on health systems but also dramatic economic, social and environmental implications (CIHEAM/FAO, 2015). The decline in adherence to the Mediterranean Diet model is due to the change of several factors such as the homogenization of lifestyles, the loss of awareness and appreciation, food globalization, environmental changes, economic and socio-cultural factors (Tarsitano et al., 2019). This silent cultural erosion resulting from new lifestyles is affecting the diversity of the Mediterranean food culture, local territories and traditions. Such a phenomenon is undermining also the identity of millions of people living in this area whose traditions are so intimately linked to food cultures (Dernini, 2011; CIHEAM/FAO, 2015).

1.2 NEED FOR THE STUDY

It is highly recommended by FAO guidelines, which aims to provide guidance to improve sustainability in the Mediterranean area, that “all main stakeholders in the agro-food sector in the Mediterranean region should cooperate towards increasing the sustainability of food consumption and production patterns to achieve food and nutrition security” (CIHEAM/FAO, 2015). The lack of interest among younger generations about cultural food heritage, erosion in deep-rooted dietary patterns, health problems due to malnutrition, rising obesity rates and cardiovascular diseases point out a need for programs promoting nutrition and balanced diet (CIHEAM/FAO, 2015).

These aforementioned changes pose important threats to the preservation and transmission of the Mediterranean Diet to future generations; therefore it is urgent and necessary for a research regarding the establishment of a facility for promotion and enhancement of the Mediterranean Diet, hence this topic as a dissertation.

1.3 THE CONCEPT OF MUSEUM

Museums are cultural institutions in which people are able to come, learn, and enjoy various fields; it is a temple where knowledge and information are the most important, and it is one of the well-established methods to educate masses, promote dialogue and inspiration. For centuries, museums have played an important role in societies around the world; as they are essential in fostering social cohesion and a sense of collective memory, they hold up a mirror to society, introduce visitors to alternative points of view and foster creativity, with respect for diversity and a culture of peace (UNESCO, n.d.). Moreover, the museum plays a key role as an ideal mediator between science and the public because of its credibility (Ognjević, 2017).

The four primary tasks of a museum are; preservation, research, communication, and education. These primary tasks should be performed simultaneously in order to conserve, continue and transmit world's natural and cultural, present and future, tangible and intangible heritages to society (UNESCO, 2015). At the same time, museum is an ideal place to approach everything that intangible heritage brings with it, especially when it comes to gastronomy and nutrition as a reflection of a much broader and more complex picture of different forms (Ognjević, 2017). Finally, when one takes into account that museology process is not a one-way street, gastronomy and nutrition themes may open up museums for a better and closer communication with the community (Ognjević, 2017). Thus, the museum concept is adequate and suitable for the research of such an establishment regarding the preservation, promotion and enhancement of the Mediterranean Diet, therefore selected as the ideal facility model for this study.

1.3.1 Definition of Museum

According to The International Council of Museums (ICOM), a museum is defined as:

> A non-profit, permanent institution in the service of society and its development, open to the public, which acquires, conserves, researches, communicates and exhibits the tangible and intangible heritage of humanity and its environment for the purposes of education, study and enjoyment. (ICOM, 2017)

Museums can also be defined as semi-formal places of learning which collect, display and interpret artifacts; withal this dissertation focuses on (i) collections-based museums which Siegel (2008) defines as "a collection of repository of rare and curious things in nature and

art, arranged for the purposes of study"; as well as (ii) science-centres which utilise interactive exhibits to illustrate a culture and emphasize technology in order to encourage visitors to experiment and explore (Senthil, 2014).

1.4 AIMS & OBJECTIVES

Inspired by the sustainable, holistic and systemic notion of the Mediterranean Diet, this dissertation aims to explain the need for preservation, promotion and enhancement of the Mediterranean lifestyle and cultural food heritage, and seeks to explore the compatibility of the museum concept for this mission. The main purpose is to search for display and interpretation guidelines for the ideal museum model and find appropriate methods of communicating with visitors via the museum's exhibits, interiors and exterior.

The study has been developed into a structured way to analyze the social, behavioral, cognitive and sensorial experiences obtained during a museum visit, in order to act as an initiative plan for future inter-disciplinary design works to establish such a museum dedicated to Mediterranean Diet. An examination of the exhibits, collections and styles of the museums will be used to reveal their impact on society and to explore how museums can and do play a role in promoting nutrition, healthy dietary patterns and sustainability. From this research, it is hoped that the reader will gain an understanding of how nutritional education can take place in museums.

Regarding the objectives of the ideal museum model; the facility is anticipated to be a cultural and educational space for nutritional learning which aims to include technological resident and participatory exhibits that allow historical, scientific and multi-sensorial exploration of the diet, as well as a number of public programs and satellite activities focusing on teaching healthy dietary patterns to tourists, locals and younger generations. Moreover, the aimed facility must provide the means to reach the public and transmit the essence of a balanced diet through the variety of local and fresh products that are part of the Mediterranean region and thereby revitalize the Mediterranean gastronomy and identity.

With the establishment of such a museum, the ultimate goal is to raise awareness to counteract food insecurity and malnutrition in the Mediterranean region and preserve the cultural heritage of the Mediterranean Diet as an outstanding resource for sustainable development, as it contributes to promoting local production and consumption, encouraging sustainable agriculture and safeguarding landscapes (CIHEAM/FAO, 2015).

CHAPTER 2

METHODOLOGY

The methodology used for this dissertation is a qualitative research with interpretive approach as it utilizes secondary and commentary data derived from desk research in libraries, online libraries and scholarly article databases. The majority of the research and evidence to support the hypothesis comes from books, scholarly articles, governmental and non-governmental organization documents. The framework consists of an informational examination of museums as a whole, cultural and educational institutions; nevertheless, a specific focus has been made on hyper-connected museums and to areas of food, wine, nutrition and medicine.

As the first step of literature review, the dissertation focuses on the major issues of sustainability and nutritional transitions in the Mediterranean region in order to present the need for preservation and promotion of the Mediterranean Diet. Later on the research continues with the study of general information on museum concepts; this includes exploration of different type of museums, the components of museum planning and exhibition styles. The next step is the study of exhibitions from various case studies, where the classification of issues and detailed studies are made for each aspect of exhibits. Finally, a comprehensive analysis have been made for the case studies and a synthesis of appropriate methods of communicating, content ideas and recommendations have been discussed for the ideal museum model for Mediterranean Diet, and concluded with the identification of scope for further research.

2.1 HYPOTHESIS

The central hypothesis for this study is that; the concept of museum is compatible and has a major role to play in promoting the tangible and intangible nutritional heritage of the Mediterranean region. To test this hypothesis, the research utilizes secondary data and asks *'How do the experiences in museums contribute to the life-learning process of society and help to preserve a culture?'* and *'How can the art of exhibiting relate to dietetic learning?'*. Intrigued by these questions and guided by the belief that museums are built environments of cultural preservation and education, this study presents the findings regarding the interaction between cultural and scientific nutritional education and museum learning.

2.2 SCOPE & LIMITATIONS

The subjects covered in this dissertation are very broad and concern many areas such as nutrition, museology, sociology, tourism, architecture and digital technology. Hereby, identifying the scope and addressing the limitations of the work about to be undertaken is particularly pertinent for a project such as this; therefore only areas with competent knowledge pertaining to topics of nutrition, museology and tourism will be covered. In attempt to indicate directions with respect to the areas which may remain undiscovered; this thesis is exploratory and not aiming at a definitive argument. Furthermore, as bearing the main purpose of finding the guidelines for an ideal museum model, no limitations have been set regarding the use of space and extent of financial resources. However for future planning, implementations and design works; it is crucial to take into account of the available space with careful consideration of the financial limitations and other parameters to work within.

CHAPTER 3

LITERATURE REVIEW

3.1 NUTRITIONAL TRANSITION IN THE MEDITERRANEAN AREA

While many low-income countries are making little progress towards raising food consumption levels necessary for good nutrition and food security; many developing countries are undergoing diet transitions and bringing them closer to the diets prevalent in richer countries, with more consumption of animal products and energy-dense foods, where follows an increase in the incidence of diet-related diseases (Alexandratos, 2006). Despite this nutritional trend, a dietetic study from the last decade clearly showed that the easiest way to reach all nutrient recommendations was to select more Mediterranean-type food (Maillot et al., 2011); however following the introduction of Western-style dietary patterns, the evolution of food consumption in the Mediterranean countries themselves is not encouraging as there is a shift in dietary habits from the traditional Mediterranean Diet to industrial food. In this context, investigations in the early 1990s already showed that dietary patterns throughout the Mediterranean countries were increasingly moving away from those reported in the 1960s; even in its very birthplace within Greece and Crete, Mediterranean Diet seems to be in a moribund state (Alexandratos, 2006). With the exception of the high consumption of olive oil and fresh fruits and vegetables, the food consumption patterns in Greece have moved away from those that were close to the diet prototype (Alexandratos, 2006). Moreover, more recent data have confirmed that in many Mediterranean countries the loss of adherence to the Mediterranean Diet is increasing due to the current economic downturn (Bonaccio et al., 2014).

In the decline of adherence to the traditional Mediterranean Diet in the region, there are three trends that can be identified; (i) a tremendous increase in the consumption of sugar, energy-dense foods and saturated lipids, which is explained by the higher consumption of animal fats, as the consumption of dairy products and meat increase as incomes rise, but even more by the consumption of vegetable oils used for cooking and seasoning or included in various industrial foodstuffs; (ii) an increase in the consumption of simple carbohydrates, connected in particular with the consumption of beverages and foodstuffs with a high carbohydrate content, and a simultaneous decrease in the consumption of fibres and complex

carbohydrates, such as cereals and legumes; lastly (iii) a change in the total protein content, where the share of animal proteins is increasing to the detriment of vegetable proteins (Padilla, 2008; CIHEAM/FAO, 2015).

3.2 FOOD SECURITY & SUSTAINABILITY ISSUES IN THE REGION

The Mediterranean Diet has nutritional, economic, environmental and socio-cultural characteristics that make it particularly relevant for the characterization of sustainable diets in different agro-ecological zones (CIHEAM/FAO, 2015). However; the rapid urbanization of society, growing incomes, technical change in the food industry, the rapid diffusion of fast-food outlets and globalization have modified dietary behaviours considerably, and associated in particular with the nutritional shifts in Mediterranean region and decline of the Mediterranean dietary model (UNEP/MAP, 2005; Alexandratos, 2006). It is important to understand that Mediterranean Diet is intimately connected with sustainability, water and food security; yet, the aforementioned changes are disrupting the long-established ecological, social and economic equilibriums, as the area is shifting towards imported consumption patterns higher in animal products, which require more energy, water and land resources (CIHEAM/FAO, 2015). Led by these issues, many simultaneous effects are seen in regards to biodiversity, locality, water scarcity, and food waste.

3.2.1 Biodiversity

The Mediterranean Diet is extremely linked to biodiversity; indeed, biodiversity plays a key role in ensuring the richness of food species in the Mediterranean area, as nutrient composition between foods and among varieties, cultivars and breeds of the same food can differ dramatically and affect the nutritional balance of the diet. However, dwindling of natural and cultural resources in Mediterranean Area has led to a biodiversity decline; the rich biodiversity of the Mediterranean terrestrial and marine flora and fauna, including many endemic species, and the agricultural and rural models in the region, which are at the origins of Mediterranean identity, are currently threatened by the predominance of imported consumption patterns, standardization of cultivation practices, monoculture, chemical contamination, overexploitation of natural resources, mechanization, and changes in lifestyles (UNEP/MAP, 2005; Boulier, 2012; CIHEAM/FAO, 2015). Nevertheless, the loss of agricultural diversity is causing negative consequences on food security and livelihood of populations living in the region, as well as reducing the sustainability of local production

systems, along with the capacity to safeguard the Mediterranean Diet heritage (CIHEAM/FAO, 2015).

The main pressure on the ecosystem and biodiversity comes from tourism, urban development in coastal areas, overfishing, intensive farming and irrigation, and the abandonment of traditional agricultural practices (Numa and Troya, 2011). Furthermore, indigenous knowledge on how to recognize, cultivate and use these local crops is also being lost at an unprecedented rate. The genetic diversity of food crops and animal breeds is diminishing rapidly; in fact, many local varieties of crops are being replaced by a small number of improved non-native varieties (Millstone and Lang, 2008).

Losing biodiversity means loss of diet quality, which can lead to micronutrient deficiencies, food insecurity, more pests on farms, fragile ecosystems, and the loss of culture and tradition. Thus, biodiversity should not only be recognized as an important player in sustainable agriculture, but also as a necessary contributor to a healthy diet (Fanzo et al., 2013). It is important that the biodiversity level is kept high in order to guarantee that Mediterranean Diet is healthy and the average level of nutrient intake is adequate. As Mediterranean local food biodiversity has received relatively little attention concerning its nutritional value in the scientific literature, it is important to acknowledge and promote its potential health benefit effects, which have long been used traditionally in rural communities (Heinrich, Müller and Galli, 2006).

3.2.2 Locality

The traditional and tradition-based innovative food products are a good way to give value to local biosystems, economies and communities and to improve sustainable development (CIHEAM/FAO, 2015). The Mediterranean basin, being a food-based agrarian landscape, comprise the symbolic value of food and its identification and differentiation that led to the creation of strong links between local food, local heritage and identity; along with the construction of terroir based cuisines and local-food production knowledge and skills (FAO, 2009). These products of origin-linked quality are strongly connected to the sustainability of the Mediterranean area by contributing to rural development and the preservation of biodiversity (Vasilopoulou, Dilis and Trichopoulou, 2013).

It was recommended by FAO to member countries to promote local and traditional food products, as an essential way for realizing food sovereignty, biologically diverse and resilient

food production (CIHEAM/FAO, 2015). It was urged to direct more efforts towards market access and consumer awareness of high value traditional products, acknowledging that traditional agriculture practices are often the only farming methods possible in difficult agro-climatic areas (CIHEAM/FAO, 2015). It is acknowledged that organic production is a quality designation, important for consumers and significant for sustainable agriculture and environment; and countries need FAO support in establishing a regulatory framework for implementing and protecting this designation (CIHEAM/FAO, 2015). The organization highlighted the typicality of Mediterranean Diet being rich in biodiversity and nutritionally healthy; indeed, the promotion of the Mediterranean Diet could play a beneficial role in the development of sustainable agriculture in the Mediterranean region (CIHEAM/FAO, 2015).

3.2.3 Water Scarcity & Climate Change

Water scarcity is one of the most critical development problems in the Mediterranean area and a factor limiting the agricultural growth. Water availability in the region has been declining steadily since the late 1950s and the resources are limited, fragile and unevenly distributed (CIHEAM/FAO, 2015). Thus, improving the water demand management, water saving, rational water use and, in some cases, reuse of waste water projects to increase water availability especially for agriculture, is important for sustainability in the Mediterranean area (CIHEAM/FAO, 2015)

Moreover, Mediterranean region is one of the major regions of the world where global warming threatens the environment and human activities (CIHEAM/FAO, 2015). Climate change is likely to affect agriculture and food security in the region primarily through changes in temperature, extreme climatic events and sea level rise (Skuras and Psaltopoulos, 2012). Climate change may result in such adverse effects as further deterioration of water scarcity, land degradation, crop failures, loss of rangeland and other vegetation covers, livestock deaths, and fisheries production and quality decline (CIHEAM/FAO, 2015).

3.2.4 Food Waste

Every year a third of the food produced in the Mediterranean area for human consumption is lost or wasted; these losses occur along the entire supply chain, from farm to fork, and in addition to food there is also a waste of workforce, water, energy, land and other means of production which cause negative repercussions in the way of achieving sustainability in the region (Tarsitano et al., 2019). The distribution of food losses and waste along the food chain,

which are due to poor harvesting techniques, lack of transport and poor storage in combination with climate conditions, are more important in developing countries where a significant amount of food losses occur at the post-harvest and processing level (Lundqvist, de Fraiture and Molden, 2008); while in industrialized countries more than 40 percent of the losses occur at the retail and consumer level, in other words food is wasted (CIHEAM/FAO, 2015). A study carried out in 2005 to estimate household food waste, using a sample of 500 households in Ankara (Turkey), showed that waste accounted, on average, for 9.8 percent of the daily energy intake per person (Pekcan et al., 2006). Reducing the amount of food lost or wasted throughout the food chain, from farm to fork, would help improve food security and nutrition; furthermore, it will also ease pressure on water scarcity. To do so, it is crucial to address losses all along the food chain and alert consumers to the environmental impacts of their diets and the negative effects of wasting food (CIHEAM/FAO, 2015).

3.3 PROMOTING MEDITERRANEAN DIET THROUGH MUSEUM CONCEPT

As the abandonment of traditional habits and the emergence of new lifestyles associated with socio-economic changes pose important threats to the transmission of the Mediterranean Diet to future generations, the promotion and the enhancement of the diet is a critical issue for sustainable development to counteract food insecurity and malnutrition in the Mediterranean region (CIHEAM/FAO, 2015). One of the most important goals should be the development of one intensive and extensive plan and strategy of preservation, including necessary measures to ensure the safeguarding of the diversity of the Mediterranean food culture heritage. This preservation strategy should strengthen education initiatives, awareness-raising and capacity-building projects and training in the management of the intangible cultural heritage, in order to effectively preserve and to advance the transmission of Mediterranean Diet heritage (Xavier Medina, 2009).

In this context, it is important to acknowledge the Global Sustainable Development Goals (SDGs), which are adopted by United Nations to improve people's lives by 2030. The process of changing the development model will be monitored through “a complex system based on 17 objectives, 169 targets and over 240 indicators; it will be in relation to these parameters that each country will be evaluated periodically by the UN and by national and international public opinions on the state of implementation of the SDGs” (Tarsitano et al., 2019).

Table 1. *How to achieve the Sustainable Development Goals in the Mediterranean area*

The way forward
Sustainable farming systems under environmental and climatic constraints Water resources and Fisheries Management Food value chain for regional and local development Reducing food waste and enhancing by-product innovations Nutrition and Education Sustainable tourism

(Tarsitano et al., 2019)

As it can be seen in Table 1, developing the museum dedicated to Mediterranean Diet will help to establish two key objectives *'Nutrition and Education'* along with *'Sustainable tourism'* on the way forward to achieve the Global Sustainable Development Goals and hold the promise of mitigating the undesirable effects that accompany the diet transitions. After all, the very notion of promoting the Mediterranean Diet is predicated not only on its health merits but also on the benefits it bestows to society at large; through sustainable development and preservation of the culture (Alexandratos, 2006).

3.3.1 Educational Role of the Museum

Museums take upon the task of presenting worlds which are distant in space or time, and bringing the unknown or past closer to the visitor, by means of contact with artifacts from those worlds (Schärer, 1996). The musealization path proceeds from its roots in the ancient world through church, guild treasures and the spoils of war, via the art collections of the Renaissance and the Baroque, and eventually been characterized by the increasing specialization through the 19th century (Schärer, 1996). Present day, museums set the stage for understanding nature, culture, art and history; therefore contribute significantly to the education of society. The power of exhibits and museum learning has long been examined in relation to attracting and educating audiences. Learning in museums involves a visitor or a group of visitors attending to an object, a display, label, person, element or a mental construct of these since the museum visit represents a collection of experiences rather than a single unitary phenomenon (Senthil, 2014). Any information obtained during the museum visit is likely to include social related, attitude related, cognitive related and sensory related association (Senthil, 2014). These associations are analyzed and become embedded in memory altogether with the result that any facet of these experiences can facilitate the recall

of the entire experience (Senthil, 2014), thus contribute greatly to the learning process. The information and experiences collected by the visitors are stored in the brain and remain there over a period of time (Senthil, 2014); in this case, it can be emphasized that environments like museums should be used more effectively in the life-learning process of the society. Essentially, museums are able to develop their educational role and attract wider audiences from all levels of the community, locality or group it serves (ICOM, 2017). It offers opportunities to its community in order to involve them in the museum and support its goals and activities; after all, interaction with the constituent community and promotion of their heritage is an integral part of the museum (ICOM, 2017).

3.3.2 Types of Museums

The types of museums vary from large institutions covering many categories, to very small institutions focusing on a specific subject, location, or a notable person. A museum normally houses a core collection of important selected objects in its field, and the type and size of a museum is reflected in this collection (Senthil, 2014). The categories may include "fine arts, applied arts, archaeology, anthropology and ethnology, biography, history, cultural history, science, technology, children's museums, natural history, botanical and zoological gardens" (Senthil, 2014). Within these categories many museums specialize further, such as museums of modern art, folk art, local history, military history, aviation history, philately, agriculture or geology (Senthil, 2014). However, an encyclopedic museum, commonly referred to as a universal museum, would have collections representative of the universal heritage and typically include most of the mentioned categories of art, science and history all together (Senthil, 2014).

Because of their compatibility to the aim of this dissertation, it will be appropriate to focus on specialized museum concepts of *'ecomuseums'* and *'hyper-connected museums'*, equipped with multimedia and digital technology.

3.3.2.1 Ecomuseums

The concept of ecomuseums, which arose in France in the late 1960s, places museums within the context of community and the environment; they are participatory processes that recognise, manage and protect the local heritage in order to facilitate social, environmental and economic sustainable development (Dal Santo et al., 2017). The term *'eco'* is a shortened form for *'ecology'*, but it refers especially to the idea of holistic interpretation of cultural

heritage; in opposition to the focus on specific items and objects performed by traditional museums (Davis, 1999). The concept is a shift from the *'museum of objects'* to the *'museum of ideas'*, a move to interdisciplinary working, to wider engagement with society, a desire to provoke audiences and a willingness to accept criticism (Davis, 2009). An ecomuseum performs its tasks of collecting, preserving and educating within an entirely different framework than a traditional museum; it is a dispersed entity consisting of heritage sites, collective memories, natural and built environment, with the community involvement as the key requisite since it is a dynamic way for communities to preserve, interpret, and manage their heritage for sustainable development (Davis, 2009). It develops creative and inclusive practices for local communities, organizations, and associations as these entities benefit from the establishment of the ecomuseum (Davis, 2009). Benefits may be intangible, such as greater self-awareness or pride, tangible or economic (Davis, 2009). As sustainable development is a central issue for ecomuseums, it implies to increase the value of a place instead of diminishing it. As such, the primary objective is to reestablish correspondences between techniques, cultures, productions and resources of a homogeneous landscape and the local cultural heritage, where landscape promotion lies at the heart of ecomuseums' preoccupations (Dal Santo et al., 2017).

In order to form a clear basis for the establishment of ecomuseums, it is needed to implement comprehensive and multidisciplinary research studies, such as this dissertation, that would point to all the potentials of the landscape and suggest sustainable possibilities for controlled exploitation (ICOM Serbia, 2017). At the same time, the intention should be to encourage the representatives of local communities and self-governments to realize important roles an ecomuseum may have in the development of their communities (ICOM Serbia, 2017).

3.3.2.2 Hyper-Connected Museums

Nowadays, the public would not go to a museum in the first instance to acquire knowledge or information through the display of historical or artistic collections; instead, visitors of a museum expect to go through unique, unexpected and interactive experiences. As foreseen by Schärer (1996), the new museology concept suggests museums to offer a balance between art, technology and information. As the information a visitor receives during a museum visit tends to bear a contextual map, museums should be able to offer an event or a wholesome experience in order to capture visitor's attention, in addition to promote societal education. As one lives in an era where people spend the most part of their time in front of screens and

connected to the internet, "the museum's biggest competition isn't the Guggenheim or the Museum of Modern Art, but rather Netflix, Candy Crush, and a desire to stay home rather than explore the city" says Sree Sreenivasan, Chief Digital Officer of The Metropolitan Museum of Art of New York City (Gilbert, 2016). These institutions no longer need to compete with each other, because they are losing their visitors to the omnipresent technologies, games and social media consumed by the modern society (Vaz et al., 2018). Museum professionals have to think about how to make collections and exhibitions still relevant nowadays, and how to compete with all the available entertainment ways and technological developments, in order to capture the visitor's attention and encourage their visit to these spaces (Vaz et al., 2018).

Museums have to find out ways to embrace the fact that smartphones, tablets, smartwatches and other digital devices are everywhere, and take advantage of the fact that people use them no matter when or where (Vaz et al., 2018). At this point, the term hyper-connectivity refers to the use of multiple means of digital communication, such as email, instant messaging, telephone, social media and web information services (Quan-Haase & Wellman, 2004); and it is widely used today in museology to describe the application of technology and complex computing environments of museums that build on the following as described by Subodh (2018):

- Broadband wireless internet connectivity,
- Miniaturised sensors built into objects,
- Collaborative robots supported by artificial intelligence and machine learning, interpreting the big data collected by the sensors.

Hyper-connectivity trend is rapidly increasing among these institutions and fueling changes in communication because of the complexity, diversity and integration of new applications and devices used in museums' network.

3.3.3 Planning Factors & Design Guidelines

Museum planning involves planning the actual mission of the museum along with the space that the collection of the museum will be housed in. The way that museums are planned and designed vary according to what collections they house, but overall this adheres to planning a space that is easily accessed by the public and easily displays the chosen artifacts (Senthil, 2014). The planning process of a museum should start by using a storyboard as guidance, and

then designing should be proceeded by evaluating and allocating exhibition space according to the storyboard themes and other visual and communication needs (Senthil, 2014). It should be kept in mind that an experiential visit must be created for visitors; which is evoked through good lighting, sound, music, recorded material, interactive spaces and audio-visual footage to enhance the ambiance. This leads to the discussion of how to design museum spaces and exhibitions. As contemplated by Senthil (2014), the overall guidelines are:

- The building's ambience should be maintained inside as well as outside. Landscaping around the building should be developed in a way that it complements the experience within the museum.
- Aesthetic choices support and reflect the theme and tone of the exhibition.
- Spatial organization and traffic flow are appropriate to the goals of the exhibition.
- The physical space such as layout, lighting, flooring is created in such a way that audience members of varying physical sizes and abilities are able to navigate and interact with the exhibition.
- The exhibition furniture system; panels, screens, shelves, wall hung panels and other wall mounted elements must be examined, designed and distributed by units, sections, subsections that correspond to themes and sub-themes in the script and storyboard.
- If required; audio-visual footage, voice recordings and ambiance music may also be used for creating a complete experience.

There are several key actors that can be identified in this process, who at times may have quite distinct, even conflicting, views on the way forward. Museum curators are the major stakeholders, in their concerns to present a thematic and coherent exhibition that honours the collections and presents the material in a way that they feel is appropriate (Fernström & Bannon, 1997). There are also architects and designers, who are involved initially in the overall plan of the spaces in the museum, and subsequently in the shaping of specific spaces, with openings, lighting and facades (Fernström & Bannon, 1997). Alongside these two main stakeholders, a number of consultants may be involved in the specification and building of artifacts for the display of material, such as film-makers and video production teams for the audio-visual work, and multimedia specialists who design the interactive multimedia installations (Fernström & Bannon, 1997). Usually, these groups are subcontracted for specific design work, under the control of a steering group, headed by curators and architects (Fernström & Bannon, 1997).

One notable absentee from such groups, is the visitor. The ultimate purpose of museum exhibition is to open to the public; so, it should not only be considered the factors of objects, but also the factors of audience, and how to combine these two is a great challenge for museum designers (Yumei, 2020). Assuming that every museum has its own potential visitors, it is essential to define visitor stereotypes to create a structured approach for design and implementation of interactive systems; it is crucial to recruit individuals with user characteristics, as close as possible to the defined stereotypes, to partake in both the design process and the evaluation of prototype systems (Fernström & Bannon, 1997).

3.3.3.1 Technology Use in Museums

In the practice of display design, it is not necessary to display an actual collection, scenes, sculptures, paintings; but need to use a variety of technology and multimedia means to display them in an all-round way, to make the exhibition more interesting and attractive. Compared with the traditional ways of museum exhibition, the application of multimedia technology is more vivid and interesting; as it can display the information content of cultural relics more intuitively, enhance the expressions, and also improve the participation and interaction of the audience in the exhibition process (Yumei, 2020). Yet, the use of technology and multimedia should be treated rationally in combination with the requirements of exhibition, and appropriate technical means should be selected according to different exhibition types and themes (Yumei, 2020). The most common multimedia forms in museum display and exhibition are touch screen, display screen, projection system, virtual reality, cinema system, augmented reality and digital guide (Yumei, 2020).

Figure 1. *Snapshots*, M9 Museum (Ambrosi, n.d.)

Figure 2. *One-to-one with the Experts*, La Cité du Vin (Anaka & XTU, n.d.)

Large screen projection (Figure 1), is a combination of multiple projection systems that has the advantages of large field of vision, multi display content and high resolution, which can make viewers feel the shock of projection effect (Yumei, 2020). Blending with the space and environment, the display screen technology (Figure 2) can display collections, such as ancient paintings and calligraphy, as well as audio-visual works; and make the effect of exhibition more vivid by enlarging content (Yumei, 2020). In addition, with advanced technological work the viewer can also use smartphones or tablet equipment to obtain detailed information on the collection.

Figure 3. *Dimensions in Testimony*, Illinois Holocaust Museum and Education Center (Billock, 2017)

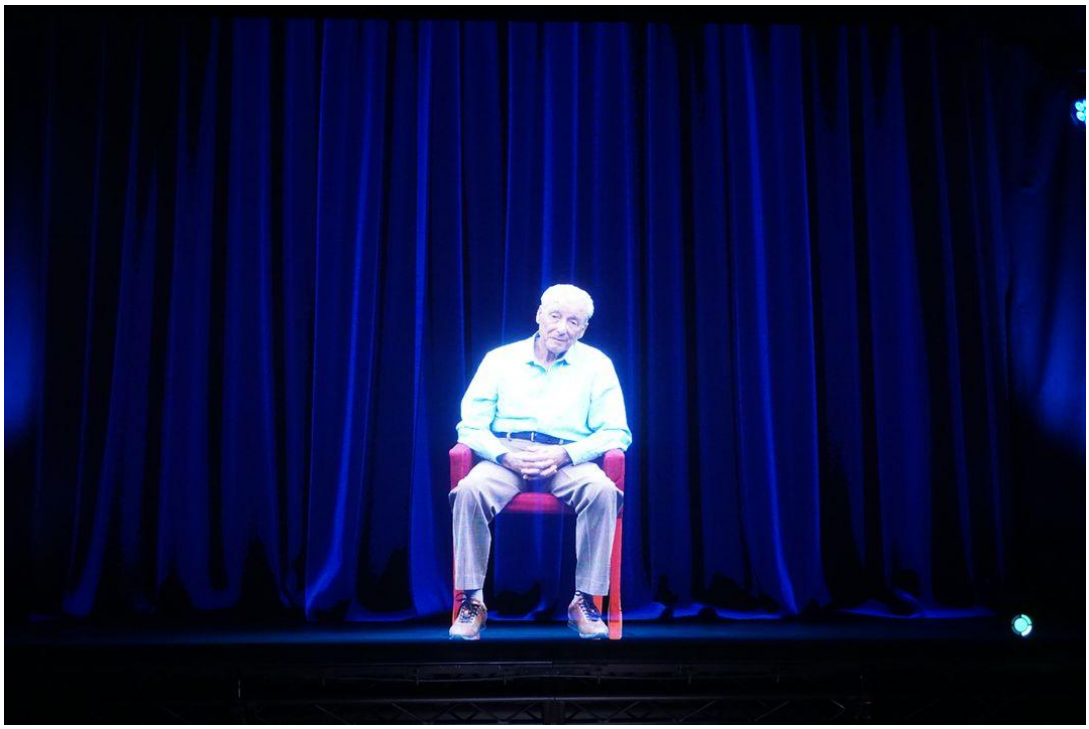

Figure 4. *Dimensions in Testimony*, Illinois Holocaust Museum and Education Center (Billock, 2017)

Holographic projection technology (Figure 3 & Figure 4), is mainly used to restore the three-dimensional image of the collection; by using laser as the lighting source to obtain holographic images, in order to enhance the sense of appreciation and beauty of the collection, and to fully play an educational role (Yumei, 2020). In addition, holographic projection technology can be combined with sound effects, through the way of making the collection speak or creating ambiance sounds to introduce the meaning behind the collection, so as to ensure that viewers can get more experience and perception (Yumei, 2020).

Figure 5. *The Italian way of life*, M9 Museum (Sono Creative, n.d.)

Figure 6. *Painting Lens*, Cleveland Museum of Art (Local Projects, 2013)

Multi touch technology (Figure 5 & Figure 6) refers to the computing system allowing users to control and implement simple operations in the way of finger contact. The multi touch device is mainly composed of three parts; shadow screen device, touchable display device and touch panel (Yumei, 2020). It mainly uses the way of software identification to feedback the touching and pointing behaviours implemented by users (Yumei, 2020). Displays or walls can be used as multi-point touch screens, with optical sensors or infrared light sources to capture the action of the viewer, where the data is processed by a computer. At present, the application of multi-point touch technology in museums is quite common that viewers can touch through fingers or touch pens, so that the screen presents what viewers need to enjoy.

Figure 7. *Bone Hall*, Smithsonian National Museum of Natural History (Travel Blue, 2020)

Figure 8. *Bone Hall*, Smithsonian National Museum of Natural History (Smithsonian, n.d.)

Augmented reality technology (Figure 7 & Figure 8), mainly takes computer technology as the core to generate a multi sensory integrated virtual environment. When viewing cultural relics, the audience only needs to use the corresponding equipment to interact with the virtual content, so that the virtual object and the real environment can be integrated (Yumei, 2020).

Figure 9. *Augmented Sand Table*, Royal Alberta Museum (Cortina Productions, n.d.)

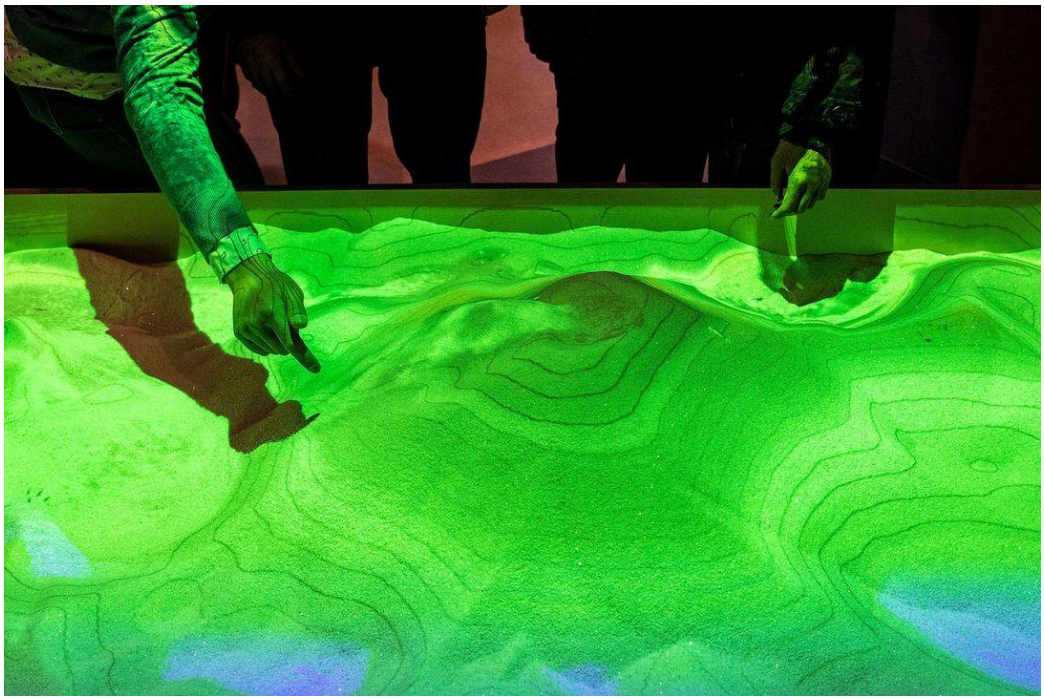

Figure 10. *Augmented Sand Table*, Royal Alberta Museum (McLachlan, 2018)

AR sandtable (Figure 9 & Figure 10), is a new physical model representation which uses projection equipment and physical movements, to make a dynamic animation and project it through precise alignment to a sand table (Yumei, 2020). Through the integration of sound, light, image and computer program control technology, multimedia can fully reflect the characteristics of display content and achieve varied dynamic visions (Yumei, 2020).

Figure 11. *Purpose*, Cleveland Museum of Art (Fusion Filmworks, n.d.)

Interactive display multimedia (Figure 11 & Figure 12), includes projection system, wall display system, fun game system and multi touch system (Yumei, 2020). The main characteristic of the interactive display technology is to bring the audience from passive visiting to active participation in the exhibition, so as to realize the core of museum display design; the people-oriented concept. Interactive projection system uses advanced computer vision and projection display technology to produce a variety of special effects through hands or feet movement, so that the audience can interact and participate with full interest (Yumei, 2020). Similarly, wall interactive display system is created through a projection or a display on the wall, and operates with image and movement recognition interpreted by optical sensors (Yumei, 2020).

Figure 12. *Gesture + Emotion*, Cleveland Museum of Art (Shaw, 2017)

The key concern with the technology use in exhibitions is the quality of the visitor experience and the ways in which the experience can be enhanced (Fernström & Bannon, 1997). Many current interactive multimedia installations (IMMS) that exist in museums suffer from being developed and presented to the visitor as an example of how computerised the museum is, "rather than being hidden and seamlessly woven into the static displays, lighting, audio-visual and other technologies that are designed to support the visitor in understanding the space they are visiting" (Fernström & Bannon, 1997). Accordingly, the technology should not stand out and separate, but become integrated into a narrative that encompasses the totality of the exhibition space (Fernström & Bannon, 1997); indeed, to an extent of being invisible and

embedded in its context. The focus should be on the material that is being portrayed, not on the computer mediation itself; furthermore, individual browsing activities need to be allowed, and create spaces for both reflection and interaction (Fernström & Bannon, 1997). This applies both to visits to on-site systems and virtual systems. Finally, as advised by Fernström & Bannon (1997), it does not matter what kind of technology that is used, or if only some of the capabilities are utilized; "As long as a user-centred, participatory design approach is taken, with all stakeholders involved, an iterative process of designing the visitor experience is likely to get the best results" (Fernström & Bannon, 1997).

CHAPTER 4

CASE STUDIES

Clearly there are a number of challenges that a museum will have to deal with within the complex task of research, preservation and promotion of this particular form of intangible heritage, the Mediterranean Diet. While proceeding to explore the ideal museum model, it would be useful to analyze successful examples of museums and exhibitions equipped with high technology, which represent themes similar to the Mediterranean Diet. Focus of the case studies will be food, wine, nutrition and medicine, along with various themed museums. Food museums, as the name suggests, are dedicated to preserve and present the history, culture, and evolution of human dietary habits. Over the last three decades, many countries had devoted appreciation to the food culture in their museums (Ser, 2020). By and large, food museums and exhibitions celebrate food; they explore its history, heritage, and cultural influence. Currently, there are various types of specialized food and beverage museums around the world, as these museums do not merely educate people about the food history and culture; furthermore bring a pleasant interactive experience. Following the establishment of the world's first food museum Alimentarium in 1985, in this day and age an enormous number of food-oriented museums have been developed as it became a worldwide phenomenon, and the age of the food museums is clearly upon the society (Ser, 2020).

4.1 ALIMENTARIUM

Alimentarium is the world's first museum devoted to food and nutrition, established in 1985 by Nestlé Foundation, the museum lies on the shores of Lake Geneva, in Vevey, Switzerland. The museum has been exploring many aspects of the human diet and eating habits of different countries from a historic, scientific and cultural point of view, in an interactive way. Its multidisciplinary, global and objective approach has gradually established the Alimentarium as a reference centre on the topic, with its mission to create, develop and contribute to awaken the public interest in past and present issues concerning human food (Food – The essence of life, n.d.). The museum organizes permanent and temporary exhibitions, cooking classes, gastronomic tastings and guided tours; moreover a restaurant and a vegetable garden are used for nutrition-related workshops. Every year the museum launches an annual theme along with its physical collection of 400 objects and permanent exhibition consisting of multimedia

displays, as well as digital content on its website (The Platform of Swiss Museums, n.d.). Regarding its annual themes, one of the themes approached food in terms of 'Vice or Virtue', exploring the moral labels applied to specific foods such as superfoods, GMOs and artificial flavors. Another theme was based on the emotion of disgust; explored unfamiliar foods, such as insects as alternative protein sources, and focused on four aspects of food consumption: ethics, aesthetics, biology and sustainable development (Food – The essence of life, n.d.).

The permanent exhibition and centerpiece of the Alimentarium is 'Food – The Essence of Life'. The exhibition itself has been divided into three individual parts; the Food sector, the Body sector and the Society sector, which all composed of installations connected to each year's theme. The unique scenography, combining discovery, experimentation and learning, invites visitors to an interactive journey through the sectors. In the first part of the exhibition, the Food sector, visitors explore the relation of the individual with the outside food world, as the exhibition tries to answer fundamental questions such as 'Where does food come from and how is it produced? How the food is transported? How it is ensured to be present out of season? What methods are used to cook, prepare and present food to make it tasty and appetizing?'. The area is surrounded by interactive screens, as visitors witness accelerated images of food in the making, from its development to its packaging, through the growth of maize and hops, the rearing of pigs, various species of fish and gushing of fresh spring water. After discovering a variety of food, visitors move on to production, focusing on the different food systems to be found across the world.

Figure 13. *The Food Sector*, Alimentarium (Brenni, 2016)

Objects used for gathering food, hunting, rearing livestock or crop farming are put into context and can be viewed three-dimensionally on tactile terminals. Visitors can also interact with a wall display video which lights up according to the path selected, to discover the journeys the food makes after it has been produced. To help visitors understand how food is manufactured, preserved and prepared with both traditional and industrial processes, the area showcases exhibits, presents interactive terminals and projects personal stories on film. There is also an introduction to cooking section which is exhibited by a large tactile table with interactive games involving recipes and culinary techniques (Food – The essence of life, n.d.).

Moving on to the second part of the exhibition, in the Society sector visitors discover how food connects an individual to its community. Above all, as the human diet is a social and cultural indicator, it gives people clues to help them understand both themselves and the people around. People create links, display social status, ritualize practices and perpetuate a tradition of conviviality whenever they share food. Accordingly, the sector favours the sharing of knowledge and experiences, and focuses on exchange, starting with the question 'How does an individual eat?'. Exhibition shows that eating is not only a biological need, but also an act which fulfils an essential social function. Sectors start with visitors entering a cocoon filled with photos and personal accounts, and realize the extent to which the education and family circles shape people's relationship with food. A community wall invites visitors to explore new social phenomena, such as the term 'food porn' or the use of hashtags on social media; from New York to Seoul, #pizza, #burger or #sushi reflect the cosmopolitan culinary discoveries and cravings. However, the silence from certain parts of the world reveals other realities; such as food security, sufficiency and boundaries. This wall is intended to inspire visitors to leave their childhood memories, favourite recipes, and tips in a special terminal which will be used to expand the Alimentarium memory bank, created for and by visitors.

Figure 14. *The Society Sector*, Alimentarium (Jutzi, n.d.)

Continuing the tour, visitors are meant to realize how their choices and habits are determined by cultural and social spheres, converging from a rich array of influences. Every society and culture defines what it deems as authorized food, taboos and rituals. A collection of large-scale photos highlights the diversity of eating habits across the globe and over the centuries. Visitors are able to find a 1950s kitchen, the epicenter of food production in a family household, complete with the gadgets of the era. Also an interactive table presents several games on tableware and table manners in different cultures, inviting visitors to learn about some of these fundamental values. To end the tour, visitors find themselves confronted by a large wall of lively and colourful images, along with a range of objects from the museum's collection. This area evokes the richness of different rituals, festivals and places where people eat across the globe.

The last part of the visit, the Body sector, invites visitors to reflect on three fundamental questions, 'What do I think about what I eat? Why do I eat? What impact do my choices have on my health?'. In the first area, visitors wander through the pathways of the brain dotted with giant neurons to discover how five senses of the human body work. This trail contains hands-on and taste experiments which shows that senses may be misled or misleading, and education, family and social environment have major influences on people's food choices and preferences. The sector also includes information about two lesser-known professions from the food industry, sensory analyst and a flavorist. Later on, visitors experience to travel through the organs of the alimentary canal, as becoming an apple, to discover how the digestive system works. They become mashed, mixed and broken down by enzymes, and discover the essential role played by food and nutrients in the construction, functioning and protection of the human body (Food – The essence of life, n.d.). The goal is to understand how making sensible food choices are the best way to protect one's own health.

Figure 15. *The Body Sector*, Alimentarium (Jutzi, n.d.)

To round off the tour, younger visitors are invited to play while putting into practice what they have learned during their visit. The GameRoom, designed as a point of exchange between the virtual educational platform and the physical museum, is an augmented reality, multiplayer gaming area. This immersive space invites visitors to move around and experiment with notions picked up during their visit. In the Digestix game, visitors explore the mechanical and chemical functions of the organs of the alimentary canal. Meanwhile, Nutrix game enables them to unravel the mysteries of the composition of food.

Figure 16. *Junior Academy*, Alimentarium (Laetitia, 2018)

The educational garden forms an integral part of the museum's scenography. The aim is to convey a better understanding of every aspect of eating and the implications of an action that has become so mundane. Combining exploration, digital interactive learning and expertise, museum has also transformed its content into a fully interactive online experience, making itself always accessible and marking its evolution into a centre of competence and learning about nutrition with a strong digital presence.

Figure 17. *Educational Garden*, Alimentarium (Hurábová, 2019)

4.2 LA CITE DU VIN

La Cité du Vin is an experiential wine museum established in 2016, a stunning piece of contemporary architecture resembling a wine decanter on the banks of the Garonne River, located in Bordeaux, France. Museum hosts a permanent exhibition, various temporary exhibitions, a library, number of tastings and events. The permanent exhibition invites visitors to take a journey through time, from 6500 BC to the modern era, displays history and cultures of the world to learn about wine; this is considered the heart of the museum with the objective of showing wine in its universal, heritage, civilization, and cultural dimensions. Unlike traditional museums, there is no exhibition of collections, objects and stories about the scientific, technical or artistic aspects of wine. Instead, it functions more as an amusement park and proposes a unique, immersive, and multi-sensory adventure to discover the cultures and civilizations of wine using the latest technological innovations in scenography, including 3D images, digital displays, holograms, smell diffusers, music, and other interactive tools (Bouzdine-Chameeva et al., 2019). The spectacular experiential design of the permanent tour is the result of strong collaboration between the museum team and a scenography agency. Museum's cultural affairs director Laurence Chesneau-Dupin describes their approach as:

> We do not want to numb the brains of visitors; this is not the idea that people want, as they are better off with a good large book in their living room at home if they want to discover deeper knowledge on a certain subject or on the Internet from behind their desks in the office. Then it should be a pleasurable experience, a performance where you don't see all the preliminary efforts, and you just get pleasure and admire. That is what we need to offer; a discovery experience around wine culture and civilizations for all the public. Even if you are not a wine consumer, this place will be an occasion to visit, have a good time, an interesting place to go. And it should be a must-see for tourists in Bordeaux (Bouzdine-Chameeva et al., 2019).

The adventure begins on the ground floor with a huge reception area, a wine boutique, a wine cellar offering wines from around the world, a restaurant and a wine-tasting bar. Before starting the museum tour, visitors are invited to wear headsets that are designed to allow the listener to hear input, which is available in eight different languages, as well as exterior conversations. A personal hand-held device is given to each visitor which activates the different modules throughout the exhibition space. During the tour, hand-held device triggers animations through infrared and motion detection system based on cameras.

Figure 18. *Visitor using the headset and hand-held device*, La Cité du Vin (Gilbert, n.d.)

The permanent tour is composed of 19 different exhibitions which are gathered under 6 sectors; Around the World, Know-How, Through the Ages, Lifestyle, Imagination and Bordeaux. Around the World sector begins with a film projected onto three giant screens with three perspectives where visitors experience to fly over twenty wine regions of the world. It is aimed to immerse the diversity of vineyard landscapes, in which cultivated vines from all over the world can be seen in a wide variety of natural conditions and the wine regions of the world thus have many faces. Continuing the tour visitors explore winemaking landscapes that are famous for their cultural heritage on five interactive globes, as going back in time to how vines and grape varieties have spread and wines have been traded across the world. Visitors are also able to discover how variety of climates affects vine cultivation.

Figure 19. *Vineyards from the sky – Around the World*, La Cité du Vin (Anaka & XTU, n.d.)

Lastly, visitors go on a tour of the world of terroirs through the testimonies of thirty winemakers from ten different regions, on interactive tables depicting a vine landscape and sounds of storms and birds. Winemakers describe what makes their wine unique and create the identity of the terroir that has been shaped gradually over the generations; the soil, climate and exposition of a particular location, as well as its history, traditions and expertise of the men and women working every day to create its wines (La Cité du Vin, n.d.).

At the beginning of Know-How sector, visitors explore some of the world's greatest grape varieties, via touchscreens on a stylised digital vine split into three sections; the vine, the gardener, and the grape. Exhibition is meant to help analyse the subtleties of vine cultivation as how vines respond to various environments, and learn the cultivation techniques used to create the ideal conditions for producing wines; such as selecting, pruning, tending, harvesting and contending with nature. Later on, visitors explore winemaking through display screens which are placed into three giant yeast molecules, that each represents a stage in wine production: vinification in the vat room, maturation in the winery, ageing in the cellar. Moreover, each space is immersed with specific evocative aromas of wine production stages. Another exhibit in this sector is composed of six giant wooden bottles each dedicated to a major wine category; dry white, red, rosé, sparkling, fortified and sweet. With tactile screens visitors transport into sensory, acoustic and visual worlds, where the diversity of the wine world is presented through different manufacturing and production methods, bottling locations, usage, and the economic dimensions (La Cité du Vin, n.d.).

Figure 20. *In the vines – Know-How*, La Cité du Vin (Anaka & XTU, n.d.)

Through the Ages sector starts with visitors wandering through a gallery composed of ten small rooms with screens, where they embark on a historical journey from the earliest civilizations through the twentieth-century; via Egyptian tombs, a Greek banquet, Roman taverns, seventeenth-century England, and a Bordeaux châteaux. In the next exhibit visitors explore the history of essential waterways in six animated paintings; representing the Douro, the Rhone, the Rhine, the Seine, the Garonne and the Loire, that helped boost the development of the major wine regions. At one of the most immersive exhibits of the museum, through a 180° large projection display of an animated film, visitors take their place in a merchant ship and set sail on a historic voyage with four stops across the world's seas. Visitors experience to cross the Mediterranean on a Roman tanker vessel, travel from Bordeaux to England in the fourteenth-century, sail to Japan in a seventeenth-century Dutch boat, and finally complete an eighteenth-century transatlantic journey in an English boat full of Madeira wines. In the last part of this sector, visitors use their hand-held device and headsets to discover the latest trends in modern wine culture; such as artistic labels, designer bottles or packaging, ultramodern winery facilities, bottle stores secured like vaults for paintings, unusual furnishings, innovative advertising campaigns; which all reflect concepts that relocate wine beyond a mere consumer product (La Cité du Vin, n.d.).

Figure 21. *Across the Seas – Through the Ages*, La Cité du Vin (Anaka & XTU, n.d.)

At the beginning of the Lifestyle sector, visitors sit across tactile screens to have one-to-one experiences with experts; renowned critics, chefs, sommeliers, doctors, lawyers, religious leaders and philosophers all offer their points of view, advice and tips on wine. In this exhibit,

visitors can also test their wine knowledge via various quizzes. At one of the most famous exhibits of the museum, the Buffet of Five Senses, a full sensory experience is created for visitors to evoke their memories, emotion and imagination as wine tasting involves all the senses; sight, smell, touch, taste and even hearing, Guests can experience to smell different aromas associated with wine; such as barn smell, pencil shavings, roses, chocolate and leather through bell jars and copper tubes at the buffet. They are also able to explore the colours and textures, put their head into a bulbous aluminum shape to smell the fermentation process and hear the sounds of wine production.

Figure 22. *The Buffet of the Five Senses – Lifestyle*, La Cité du Vin (Anaka & XTU, n.d.)

Continuing the tour, visitors watch a pre-recorded performance on a projection display; a dinner table in the company of key figures from various periods in history, who appear and provide commentary of their oenological memories. Visitors are able to discover the development of certain wine styles over the ages, and the devotion of enthusiasts. The last exhibition of Lifestyle sector reveals the French way of life with three dinner tables equipped with projection display with motion compensation, where visitors discover the art of serving wine with historian Franck Ferrand, examine the different ways of sharing wine with journalist Ariane Massenet, and listen to Michelin-starred chef Hélène Darroze talking about the French gastronomic meal, recognised by UNESCO as a piece of intangible heritage (La Cité du Vin, n.d.).

Imagination sector starts with exhibiting the effects of drinking wine in excess, which is synonymous with distortion of the senses, transgression, disorder and even poverty and ruin; therefore all is a matter of moderation. With a tactile place, visitors explore the complex relationship between alcohol, the individual and society; as represented in artistic, musical, literary and cinematographic works all illustrate the isolation and degeneration that can result from excess wine consumption. At the next exhibition, visitors are seated on a circular sofa and look up at a sky dome with scenes illustrating the relationship between wine and love as seen by painters, sculptors, poets, novelists, filmmakers and composers. Lastly, visitors are invited to sit in an amphitheatre and enjoy the religious and spiritual art on display screens. Frescoes, stained glass windows, paintings and miniatures are illustrated, reflecting the symbolic nature of wine and the vine in Greco-Roman mythology and Christianity (La Cité du Vin, n.d.).

Figure 23. *Wine and Love – Imagination*, La Cité du Vin (Anaka & XTU, n.d.)

The last sector is dedicated to Bordeaux, the city which is linked to wine in a strong, almost intimate relationship reflected throughout history. In this exhibition visitors discover the city and its landscapes, and how a great commercial port gave birth to a land of mythical wine. Via interactive game tables, visitors simulate the iconic figures; artist, inhabitant or famous traveler and experience how Bordeaux evolved over the eras, and discover legendary locations such as the medieval ports and districts in the seventeenth-century, a glass factory or nineteenth-century barrel stores. The permanent tour finishes with a film offers the lengthy history of Bordeaux, full of adventure and characters such as enterprising merchants, brokers,

scientists and wine lovers; with political alliances, the role of winemaking brotherhoods, territorial conquest, technical innovations and scientific discoveries (La Cité du Vin, n.d.).

While the permanent tour finishes, there are three tasting rooms where groups can sip, spit and explore the flavours of wine, where each place has its own faucet and white spitting sink. There is also a booking desk of interest to those who plan to explore the wine regions of Bordeaux; to arrange tours, visit wine chateaus and a river tour, leaving from La Cité du Vin to explore the chateaus along the Garonne River.

4.3 MUSME – THE MUSEUM OF THE HISTORY OF MEDICINE IN PADUA

MUSME – The Museum of the History of Medicine in Padua is a new generation museum that narrates the journey of medicine, from ancient discipline to modern science, with a keen eye on the history of Padua's Medical School. Inaugurated in 2015, the museum is set up in the fifteenth-century building that used to house the first hospital of Padua, built in 1414. A hybrid between a traditional exhibit collection and a modern science centre, MUSME embodies the concept of futuristic scientific museum, combining history and technology, and offers an exhibition that adapts to the visitor; from playful story-telling for the younger ones, to in-depth scientific analysis for scholars (MUSME, n.d.)

Regarding its permanent tour, MUSME places the human body at the centre of its exhibition along three floors; in the first sector two rooms are dedicated to the history of the building and to the years of the scientific revolution, while in the second sector four rooms are dedicated to the birth and development of modern medical sciences, and lastly in the third sector there are two rooms for thematic exhibitions and a modern anatomical theatre. At each room, an important figure from the history of medicine welcomes visitors through display screens. Designed to be an innovative and immersive experience, visitors are able to find interactive showcases, videos and multimedia games to learn the correct anatomy of the human body, the medical terminology, the link between pathologies and pathogens, along with medical instruments and ancient specimens provided by the University of Padua, Musei Civici and Azienda Ospedaliera (MUSME, n.d.). With interactive Q&A panels, visitors are encouraged to reflect upon the themes of both historical-scientific knowledge and their own health.

The first room on the ground floor is dedicated to the history of the former Hospital of Saint Francis the Greater, the first city hospital built in 1414 and remained operative until 1798. It was within these premises that, for the first time in the world, medicine students started to

learn clinical practice directly on the patients' bed, thus laying the foundations for the modern academic approach towards medicine. Through display screens represented as virtual doors, important characters from hospital's history describe the motivations and peculiarities of the hospital, as well as explaining the importance of introducing the anatomical and clinical practices into the academic teaching of Medicine. The entire complex; the hospital, the convent and the church, is well displayed on a big scale model with mapped projections. Manuscripts from the fourteenth-century can be browsed through a touch-screen, while several ancient volumes of medicine can be read through projection display (MUSME, n.d.).

Figure 24. *Room A – The former Hospital of Saint Francis the Greater*, MUSME (MUSME, n.d.)

The University of Padua, by virtue of the freedom of study and thought granted by the Venetian Republic, was the cradle of scientific revolution, which changed the face of western knowledge. During the Renaissance, it was here that astronomy and physics were revolutionized, and it was here that modern medicine was born. The second room of the museum is in fact dedicated to the University and its centrality in the scientific revolution, illustrated on a huge infographic and by Galileo Galilei himself, speaking through a virtual display. A projection on the ceiling narrates the tight relationship between astrology and ancient medicine, while some touch-screens present biographies and works of prestigious physicians through the centuries (MUSME, n.d.).

Figure 25. *Room B – The University of Padua and the Scientific Revolution*, MUSME (MUSME, n.d.)

In Room C, subject of the exhibition is Human Anatomy, which is the science that describes how the human body is structured and therefore the morphology of its parts. From a display screen, Andreas Vesalius, graduated in Padua and considered the father of modern anatomy, describes the motivation and the relevance of his revolution in the teaching of human anatomy. A multi-touch tactile table allows visitors to perform anatomical dissections according to the methods employed in post-Vesalian anatomical theatres. Visitors also test their knowledge in the anatomical field through touch screen games, while a mirror-like display screen gives the illusion to observe the inside of visitors body: organs, muscles and bones. Lastly, many ancient and contemporary anatomical specimens are exhibited in the room, along with ancient surgery tools (MUSME, n.d.).

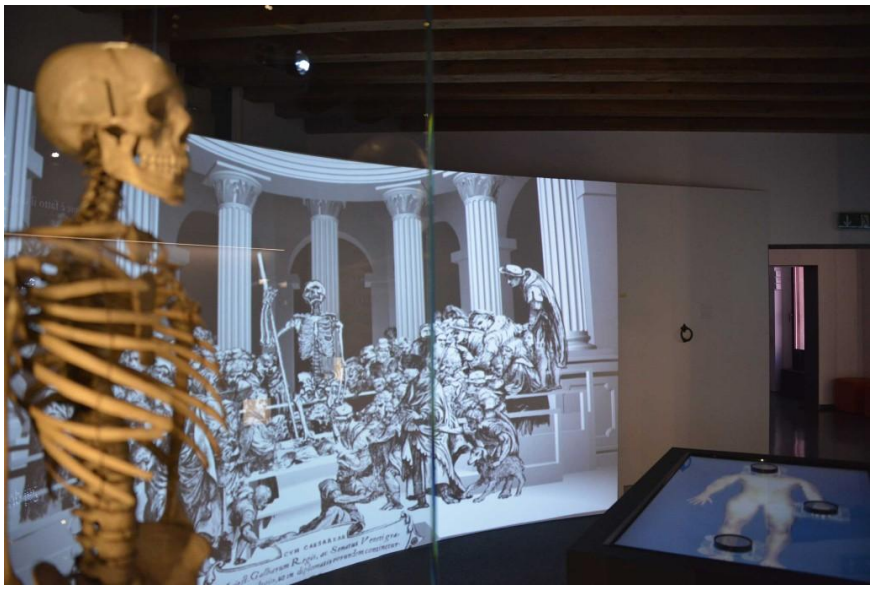

Figure 26. *Room C – Anatomy: How is the Human Body structured?*, MUSME (MUSME, n.d.)

Room D is dedicated to Human Physiology that is the science that studies how the human body and its parts function. Through a screen display, Santorio Santorio, who was the first to introduce quantitative measurements in medicine, narrates his and other important physicians' discoveries and inventions on human physiology. Three interactive stations with explanatory animations show the meaning of physiological measurements and allow education-oriented self-measuring. An interactive panel encourages visitors to reflect upon the topics they have encountered, also in relation to their own health. In the room, visitors can also find three authentic human skulls used for phrenological studies, dating back to the nineteenth-century (MUSME, n.d.).

Figure 27. *Room D – Physiology: How does the Human Body work?*, MUSME (MUSME, n.d.)

Room E is dedicated to Pathology, which is the branch of medicine that studies diseases and how the human body malfunctions. From a screen display, Giovan Battista Morgagni explains his journey, who was the first to associate the symptoms of live patients and introduced the scientific method in diagnostic methodologies. An explanatory panel shows some of the epidemic diseases, whose viruses can be observed through microscopes placed at different heights. A virtual stethoscope allows visitors to listen pathological noises of the heart and the lungs, while a game teaches how to associate diseases to their correct pathogens (MUSME, n.d.).

Figure 28. *Room E – Pathology: How does the Human Body malfunction?*, MUSME (MUSME, n.d.)

In Room F, the evolution of Pharmacology and Surgery is narrated by Prospero Alpin, who was a physician, botanist and one of the first prefects of the most ancient university medicinal garden, built in 1545 in Padua. He talks through a display screen and narrates a journey from medicinal herbs to modern pharmacology, from barbers to surgical specialities, along with the detailed infographics about this development in the room. There is also multi-level multimedia game that tests the knowledge of medical terminology. Visitors can find sample herbs from original herbaria, some ancient tomes and a reproduction of an orthopedic machine (MUSME, n.d.).

Figure 29. *Room F – Therapeutics: How does the Human Body heal?*, MUSME (MUSME, n.d.)

After the six rooms, visitors enter the Modern Vesalian Anatomical Theatre, a large salon where anatomy and physiology are explained through mapped projection to an 8-metre-long human mannequin, which speaks to visitors and seems like a live giant. Around the mannequin, eight nooks examine the organs and apparatuses which the human body is composed through ancient artefacts and 3D images; such as musculoskeletal system, brain, eye, ear, heart, lungs, digestive system, obstetrics and gynaecology (MUSME, n.d.).

Figure 30. *The Modern Vesalian Anatomical Theatre*, MUSME (MUSME, n.d.)

4.4 VARIOUS THEMED MUSEUMS

In addition to the above mentioned examples of promoting the exploration of food, wine, nutrition and medicine, some art museums are enhancing education through the interaction with virtual scenarios and using various technologies to present exhibitions. In the case of 'Pipilotti Rist: Pixel Forest' exhibition at the New Museum in New York City, the artist's work explores physical and psychological experiences through the presentation of textures, forms, lights and sounds, in immersive environments (Vaz et al., 2018). Described as being radiant with colour, projections on the floor, walls and ceilings expand video images everywhere, and to improve the visitors' experience, the space was embedded with steps, pillows and beds (Vaz et al., 2018).

Figure 31. *Pipilotti Rist: Pixel Forest*, New Museum (Hutchinson, 2016)

Within the National Museum of Singapore, immersive and colourful 'Story of the Forest' exhibition takes visitors on a walk, where the walls of the path are large screens that hug the curvature of the walls. An animated display of a forest scene is projected from the screens, inviting the viewer to spot various animals in the foreground and background. Visitors can use the museum application on their mobile device to find out more about certain animals in front of them; including habitat, diet and levels of endangerment. This is also performed in the main dome area of the exhibit, where visitors lie down and observe the ceiling that features cascading spores and plants (Hillier, 2021).

Figure 32. *Story of the Forest*, National Museum of Singapore (TeamLab, n.d.)

Figure 33. *Story of the Forest*, National Museum of Singapore (TeamLab, n.d.)

One of the most mediatic multi-touch projects is located in Gallery One at Cleveland Museum of Art, where more than 4100 objects from the most important museums in the world are displayed on the 'Collection Wall' installation, This surface, arranged as an enormous interactive wall, can be used simultaneously by several visitors to navigate through the collection. When an image is touched, the screen enlarges it and gives extra details about the object and where it is located (Vaz et al., 2018).

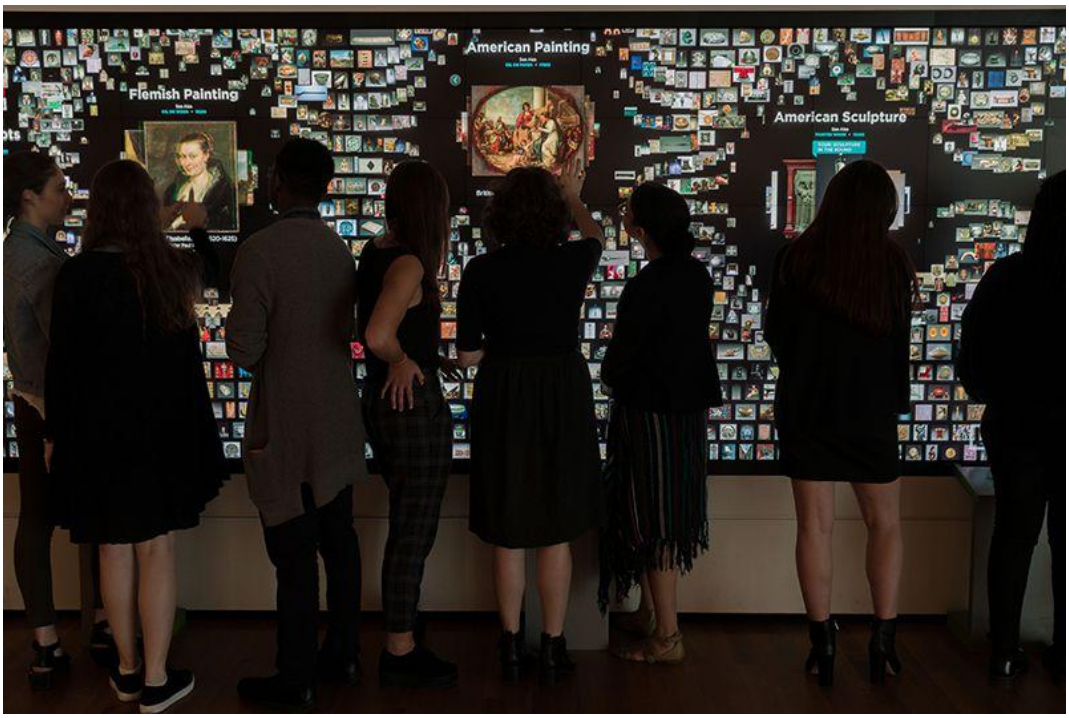

Figure 34. *Collection Wall*, Cleveland Museum of Art (CMA, n.d.)

Besides the Collection Wall, Cleveland Museum of Art has taken interactivity to the next level with their 'ArtLens Studio Play'. The studio, based in a room within the gallery, contains a variety of screen-based activities that require physical movement of the body to operate. Throughout the room, visitors can participate in activities include virtual painting, virtual pottery, drawing shapes and matching them via Artificial Intelligence to items in the gallery database (Hillier, 2021).

Figure 35. *Pottery Wheel*, Cleveland Museum of Art (CMA, n.d.)

An example of museum application for smartphones is the Royal Ontario Museum which allows visitors to experience the past by using augmented reality. Through an application it is possible to add skins to dinosaur skeletons, give life to extinct animals, restore destroyed objects to their original form, decipher antique languages and see objects in its original setting (Vaz et al., 2018). It also allows x-ray views of some pieces and to scan QR codes scattered throughout the museum, which give visitors extra information about the artefacts in exhibition, in the form of video, audio, text and interactive graphics.

The San Francisco Museum of Modern Art designed an application to encourage visitors to explore the museum with their eyes on the physical exhibition and art, instead of being concentrated on their phone screens, as they listen to unique descriptions while moving through the museum. Based on a virtual map, the application finds the location of the visitor inside the museum and combines immersive audio storytelling that adjusts its contents, such as perspectives, reflections and responses to artworks, and point-to-point direction to locations in the building accordingly to their walking (Vaz et al., 2018).

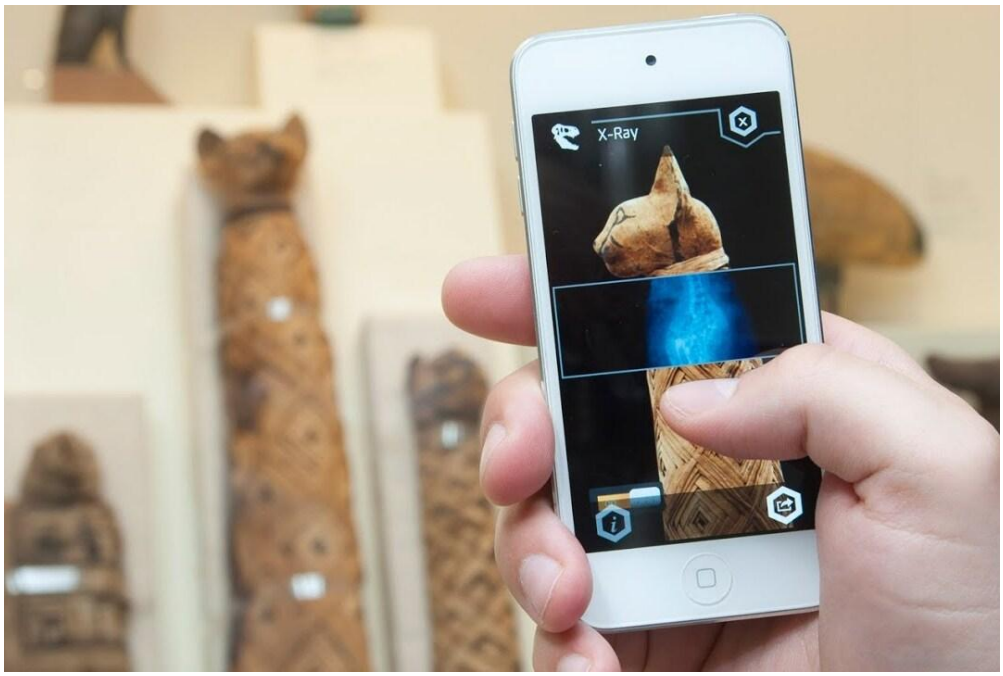

Figure 36. *ScopifyROM App*, Royal Ontario Museum (ROM, 2013)

As the last project, the first physical team game in a museum developed at the National Museum of Scotland in which visitors, with their own smartphones and museum's application, explore galleries of the museum to solve exhibit-related puzzles and scan into territories using their device's camera, in order to beat the other team. With duration of 30 minutes, the game can accommodate up to 50 players at the time and a map shows in real time which team is winning the challenges concerning to the different galleries of the museum. By introducing technology to encourage visitors to learn more about history, the application can appeal to new audiences (Vaz et al., 2018).

CHAPTER 5

ANALYSIS & DISCUSSION

According to the characteristics of the period, the museum of the twenty-first century is not only the space where memories are stored, but also the one where experience is created as the substance for the emergence of a new memory (Ognjević, 2017). Without question interactive and digital exhibitions have the power to pull the audience closer to the museum's themes and create a more memorable experience. Accordingly, case studies at Chapter 4 aimed to make a contribution in the discussion of the appliance of digital technologies to enhance the visitor's experience, as well as provide practical examples of their use in real museum contexts within the themes of food, wine, nutrition and medicine.

As seen, a visit to a museum must respond to visitors' high expectations for the ease of gathering interactive information about the exhibitions, at the same time that have to be effective on communicating a good message to their publics. It is important to make clear; either the museum artefacts or the themes themselves should always be the focus, no matter what technology is being used to increase the public's experience (Vaz et al., 2018). The technologies must be properly designed to provide unique and exciting moments, that will be part of the visitor's memories in the future, as well as to ensure a magnificent and effective mixture between entertainment and education, conveying solid information and making sure that it reaches people. On one hand, it should support the dissemination of information about the exhibits and, on the other, contribute for an inclusive museum that is committed to providing outstanding learning experiences.

The final main goal of the case studies was to highlight the role of technology in helping to promote physical, cognitive, sensory; overall the cultural accessibility of museums exhibitions. Although interactive displays are becoming more commonplace in many galleries and museums, they are often produced tentatively and scarcely, with limited capabilities. The method of involving the movement of the body as a means of control to the standard and arguably outdated static touch-screen display, is not only more immersive for the user but it is also a more social and collaborative way of learning more about the collections.

5.1 MUSEUM ACTIVITIES

The mission of the Mediterranean Diet museum should be to document, preserve, and promote the Mediterranean lifestyle and cultural food heritage, with a derivative mission to research, exhibit, and publicize it for the benefit of the local community of establishment, national and international visitors. Ideas and suggestions for the creation of Mediterranean Diet museum must aim to establish a cultural and educational space; promoting history, nutritional learning, dietary benefits, public health, agriculture, environment and sustainability. Museum should incorporate technological elements of entertainment and interactivity into its exhibitions to provide a rich educational experience, inspire creativity and curiosity within each visitor. Museum must present the historical, scientific and multi-sensorial exploration of the diet via its exhibitions, while providing a number of public programs and satellite activities focusing on teaching healthy dietary patterns to tourists, locals and younger generations. Overall, the aimed facility must provide the means to reach the public and transmit the essence of a balanced diet through the variety of local and fresh products that are part of the Mediterranean region and thereby revitalize the Mediterranean gastronomy and identity.

To this end, the museum must use the expertise of a number of specialists; designers, educators, sociologists, interpreters and curators, to obtain ideal communication through its exhibitions and public programs. However, according to the aforementioned themes and adhering to the researched material from literature review and case studies; content and context recommendations can be given in order to guide future works.

5.1.1 Exhibitions

(1) An exhibition displaying the typical habitat of the Mediterranean Basin: Similar to 'Story of the Forest' exhibition (Figure 32 & Figure 33), interactive projections can create immersive learning experiences throughout the spatial environment and reflect the Mediterranean climate; with mild, rainy winters and hot, dry summers, which supports characteristic Mediterranean forest, woodlands, and scrub vegetation. Through an animated forest, field or vegetation; the endemic species of the region can be displayed including olive trees, grape vines, fruits, vegetables, grains, legumes, beans, nuts, seeds, herbs and spices, as well as various animals and livestock. A mobile museum application can be used by visitors to augment information concerning the species. Additionally, as in 'Pipilotti Rist: Pixel Forest' exhibition (Figure 31), through an animation or a video made from real recordings, an

immersive underwater experience can be created to reflect the sea life of the Mediterranean. Either with display screens or projection display, the installation can present the marine species of the Mediterranean Sea. Lastly, by including plastic and different types of waste to the visuals, an attention should be paid to the plastic pollution and many other adverse effects caused by both human activities and climate change; such as loss of biodiversity, water scarcity, food waste, land degradation, crop failures, loss of rangeland and other vegetation covers, livestock deaths, fisheries production and quality decline.

(2) An interactive exhibition displaying the Lands of the Mediterranean: At multi-touch screen surfaces, such as the example from Cleveland Museum of Art (Figure 6), an interactive installation can show the Mediterranean Basin (Figure 37), on which visitors can interact by touching to different regions or countries to learn about the geography, history, ancient foodways, lands of agriculture, local food and beverage products, and various other information related to the Mediterranean area. Installation can allow the condensation of information related to Mediterranean Diet in a restricted space, amplify the exhibition without overloading the museum and promote scenarios of social living, sharing and collaboration. At least 16 countries border the Mediterranean Sea, and diets vary between these countries and between regions within a country. As differences in culture, ethnic background, religion, economy and agricultural production result in different diets, exhibition should reflect these unique styles of Mediterranean Diet. Furthermore, each mentioned region or country could be asked to maintain a relationship with the Mediterranean Diet museum to keep the exhibition current and continue to reflect important nutritional, culinary and economic issues.

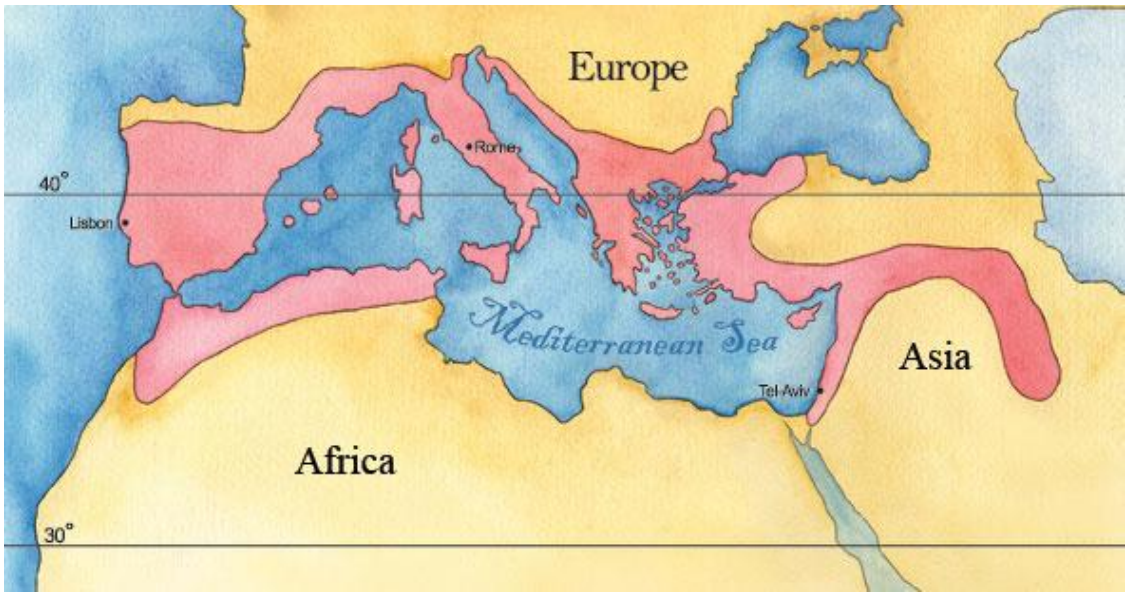

Figure 37. *The Mediterranean Basin* (Pompelli, n.d.)

(3) A special tribute must be made to Ancel Keys, an American physiologist known by rediscovering the Mediterranean Diet together with his wife Margaret Keys. Just as in their professional and private lives, the central themes of the exhibition should be science, diet and health. With large display screens or projection display as used in MUSME (Figure 24, 25, 27, 28 & 29); Ancel and Margaret Keys can give information through their virtual doors, regarding the history of the Mediterranean Diet which dates back to the dietary model of Graeco-Roman civilization as bread, olive oil and wine. Seven Countries Study must be included in the narrative, as the world's first multi-country epidemiological study that examined the relationships between lifestyle, diet, coronary heart disease and stroke in different populations from different regions of the world (Teicholz, 2014).

(4) An exhibition dedicated to Nutrition: As Mediterranean Diet is extremely connected with the relationship between food and health; museum must demonstrate how nutrients and compounds in foods nourish the body and affect body functions, and overall health. Similar to the Body sector at Alimentarium (Figure 15), through an interactive walking path paired with audio and visual works displayed through screens and projections, an immersive experience can be created to inform visitors about 6 classes of nutrients that are found in foods; carbohydrates, fats, proteins, vitamins, minerals and water. The exhibition's main goal must be the exploration of how food is digested, absorbed, transported, metabolized, used and stored in the body. Throughout the exhibition, the best food sources for the intake of essential nutrients can be mentioned. At the end of the exhibition, visitors should be acquainted with the answers of the following questions: Why care about nutrition? What are the nutrients in foods, and what role do they play in the body? What constitutes a nutritious diet? What motivates ones choices? What are dietary guidelines?

(5) An exhibition dedicated to Nutrition-Associated Diseases and Pathology: Following the exhibition on Nutrition to transmit the roles of the 6 classes of nutrients, it is also important to explain what happens in human body both in deficit and excess consumption of these nutrients; since choice of diet influences long-term health. It should be adverted that good nutrition, such as Mediterranean Diet, reduces the risk of the leading causes of death and helps prevent morbidity and disability. As nutrition is a widely accepted tool for prevention and management of several chronic diseases, such as obesity, diabetes, cardiovascular disease, cancer and dementia, exhibition should identify how chronic diseases can be caused, or prevented and treated by proper nutrition and lifestyle, and identify what dietary regimens are harmful or beneficial for chronic disease management and healthy aging.

(6) An interactive exhibition dedicated to Physical Activity: The Mediterranean Diet is not simply a diet but rather it should be considered a philosophy of life that includes non-dietary lifestyle factors; such as moderate physical activity, walking every day, and resting in the middle of the day, after an enjoyable family meal (Iriti & Varoni, 2015). To reflect the importance of physical activity with an interactive play; a human-size hamster wheel, an indoor bike trainer and various other sportive instruments could be installed to allow visitors to interact and learn how much effort is required to burn calories or to generate energy. The importance of the regular practice of physical activity and muscle-strengthening activities must be presented, which emphasize as basic complements to the diet for balancing energy intake, maintaining a healthy body weight and for many other health benefits (Serra-Majem et al., 2020); such as lowering blood pressure, weight control, increased insulin sensitivity and blood glucose control, reduced risk of cardiovascular disease and type-2 diabetes.

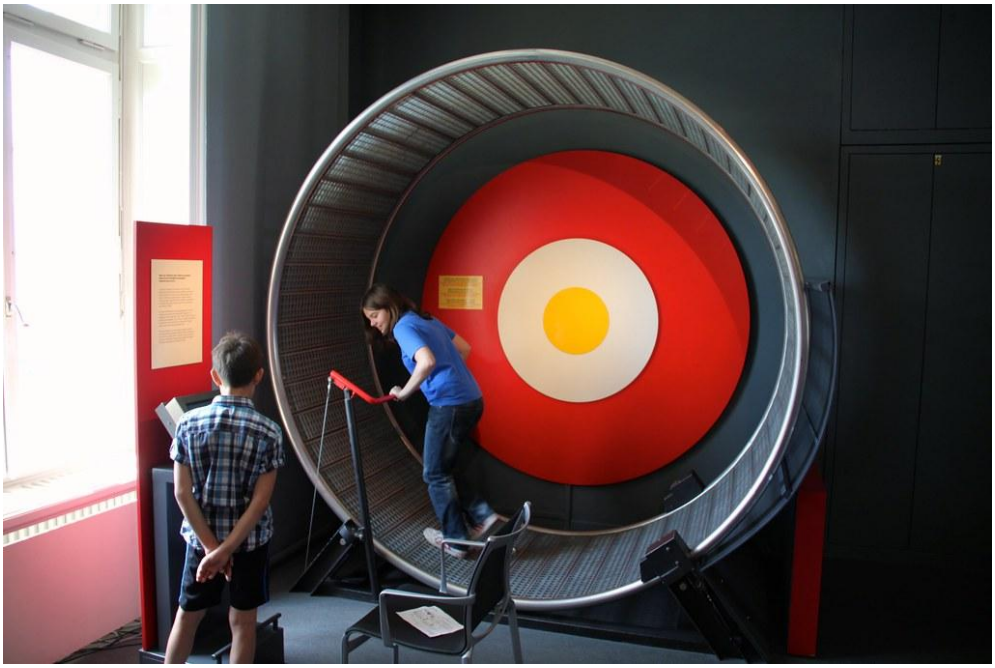

Figure 38. *Hamster Wheel*, Alimentarium (Bekker, 2013)

(7) An exhibition dedicated to the Mediterranean Diet Pyramid: Created in 1993 by the partnership between Oldways, the Harvard School of Public Health and the WHO; Mediterranean Diet Pyramid is a nutrition guide summarizes the Mediterranean pattern of eating, and suggest the types and frequency of the foods that should be enjoyed. Starting at the base of the pyramid, core foods to enjoy every day are whole grains, fruits, vegetables, beans, legumes, herbs, spices, nuts and healthy fats such as olive oil. Twice weekly servings of fish and seafood are recommended, with moderate portions of dairy foods, eggs, and occasional poultry. Moderate intake of wine during meals, and infrequent servings of red

meats and sweets are suggested. Physical activity, adequate rest and socialization during meals are also represented at the bottom of the pyramid, being practices integral to the definition of the Mediterranean lifestyle. The updated version represents also the environmental impact of the food items included, as well as aspects of affordability and food production sustainability (Serra-Majem et al., 2020). It would be appropriate to exhibit the pyramid either through hologram display technology to create an immersive three-dimensional view, or with projection display or through a transparent glass pyramid.

Figure 39. *Updated Mediterranean Diet Pyramid* (Serra-Majem et al., 2020)

(8) An interactive exhibition dedicated to the Dining Tables of the Mediterranean: Supporting the Mediterranean Diet Pyramid exhibition; traditional breakfast, lunch, and dinner tables from various Mediterranean cultures can be expressed with menu suggestions, pairings and nutritional information. Three tables can be exhibited through interactive multi-touch surfaces (Figure 5) or blank surfaces equipped with projection display with motion compensation (Figure 10), where visitors interact and listen to historians, chefs and nutritionists to discover the art of eating, examine the different gastronomic meals and the ways of sharing food in the Mediterranean. Transmitted information should contain menu suggestions for daily consumed main meals such as;

- A combination of cereals, vegetables and fruits, and a small quantity of legumes and beans (Serra-Majem et al., 2020). Cereals in the form of bread, pasta, rice, couscous or bulgur, preferably using whole or partly refined grains.

- Vegetable consumption in raw form for at least one of the two main meals, lunch and dinner. Fruit should be considered as the primary form of dessert. Consuming a variety of colors of both vegetables and fruit to help ensure intake of a broad range of micronutrients and phytochemicals (Serra-Majem et al., 2020). The less these foods are cooked, the higher the retention of vitamins.

(9) An interactive exhibition for the Stakeholders of the Mediterranean Diet: Since many stakeholders are involved in this sustainable framework; through large display screens (Figure 2), visitors can sit across and have face-to-face experiences with experts; from farmers, fisherman, cheese maker, fresh pasta maker, olive oil producer and winemaker to historian, anthropologist, sociologist and public health nutritionist. Examples can be increased with food critics, chefs, sommeliers, religious leaders and philosophers, which all offer their experiences, emotional stories, points of view and advice on the Mediterranean Diet.

(10) An exhibition dedicated to the Sustainability and Future of Food: This zone would aim to bring the politics and pleasure of foods together, and propose questions to raise visitors' awareness of today's sustainability and biodiversity issues, and tomorrow's food production and consumption patterns; in order to transmit the problematic exigency of feeding the world population by 2050, and indeed, how Mediterranean Diet can support this global goal. Innovations such as cultured meat, 3D-printed food, space food, insects and edible seaweed can be showcased, even tastings can be executed, alongside with interviews of renowned scientists in the field of food innovations as how they are always looking for new and inventive solutions to the future food question.

At the end, in a circular table, a moment of sharing experiences among the visitors and a tasting of the main products of the Mediterranean Diet can be executed through the video guiding of the stakeholders; such as olive and olive oil, bread, cheese, fruits and wine. Visitors would be able to perform tasting tests and obtain the ability to recognize quality.

5.1.2 Mobile Application, Headset & Hand-Held Device

Since portable devices like smartphones and tablets allow connection to the Internet, and include built-in cameras and sensors that enable the interpretation of the real world; they can contribute to stimulate new interactions within the exhibitions and the museum space (Vaz et al., 2018). Most part of the visitors bring their own devices when visiting, therefore Mediterranean Diet museum should embrace and take advantage of this reality by creating a

mobile application; which would allow visitors to augment information concerning the exhibits and create gaming experiences within the facility. The concept of encompassing the visitor into an immersion technology, like Augmented Reality, can be used within all the above mentioned exhibitions, if it's created in a way that engages with the museum's themes and invites public to move within the space, thus learning can be completed with enjoyment.

If the museum desires to provide headsets and hand-held devices instead of developing an application; before starting the museum tour, visitors must be invited to wear headsets which allow them to hear input, and a personal hand-held device must be given to each visitor which activates the different modules throughout the exhibition space. Either the museum application, or the headset and hand-held device, both should aim to make the museum content available in different languages and include an interactive map that tells where the visitors are to guide them to a specific destination. Both should be designed to provide an enhanced experience for visitors with disabilities; by providing audio feedback through map features and integrating a high contrast option, thus individuals with visual impairments can move inside the museum and zoom information for high-resolution text, so they can learn more about the museum's exhibits while moving. It should be kept in mind that some of the technologies that are used to enhance the non-disabled public experience can improve also the disabled visitors' experience, coexisting simultaneously and contributing for a more interesting and accessible visit to museums.

5.1.3 Educational Outreach

Apart from the accomplishment in promoting the Mediterranean lifestyle, heritage and food culture through its exhibitions, museum should contribute to the nutritional education of the society. One reason for this is the globalization of food sources and the dominance of chain restaurants which led the local and regional food production, cooking and dining traditions to quickly disappear. Mediterranean Diet museum will be a primary source where evidence of bygone food traditions and histories will be saved and revitalized for future generations. It should mean to be where people, especially students and children, can connect with food. Most people live in urban or suburban settings and have no opportunity to see food production in gardens or farms; outdoor food markets have dwindled, and busy families frequently do not eat together. One consequence of these factors is the rising obesity rates among many people, including children, in the developed world. A nutrition-focused museum will help people develop different attitudes about food and their dietary choices. Educational outreach

programs, that extend and expand school curriculum, would help students to take a new look at food. However, the role of the museum in education is another aspect that requires the museum management team to pay attention to; other than the permanent exhibition, there is a lot more need to done to enrich the museum's education programs. For instance, education programs or activities such as special temporary exhibitions, public lectures on food culture, culinary heritage, and local history might be a good initiation to consider. There should be plans for K-12 education programs, which will train teachers to use the Mediterranean Diet museum to teach culture, history, economics and nutrition through the lens of food. Activities can represent the means of interpreting cultural heritage; in fact, it means practical educational work, which indicates that museum management should be able to deal with the field of museum pedagogics. Overall goal should be contributing to the development of children's programming to reinforce these goals and create a memorable experience in the museum.

The museum of Mediterranean Diet aimed to present emotional and satisfying experiences, which reinforces the memory formation in the mind. However, long-term museum memories are not restricted to exhibitions and objects, but are often connected to multi-sensory, participation-based visits (Aldenhuysen, 2016). Multi-sensory tours, which rely on active visitor participation with the content, may provide the visitor with a more individualized experience. Research shows that multi-sensory tours have the ability to positively benefit museum visitors who are not visual learners and prefer other sensory experiences (Aldenhuysen, 2016). Therefore, Mediterranean Diet museum must offer food-based historical and multi-sensory walking tours; including visits to farms, agricultural cooperatives, olive groves, cheese and pasta factories and wineries where tastings can be executed together with the exploration of production, quality schemes and geographical indications.

Furthermore, museum should try to represent the Mediterranean tradition in a practical way and transfer it with programs designed for adults such as in the form of culinary workshops, lectures, regular tastings, and other types of educational presentations that involve local community participation that will be another possibility to grow the museum's educational programs as well as interesting outreach activities for audiences' development. The purpose of the workshops is not only a mere transfer of facts on the characteristics of folk nutrition, but to help the participants experience the food with all their senses; to see, hear, touch, smell and taste it. It should mean to inspire the participants to take an interest in culinary heritage and form a personal relationship, develop consideration and understanding.

Lastly, an educational garden could be set up outside of the museum or on the rooftop; serving as an open-air exhibition of living elements such as fruits, vegetables, medicinal plants and herbs that characterize the Mediterranean Diet. Recognition skills of these plants, as well as their nutritional properties, sowing and taking care of them must be transmitted to visitors, especially the younger ones since today a lot of children spend too much time in virtual worlds and less in nature. By using active learning methods in teaching; children could learn about the laws of nature, observe the seasons changing and monitor the growth and development of plants at certain stages, gain knowledge about organic production and producing good quality healthy food.

5.2 MUSEUM ORGANIZATION

5.2.1 Funding & Management

Being a non-profit organization, Mediterranean Diet museum would operate under a form of public or private governing body. The main source of funds for any museum in the public sector would be provided by the local, regional or national government; where it may be overseen by diverse ministries such as education, tourism, environment, national heritage, culture, and leisure. While in the private sector, funding would be achieved through individual and corporate sources, as well as private benefactions and endowments that help to support the routine operation. Hybridization of these two forms of governance may improve the ability to document and predict a more feasible institutional behavior.

Either way, the governing body would administrate and define the general policy of the museum, provide and control the necessary resources to deliver it. The appointment of the director and staff members is among their responsibilities. The director of a museum would be responsible for the formulation and implementation of policy, for the day-to-day running of the institution, and for facilitating communication among the museum's governing body, staff, supporters, and visitors. The operation of a museum involves specialists in subjects relevant to museum collections such as designated curators, information scientists who are involved in the documentation of collections and related scientific information. Another group is involved more actively with the public functioning of the museum, that includes specialists in education, communication, and interpretation, designers, the security staff, and marketing and public relations personnel as well as administrative, maintenance, and other support workers (Lewis, 2021).

After initial funding, there are several sources that the museum of Mediterranean Diet can help to finance and sustain its operations; involving in fund-raising, in seeking commercial sponsorship, and owning trading activities. Fund-raising may be undertaken by the museum, or by a commissioned organization. Fund-raising and sponsorship should be directed toward a specific project or development. Museum may charge an entrance fee to help finance its operations. Commercial activities can become a significant feature of the museum that may take the form of restaurants or souvenir shop that provide a service to visitors as well as income to the museum. Other sources would include membership dues, donations, souvenir shop, and grants from government, corporate and private foundations. The museum should be available for rental to people or organizations for special events, and meetings.

According to Higgs (2018), souvenir shops can contribute as much as a quarter of museum revenue, yet their contributions are not merely economic. A retail zone also helps to educate visitors, builds the museum's brand, and serves a highlight of the museum. For the case of the Mediterranean Diet, souvenir shop may include unique souvenirs inspired by the museum's themes and history of the Mediterranean Diet; this will contribute to the museum's unique destination offer. A selection of high quality non-perishable Mediterranean food would also contribute greatly to the museum's souvenir shop; such as olives in jar, olive oil, dried fruit, dried mushrooms, nuts, herbs and spices, pasta, tomato sauce along with typical pasta sauces, canned sardines, balsamic vinegar and local wines.

Lastly, a food and beverage facility, a restaurant or café, could be set up within the museum or on the rooftop alongside the educational garden; where crops and products of the garden could be used as the main ingredients to create traditional Mediterranean dishes around the region, while maintaining seasonality and sustainability.

5.2.2 Partnerships

The museum can regularly work in national and international partnerships to deliver collaborative projects with other museums, educational establishments, heritage and community organizations. The main partnership for the continuous research and development of the museum can be with Italian Food and Wine MSc program at the University of Padua, which would contribute greatly to the museum with its students dedicated to research and promote the Mediterranean Diet; as well as other programs and departments of the University, preferably in the fields of design, architecture, engineering, sociology and tourism. Another partnership should be with the Mediterranean Diet Foundation based in Bari, Italy; as being

the first foundation in the world whose primary aim is to protect the patrimony of the Mediterranean Diet and highlight its health benefits. Another partnership could be with 'Granai della Memoria – The Granaries of Memory' project, in order to deliver collaborative works which can reach audiences beyond those able to visit the museum itself. The project is a collaborative scientific and didactic work between University of Gastronomic Sciences, Slow Food Foundation and various scientific partners; bearing the purpose of collecting and communicating the food memories of the world on video through a complex multimedia archive. The collected interviews are testimonies of farmers, workers, artisans and entrepreneurs of the food industry. The project even served as a database for a 'virtual museum' of gathered video stories about Mediterranean Diet, built by MedEatResearch – Center for Social Research on the Mediterranean Diet, based at Suor Orsola Benincasa University of Naples. All these partnerships could focus on developing new exhibitions, permanent or temporary, public programming, sharing skills and expertise, education and learning.

Lastly, the museum must aim to participate in 'DROPS Platform', an international platform for exchange and experience sharing between eco-museums, heritage and community museums, which aims at connecting all the networks, existing or to be established, in a virtual and interactive space. Multilingual documentaries and a bibliographic pool of resources on eco-museology and its best practices would help with the future development of the Mediterranean Diet museum.

5.2.3 Marketing

In terms of the target audience of the museum, the visitors would consist of local and international tourists from different age groups and demographic cohorts. However, a special focus must be made within the audience as; (1) tourists that seek education, information and high quality tourism engaged with local culture and lifestyle, (2) locals in need of rediscovering the traditions regarding food and culture in the Mediterranean area, (3) professional individuals and institutions related to food, nutrition, public health and sustainability, whom would be provided assistance and scientific information for further research. Yet, the number of millennial visitors is expected to be the highest. Therefore, in addition to interactive design; exhibits and spatial planning of the museum should also been designed as visually attractive to reach the new publics and cater to their interests, particularly on young audiences' passion for the 'selfie' phenomenon and enrichment of their social media

feeds. As leaders of tomorrow and carriers of culture, the youth are also the real users of the internet; however most of them do not know the existence and importance of museums, since the main competitors of the museums are internet and social media as mentioned in the previous chapters. This is why, compared with the 'no photo' policy of the traditional museums; the Mediterranean Diet museum should be able to encourage the visitors to experience, have their photos taken and shared on social media. Besides the innovative social media marketing, traditional advertisements and news releases should be sent to food editors and journalists at daily and weekly newspapers, magazines, radio and television on a regularly basis; including exhibitions and new programs, opening hours, cost of entry and what to expect when visiting.

5.2.4 Membership Program

Sustaining continuous visitors and long-term memberships is an important strategy that cannot be overlooked; thus Mediterranean Diet museum has to develop a membership program which is another significant mission that needs to be realized. The museum needs to build up a strong community that can contribute to the museum's sustainability. Membership program would entail members to receive e-newsletters and be notified of all programs and special events. Potentially, members could receive a discounted price at ticketed events and receive discounts at the museum's souvenirs shop. Most substantially, the membership program is not merely to generate financial support for the museum, but it is also an effective 'word-of-mouth' marketing channel to cultivate museum's ambassadors who will spread the word about the exhibitions and programs, which brings even more visitors and potential members to the museum (Ser, 2020). Recruiting new members and ambassadors can be made through e-newsletter and news releases that are distributed through the traditional and social media (Smith, 2008).

5.2.5 Information Services

In addition to its displays and exhibitions, Mediterranean Diet museum acts as an information centre to the community by its nature. Taking the form of periodicals, handbooks, catalogs and research papers; educational and cultural publications should be designed to act as important mediums for disseminating information to the public and scholars, where such information and products should be commonly available via the museum's website (Lewis, 2021).

The museum's presence on the internet, in these days, may represent its very subsistence, since the lack of virtual communication may result in invisibility to many potential visitors. Traditionally, collection-based museums allow their database be present digitally over the internet with a focus on the content. However, the Mediterranean Diet museum is aimed to be an experiential multi-media museum and should create a virtual environment that is concerned with the narrative and relational aspects of the digital exhibition, that promotes collaboration between public and museum experts, social interaction and sharing, as well as encourage knowledge dissemination. The presence of Mediterranean Diet museum in the virtual world, available in different languages, will enable engagement and interaction with users outside the physical barriers; therefore it should provide information support regarding museum's exhibitions, also involve online collaborative activities such as contents generated by visitors through posted photos and videos, discussions about diverse themes, blogs, tagging, integration and sharing of information via social media platforms (Vaz et al., 2018). The user, therefore, is not only passive but actively influences the construction of museum knowledge, structuring a new paradigm for the museum-visitor relationship. With this approach, the museum can aim to become a global reference on food and nutrition, combining a digitally and physically interconnected learning platform to share its expertise with the general public and professionals. As additional communication channels, museum can rely on Facebook, Twitter and Instagram, which are no doubt workable social platforms for the museum's marketing and promotional related activities that can position the museum with a professional outlook and enhance its branding. Overall, in today's competitive digital marketing landscape, it is very important to build a professional website and social media profiles to showcase the museum's credibility and gain full control over its online destiny (Smith, 2008).

5.3 SOCIAL & ECONOMIC IMPACTS ON THE LOCAL COMMUNITY

As food is one of the strongest tools for shaping and maintaining the contact between people; with its social importance, it provides the museum with additional opportunities to establish itself as an open and social place. The museum of Mediterranean Diet has the opportunity of being an integral part of the local community of establishment and its surrounding environment. The development of such museum can be seen as a great growth strategy for the local community, as it offers the potential to develop a stronger local economy from the ground up, without detrimental impacts on its community and culture. This model will treat

the local cultural heritage as an asset, maintaining its integrity, while integrating it into the larger Mediterranean culture and economy.

Throughout the years of economic research, a special attention has been paid to the analysis of cultural and touristic investments as important sources of income generation in local economies (Llop Llop & Arauzo-Carod, 2012). Based on the economic index to capture the direct and indirect effects of the cultural asset on the local economy, the Keynesian multiplier model used at Llop Llop & Arauzo-Carod (2012); it is possible to say that the Mediterranean Diet museum may generate greater economic activity in the local area in multiple ways. First, the museum contracts employees and consumes goods and services, therefore directly contributes to local economy. Second, there could be a potential tie-in with the farming community in the area of establishment that the museum could preserve and promote farming on heritage crops by hosting a seed bank gathered from different areas of the Mediterranean region, which would be a great tie between culture and agriculture. Lastly, it attracts new visitors to the area of its establishment. This increases local demand for services such as accommodation, restaurants and commerce. Therefore, to capture the full economic impact it must be taken into account not only the museum's current activities but also the demands that the visitors attracted by the new cultural venue in this area.

After all, food plays a central role in cultural heritage tourism, and it has become a main travel motivator for tourists. According to Aldenhuysen (2016), there has been a growing interest in the promotion of culinary tourism in many areas of the world, and food-based historical and multi-sensory walking tours are both popular with visitors and financially successful programs for the participating museums. By developing and promoting tours, a museum can define its region culturally. This is due to the connection between food and local community, because food can be identified as a cultural symbol of an area or destination, which determines the way tourists experience both local culture and the destination. Thus, cultural and tourism projects of the Mediterranean Diet museum would be important tools for strengthening the economic and social development of the local community.

CHAPTER 6

CONCLUSION

As seen throughout the chapters, Mediterranean Diet describes a peculiar way of interpreting and experiencing the oldest social act known to mankind; eating, which constitutes the synthesis of a set of elements and values of a particular geographical, historical, ethical and cultural area combine economic, social and cultural rights, protective of human health and the ecosystem, the Mediterranean basin (Tarsitano et al., 2019). Paradoxically, just as the Mediterranean Diet is becoming more popular in the world and increasingly recognized by the international scientific community, the Mediterranean populations are moving away from this dietary model. The danger lies behind the fact that, there is an enormous gastro-media production on television and internet which represents only the tip of the iceberg of a complex phenomenon of food and the culture of eating (Ognjević, 2017). And that is a huge, largely unknown, only partially explored and unexhibited material of great importance for both science and human society. Unfortunately, the findings in this field obtained by nutritionists, historians, anthropologists, sociologists and other scientists remain largely unknown when it comes to the general public. The lack of readily available, scientifically proven and fact-based information about nutrition opens an immense manipulation space for mythologies. Withal, finding the correct mode of preservation and promotion of the Mediterranean Diet is very important in the future social-economic and environmental context.

Thence, a museum can be an institutional intermediary between the public and science, the intangible heritage and the media. As a system that includes a wide array of activities from collecting, preservation and research all up to presentation, communication and education, according to its recognized role of a leader in the culture, the museum is a public institution with authority of exceptional value (Ognjević, 2017). Accordingly, this project is an attempt to identify the importance of nutritional education in museum environment, specifically the scientific research of the sustainable food culture of the Mediterranean area. It is necessary for a planning to develop projects such as the museum of the Mediterranean Diet, to transmit this cultural heritage from generation to generation. By the establishment of this project, it is foreseen to raise awareness among the public, along with the executive, legislative and judicial branches of governments in the Mediterranean area; in order to take appropriate actions to revitalize the Mediterranean Diet and build sustainable food systems.

6.1 LIMITATIONS

Although the obtained information were sufficient and reliable for such qualitative research; there is too little, nearly no prior research regarding the museums that use high technology, multi-sensorial explorations and educational outreach programs to present food culture and nutrition, and it was required to develop an entirely new exploratory research design rather than explanatory. The hesitancy of museums, throughout the world, to exploit the full potential of gastronomy in the sense of nutritional education is somewhat confusing. This attitude may partly be the result of traditional tightness and conservatism when it comes to the subjects and topics that deserve the attention of museum professionals and museologists, but also of the lack of understanding of intangible heritage concept and its place in museums and museology. However the limitation served as an important opportunity to identify new gaps in the literature and to describe the need for further research.

6.2 SCOPE FOR FURTHER RESEARCH & DEVELOPMENT

The idea of creating a museum dedicated to the Mediterranean Diet needs comprehensive strategies through multi-cultural and multi-sectoral rethinking and collaboration at different specialist levels. It is more than necessary to team up with an interdisciplinary group of specialists, gathered from students or professionals; such as artists, programmers, engineers, computer animators, mathematicians and architects whose collaborative practice seeks to navigate the confluence of art, science, technology, education and the natural world. After choosing the location and settling with a building, this group would offer a feasibility plan for the project, consultancy regarding the budget and be responsible for ordering supplies necessary and managing the construction of any displays needed for the exhibitions. They make sure that all supplies ordered are suitable for the exhibitions and, more importantly, within the budget of the project. These teams would often work together with contractors and other technical staff, especially during the construction stages of the project. Lastly, potential donors and sponsors should be identified and applications to different funding, grants and donations should take place; such as filing relevant paperwork with the local government and private funders, opening bank accounts for handling funds, and other operational necessities, in order to establish the museum.

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