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Entrepreneurship for addressing grand challenges: the role of indigenous entrepreneurship, familiness, and the entrepreneurial ecosystem

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This doctoral thesis lovingly dedicated to

My dear husband Hamidreza Sohrabi who has stood by me and supported me through the most challenging of time

My mother, father, and lovely sister for their support and constant love

This is also for my delightful son, Arman

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

Acknowledgments

Abstract

Entrepreneurship in the global economy is consumed as novel ideas to create progress from the production to the commercialization stage. It is essential to explore how an entrepreneur can influence sustainable innovations that remain under-researched during grand challenges that we face through entrepreneurial activities. The analysis of the present thesis indicated some noticeable results. (I) Local business in each region can be an essential portion of business systems and entrepreneurial ecosystems in their around environment. (II) Familiness is a substantial variable in each region's entrepreneurial structure, which puts family businesses in proper places to promote organizational culture and ecosystem. (III) The entrepreneurial ecosystem in the scale of the country-level can represent different impacts on sustainable innovations over time. The policy, finance, and support factors, involving government and leadership aspects, financial capital, entrepreneurial infrastructure, and support professions, can promote entrepreneurial sustainable innovations in each country. The present thesis contributes to a better understanding of entrepreneurship in several ways concerning the described research framework and analysis in three published papers. Overall, a concluded examination of the study will help researchers better understand the relationships between geography, personality, and the entrepreneurial phenomenon, contributing to more effective policy solutions to encourage sustainable and resilient entrepreneurship-led economic growth. Furthermore, the present dissertation provides different recommendations for policymakers and entrepreneurs in the public institutions for addressing sustainability challenges and conditions with the potential of entrepreneurship leveraged by the expected targets.

Keywords

CHAPTER ONE

Introduction and Background to the general topic area

1.1. Research problem

In recent years, some serious problems without a global scale solution have been defined as grand challenges (Colquitt and George, 2011), depending on the changes in behaviors, different actors, and technological progress. Now, a robust global reference agenda for addressing grand challenges relates to a set of Sustainable Development Goals (SDGs) such as renewable energy and responsible consumption, demonstrated by the United Nations in 2015. All the scientific disciplines are called into action in a collective effort to pursue the SDGs, such as the business disciplines, which are increasingly hosting studies on the management implications of grand challenges and SDGs (Ferraro et al. 2015; George et al. 2016). Accordingly, as a part of business and management disciplines, entrepreneurship studies have been developed in the societal levels together with innovation, competitiveness, productivity, wealth generation, and job creation (Fu et al. 2019, Jones et al. 2011, Liu and Fang 2016, Luu 2017). Today, the links between entrepreneurship and societal challenges are being investigated by several viable research streams (Hossain et al. 2017), such as sustainable entrepreneurship (Schaltegger and Wagner 2011, Shepherd and Patzelt 2011). Entrepreneurial ecosystems are networks that can afford the grand challenges innovatively and sustainably, which can become a driving power of sustainability transformations (Cavallo et al. 2018). There is still a gap between understanding the role of entrepreneurship and sustainability in addressing grand challenges, where those imply to address the solutions, but resulting in new problems (Etzion et al. 2017).

1.2. Research aim and context

Regarding filling these research gaps, the main objective of the current thesis is to contribute to a relevant and viable debate, following through write up three papers. In detail, the purpose of the first paper is to evaluate the feasibility and usefulness of specific local food business (food entrepreneurship) initiatives for improving virtuous cycles and tourist attractiveness through some sound samples by using the indigenous entrepreneurship theory. In the second paper, an

empirical attempt is carried out to evaluate entrepreneurship through SMEs family business companies and to promote the culture in a given territory using the resource-based view (RBV) and simultaneous relationships between internal factors (familiness and culture) and external elements (food heritage). Moreover, in the third paper and based on the main gap, entrepreneurship and entrepreneurial learning are considered ways to solve grand challenges. More entrepreneurial education can be a boost inside the global network of an ecosystem. Entrepreneurial ecosystems (EE) are networks, which can afford the grand challenges innovatively and sustainably. Therefore, the main aim of the third paper is to investigate entrepreneurial sustainable innovations (ESIs) that work against the five elements (policy, finance, human capital, support, and culture) of the entrepreneurship ecosystem (EE) model.

In this regard, a comprehensive research model is constructed to guide the study from the research problem (i.e., grand challenges of unsustainable entrepreneurship) to contextual investigations (including variables of familiness, food heritage, clan culture, entrepreneurial ecosystem, and sustainable innovations) (Figure 1.1). Finally, implications for sustainable innovations can be recommended to summarize the investigations from a local-level survey to a national-level analysis regarding the various theoretical backgrounds by using accessible data sets and indicators, improving the concept of entrepreneurial and innovative ecosystems.

1.3. Research question

On this basis, along with writing up three papers, we follow up one main question: How an entrepreneur influences sustainable innovation through entrepreneurial activities. In detail, we express three main questions: RQ1: How we define the working of the virtuous cultural cycle in a non-Western country and how we explore it in a sample. RQ2: What are the relationships between food heritage, familiness, and clan culture? RQ3: How the entrepreneurial ecosystem affects entrepreneurial sustainable innovations?

To cope with such the mentioned research questions, the below ways are assumed. In the first paper, both quantitative and qualitative data assess local food heritage in this study. Quantitative data are the statistical data from official databases and results from 40 questionnaire forms, analyzed by the numerical tabs in the SPSS software; meanwhile, the qualitative data consists of two environmental checklists and about ten interviews with different groups of people in addition to concept analysis addressing the terms of the food heritage and food tourism. Census coordinated method is used to cover all the 40 participants in both case studies (Bagh-Chehel-Sotoun and Bagh-Fin gardens) who are actual visitors (i.e., domestic or foreign tourists) or local respondents (e.g., involved in food business stockholders or farmers). In the second paper, through a quantitative analysis with data from one eco-tourist city in Iran (Torqabeh), a structured questionnaire surveying for 98 small-and-medium-sized enterprises (SMEs) is developed operating in the food industry. A statistical method, namely partial least squares structural equation modeling (PLS-SEM), is assumed to analyze. Ultimately, in the third paper, we construct our investigation on the empirical analysis of 14 European countries from 2007–2016, selecting five elements of entrepreneurial ecosystem (EE) (e.g., policy, finance, human capital, support, and culture) on entrepreneurial sustainable innovations.

1.4. Research contribution

The thesis outputs may inform policymakers and the entrepreneurs in the public institutions for addressing sustainability challenges and conditions with the potential of entrepreneurship leveraged by the expected targets. On the other side, the published findings also help entrepreneurs to view themselves as co-builders of complex and resilient eco-socio-technical systems. To summarize, the present thesis provides different contributions in the field of entrepreneurship in different ways. The first paper results can improve the awareness of local food for a range of policymakers, urban planners, and cultural affairs to promote the cultural dimension of entrepreneurship from vicious circles to virtuous cycles. The second paper can contribute to family business studies by highlighting the possible role of entrepreneurs' familiness as an antecedent of clan culture in given SMEs of the

food sector. Ultimately, the third paper has several distinct contributions supporting successful EE development at the country level. Our results reinforce the literature that exercises the empirical and quantitative frameworks of an EE and its key factors regarding ESIs in each region (e.g., Cavallo et al. 2019; Ricciardi et al. 2021). The research also provides evidence and insights, helping provide the regional and national norms of entrepreneurial actions that can create an appropriate ecosystem because an EE, as an aspect of entrepreneurship, plays an essential role in how ecosystems support firm growth through their direct impact on entrepreneurs (Spigel 2020). A regional and complex agglomeration of EEs provides enhanced entrepreneurial activity benefiting the national economic and societal environment (Kuckertz 2019). Hence, the results of all papers can invoke sustainable mechanisms to boost local and national economic performance.

The present dissertation's outline consists of five sections as follows: "Chapter one" represents the introduction and background to the general topic area, the main research gap, and research questions. "Chapters two", "Chapter three", and "Chapter four" involve first, second, and third published papers, respectively. "Chapter five" then presents the conclusion and implications and further research.

Figure 1.1. Research framework
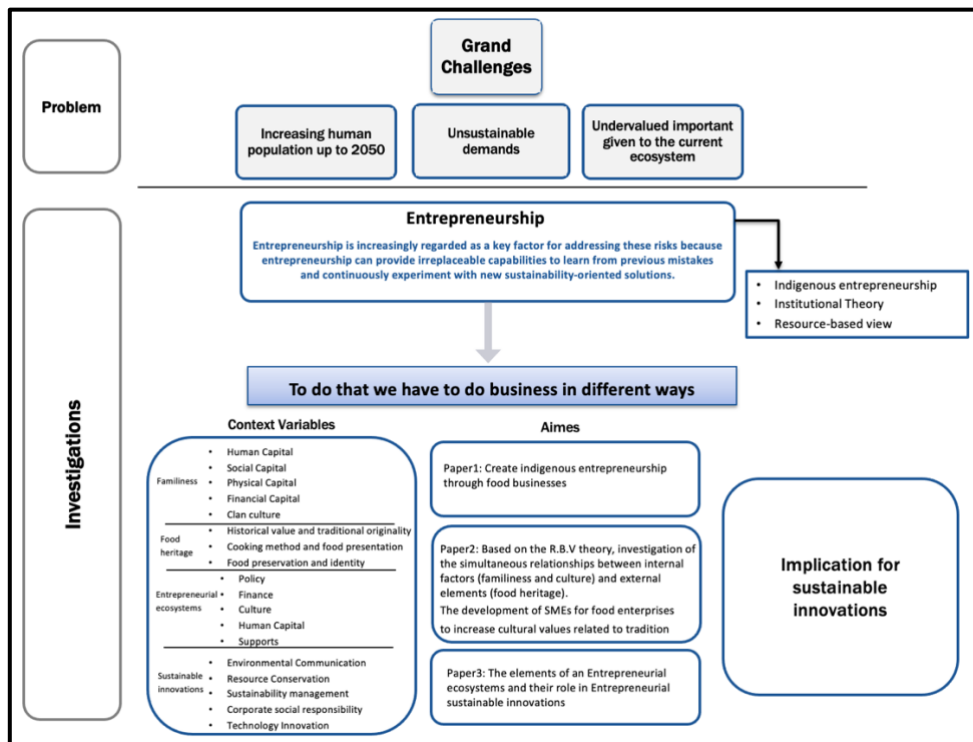
CHAPTER TWO (FIRST PAPER)-Accepted for publication by Journal of Culture heritage management and sustainable development

"Assessment of food heritage to improve virtuous cycles"

2.1. Abstract

Purpose – The purpose of this paper is to contribute the advancement of knowledge on food heritage and indigenous entrepreneurship in a non-Western country, specifically in the Persian gardens as the touristic destination for increasing the tourism and food businesses in Iran.

Design/methodology/approach – The methodological approach adopted is based on qualitative and quantitative approaches to compare two representative gardens named as Bagh-Chehel-Sotoun and Bagh-Fin, as famous examples of a Persian garden in Iran. The methods supported the research to explain the lack of strategies for improving virtuous cycles in Persian gardens despite their potentials as the main places to attract many tourists.

Findings – Regarding local food and the quality of servicing, most of the visitors and tourists (85–90%) had interest to test local and traditional foods around both gardens, but they had no sufficient awareness of Iranian traditional foods. According to the tourists' interests, the authors concluded the lack of servicing and facilities to present and introduce local and traditional food for tourists.

Research limitations/implications – Despite the limitation of local food services and lack of awareness of tourists about local foods, the implication of the study offers possible avenues to promote local food business. Practical implications – The results could be useful for cultural heritage and tourism organizations and for investors in the economic sector due to more exploitation of the tourism industry.

Originality/value – The paper is the first work evaluating the Persian garden with a new perspective of local foods in Iran.

Keywords: Local food, Indigenous entrepreneurship, Persian garden, Tourism

2.2. Introduction

Food as heritage concept is closely associated with local food, including food events, festivals or cooking holidays (Di Domenico and Miller, 2012; Hall and Sharples, 2008), local food through farmer's markets and the inclusion of locally grown food products in the hospitality supply chain (Telfer and Wall, 1996; Torres, 2002). The cultivation, preparation and communal consumption procedure for preparing local food have been considered as a form of cultural heritage. Food creates social bonds as it simultaneously marks off and maintains cultural

differences. According to Zago and Pick (2004), local food specialties are agricultural commodities or finished products with specific organoleptic characteristics related to a production area or technology. Currently, local food has an excellent contribution to the success of tourism and has been favored by a high degree of popularity more than in the past (e.g. Mak et al., 2012; Chang et al., 2011; Henderson, 2009; Kivela and Crotts, 2006; Kim et al., 2009).

According to scholars (e.g. Brulotte and Di-Giovine, 2014; Ramli et al., 2016), food heritage is an essential item for linking to tourism. The relation between heritage and tourism is mutual, so that tourists bring money affecting sustainable entrepreneurship and encouraging food entrepreneurs. The linkage between food and tourism can be observed as virtuous or vicious. The emerging processes of virtuous cycles rather than vicious circles are investigated in Western countries about local food heritage (Mynttinen et al., 2015; Cuevas et al., 2017; Raji et al., 2017; Roy et al., 2017; Sthapit, 2017) and also cultural heritage (Vecco, 2010; Del-Barrio et al., 2012; Lee, 2015; Abbas et al., 2016), while non-Western countries remain underinvestigated. One of the reasons relates to suffering the tourism marketing image of some countries in terms of long periods of extremely negative Western media coverage in addition to the unreceptive strategies of these countries due to their restricted political or religious agenda (O'Gorman et al., 2007). Hence, the local food industry has some limitations in the non-Western countries concerning tourism development. For instance, the "wine" marketing could not be considered as the main part of food and drinking heritage affected by religious agenda.

Therefore, the purpose of this research is to investigate the virtuous cycles of food heritage in non-Western countries through some sound samples. The novelty of this study is an attempt to answer how we define the working of the cultural virtuous cycle in a non-Western country and how we explore it in a sample. This paper explains conceptually the linkage of food heritage, food entrepreneurship and tourism attractions in the case of Persian gardens to fill the research gap. In many cultures, not only in Iran but also in Europe, the garden is essential according to the monument, expression of art, culture and so on; for example, famous classical gardens of Suzhou in China or Boboli Gardens of Florence in

Italy. This also presents in non-Western countries especially in Iran with specific meaning and history. During the development of the gardens, the tangible and intangible heritage achieved perfect harmony (Abbas et al., 2016).

Persian gardens are a valuable heritage resource from the cultural history of Iran. These gardens as traditional forms of horticulture in a public realm scale have the powerful ability for presenting their identical values through the Iranian cultures. This paper attempts to evaluate the feasibility and usefulness of specific local food business initiatives for improving virtuous cycles and tourist attractiveness of heritage places. For this purpose, two important Iranian historical gardens were considered, which are similar in every physical and historical feature. In this study, the literature review is given in which a comprehensive study is conducted on the food heritage, its influence on the tourism economy, and literature on Persian gardens is provided. Subsequently, the study areas and methodology are presented. After analyses of the case studies, the conclusion is delivered by providing the findings toward the indigenous entrepreneurship for tourism policies and practices.

2.3. Background of literature review

2.3.1. Food heritage and tourism

The term food can be introduced from different points of view. From the perspective of heritage, several tangible and intangible factors contribute to the food heritage in a historical place (UNESCO, 2003; Ron and Timothy, 2013; Brulotte and Di-Giovine, 2014; UNESCO, 2019). Also, from the point of management, food is a part of the tourism system and is a vital necessity (Kim et al., 2009; Mak et al., 2012; Ron and Timothy, 2013; Alderighi et al., 2016). In the same vein, other scholars (e.g. Torres, 2002; Sims, 2010) have argued that the type of food, which is available for tourists, has an essential role in the sustainability of tourism destinations, especially in the case of local food produced by indigenous people. In addition, food as a component of holiday experiences can represent the image and reputation of a locality, although to a lesser degree than cultural sites (Bessiere and Tibere, 2013).

Food as a heritage relates to achieving cultural value belonging to traditional science, agriculture products, ingredient, dishes, techniques and traditional food (Ramli et al., 2016). Moreover, the role of food heritage in the marketing of destinations can help to promote this issue. Marketing strategies, including the piece of the food, can be designated at a personal, local, national or international level (Misiura, 2006). According to Du Rand et al. (2003), the improvement of product potential helps to give a structure to increase marketers and entrepreneurs regarding touristic deals of local foods. On the other hand, food heritage is a new approach for improving sustainable tourist development at the local level (Everett and Aitchison, 2008). Tourists can experience unique things when they enter a place and experience local foods in that place (Bessiere and Tibere, 2013). Food heritage has the potential for introducing the cultural identity of a place that can also be a perfect sign for tourists to perceive different products and destinations (Lopez-Guzman and Sanchez- Can~izares, 2014). In the future, food heritage can include a comprehensive and exploratory discussion between food and culture (Ellis et al., 2018).

Kivela and Crotts (2006) have reported that local food is the main point of both leisure and business tourism. Local food can influence the economic and environmental sustainability through protection from local business and build a brand that can be useful for attracting tourists (Sims, 2009). Tourism's role in improving the high quality of lives of both Western and non-Western countries has come under increasing scrutiny in current years. Food can change each simple place to the tourist destination by increasing local economic products and virtuous cycles (Ji et al., 2016).

2.3.2. Indigenous entrepreneurship theory

Indigenous people participate in developing the economy and advancing technological changes with a degree of self-determination (Peredo et al., 2004). According to the literature review, the creation of entrepreneurship by applying local food products has two significant results: first, it can increase the economic interactions related to each particular area; second, it can introduce traditional food to the tourists coming to this region (Ruhanen et al., 2015). This also can help indigenous tourists and improve the cultural identity of the historical

placements. As Butler and Hinch (2007) have mentioned, indigenous tourism can be defined as a tourism activity in which indigenous people are directly involved. Due to the indigenous entrepreneurship approach, research should firstly focus on the tangible and intangible resources of the study areas to understand the hidden potentials for the indigenous investment.

By using indigenous entrepreneurship theory, we explored how this research helps to implement food businesses like indigenous entrepreneurship for local people and improve the tourist level of Persian gardens, which leads to promoting the economy level. Then, the results can help policymakers to develop their strategies better in the field of tourism management especially in Persian garden destinations by leveraging the potential of food heritage.

2.3.3. Persian garden

Persian garden is an excellent example of a cultural heritage place, which is formed by the interactions between Iranian society and their environment. Therefore, it would be a suitable case for examining the role of food in its tourist attraction and tourism perception (Ramyar, 2011). Persian gardens are valuable heritages from the cultural history of Iran. There are many studies available on this notion from philosophical, geographical, aesthetical and archaeological points of view (e.g. Pirnia, 2008; Pourmand and Keshtkar, 2011; Ramyar, 2011; Abbas et al., 2016).

In the past centuries, Persian gardens with private possession were the aesthetical place for the leisure of the kings and governors. Different types of seasonal plants, fruit and nonfruit trees, shrubs and flowers with recreational and economic landscapes comprised green spaces in these gardens. Hence, the gardens with beautiful landscapes, quiet space with the sound of water and birds apart from the people and cities were the place for taking rest times. In this regard, the palace in the central axis of the Persian gardens was a private place for the king's parties and leisure times (Wilber, 1979). Nevertheless, in the present time, these gardens have been transferred to public green spaces and main touristic destinations with historical, cultural and economic characteristics. The main character and identity of the Persian garden are described by its physical features and conceptual symbols, which can be explained as follows.

Physical features: Water, plants and manmade constructions cover all of the Persian gardens as fundamental elements for shaping spaces. However, the ways that these elements mixed may appear varied from garden to garden, but all of these elements are used in general patterns. Water is one of the most valuable elements in Persian gardens because of its shortage in dry and hot climate and the values of the water in common Iranian beliefs. Water is a symbol of cleaning, calmness and peace (Zamani et al., 2009). The reflection of images is beautiful patterns in front of the palaces in gardens, which are made by the big pools in front of palaces (Pourmand and Keshtkar, 2011). Using the slope of the land is one of the basic principles for flowing water, and because of this slope, water flow made beautiful sounds (Pirnia, 2008).

Plants are natural elements of Persian gardens, which have variety in forms, colors and functions. The plants are divided into two types of trees and flowers. Trees are symbols of the perfection of the soul, growing up the mind and spirit in human life (Zamani et al., 2009). Flowers are the most beautiful small objects in the gardens, which were described several times by traditional poets while they were the symbol of the lover (Wilber, 1979).

Conventional man-made objects in Persian gardens consist of the palace buildings, walls and entrances. The architecture of the buildings allows users and visitors to have fantastic views from inside the palace to the garden. Most palaces are constructed on two floors. Several terraces include the second floor for standing and looking to the gardens' perspective (Pirnia, 2008).

Conceptual symbols: The main character of the Persian garden is its conceptual symbols and its intangible values. Moreover, the sense of unity, keeping privacy, the functions of spaces and the mixture of art and poetry are the main qualities that altogether make the spirit of these gardens. In this regard, the feeling of the garden statement will be the same to experience space sense. Space, context, ideology, knowledge and religion all together can make a being in the form of a garden. Persian garden presents life's natural rhythm in the form of unity of the body, mind and spirit (Ramyar, 2011).

Meanwhile, Persian gardens have the potential to attract tourists. One of the most important reasons for tourist attraction into these gardens is the placement of them within arid and semiarid climate as a fresh and relaxing place for comfort and recreation in Iran. The existence of shrubs and trees, such as fruit horticulture, planting and traditional architecture in the Persian garden has produced a useful situation for the preparation of the food or medicine objects in addition to aesthetic space (Alidoost et al., 2013). Most of these gardens have been constructed in the past for political or social reasons.

2.4. Data and methods

2.4.1. Study area

The present study considered two case studies of Persian gardens called Bagh-Chehel-Sotoun and Bagh-Fin to further analyze. The origin of both gardens is to the Safavid period during the 16th and 17th centuries. The garden of Chehel-Sotoun (Bagh-Chehel-Sotoun) with 67,000 m2 surface area is located in the Isfahan city, central Iran (3283902700 N, 5184002000 E) (Figure 2.1). Isfahan as the third largest city of Iran is one of the cultural, historical and economic cities and has great potential for cultural and tourism affairs. Bagh-Chehel-Sotoun is one of the nine beautiful Iranian historical gardens, which was registered in the list of UNESCO World Heritage Center in 2011 (UNESCO, 2011). Based on the municipality's tourism report in 2015, annually about 418,000 tourists visit this garden especially in spring and summer periods.

Therefore, the garden of Bagh-Fin with 23,000 m2 surface area is located at the Kashan city in the north of Isfahan (3385604700 N, 5182202100 E) (Figure 2.1). Similar to Bagh-Chehel- Sotoun, Bagh-Fin was registered in the list of UNESCO World Heritage Center in 2011 (UNESCO, 2011). This garden is the monument's place of murdering Amir Kabir, the famous

Chancellor of Iran's history during the Qajar dynasty, which is an important incident. Based on the municipality's tourism report in 2015, annually, about 819,000 tourists visit this garden usually during all season periods.

Both gardens are the main touristic destinations of Isfahan and Kashan, which have been visited annually by native Iranian visitors and foreign tourists. Over

90% of visitors belonged to Iranian and local people, while approximately 10% of visitors belonged to different countries dominantly from Italy, Germany, Switzerland, Australia, China, Japan and Singapore, respectively.

2.4.2. Methodology

According to the literature review, it was exposed that the food, as cultural heritage, can boost up tourism flows in non-Western countries such as Iran. The methods for assessing food and tourism dominantly tend to adopt the existing research frameworks used for destination image and tourists' perception (Ellis et al., 2018). Hence, both quantitative and qualitative data were considered to assess local food heritage in this study. Quantitative data are the statistical data from official databases and results from 40 questionnaire forms, analyzed by the numerical tabs in the SPSS software; meanwhile, the qualitative data consists of two environmental checklists and about ten interviews with different groups of people in addition to concept analysis addressing the terms of the food heritage and food tourism.

This research compares two case studies through purposeful sampling. These two cases are the famous gardens, which are very similar in terms of architecture, history and beauty; nonetheless, they are different in their relationship between food and heritage. One of the gardens is virtuous, and another is vicious. By comparing both gardens, we can highlight how a virtuous cycle of relationship between food and heritage has been developed. Hence, the study needs to carry out observations and field works around and inside the gardens. For this reason, local people and tourists were surveyed using fieldwork operations. Hence, several procedures such as interviews, questionnaires, observation and empirical in situ operations were used. Census coordinated method was used to cover all the 40 participants in both case studies (20 respondents in Bagh-Chehel-Sotoun and 20 respondents in Bagh-Fin gardens) who were actual visitors (i.e. domestic or foreign tourists equal 28 participants) or local respondents (e.g. involved in food business stockholders or farmers equal 12 participants). This method was deemed more appropriate than the conventional random sampling technique. Hence, an interview protocol has been prepared in order to interview with three groups of the local community (1. owners of shops or restaurants around the gardens, 2.

agricultural workers inside of the gardens and 3. tourists and visitors). The interview protocol contains questions, which are about the agricultural scenario, annual visitors, the percentage of employment and the evaluation of commercial land use in addition to information about retails and wholesales and the employment of indigenous people inside and around the gardens. Moreover, a prepared questionnaire contains questions that were used to gather the awareness of traditional food from local and foreign tourists who visit the garden. Accordingly, a questionnaire form, including the demographic profile of respondents (five questions) and substantial issues of local food properties (seven questions) with fixed statements and two- point scales, agreeing (high) and disagree (low) statements, was prepared for all tourists/ visitors and local community (40 participants) to identify their personal preferences and awareness of traditional foods of the study areas. We indeed faced limitations regarding the data sampling (preparation of 40 participants) due to some communicational and political restrictions, which unfortunately relates to the governmental rules in Iran. In any way, the questionnaire survey was performed during a week in the summer of 2017. After the data collection, using the indigenous entrepreneurship theory, we attempt to explore how the

research can help the implementations of food businesses, which leads to promoting the economy levels. Since this research is one of the first one addressing this issue in non-Western countries, we are aware that we faced limitations regarding small sampling from the quantitative point of view. Therefore, we hope that the contribution could be useful for the future.

2.5. Results

2.5.1. Characteristics of Bagh-Chehel-Sotoun

The valuable features related to the touristic ability of the garden are analyzed here by the tangible factors, which are more related to the shape and landscape of the garden, and the intangible factors that mostly arise from the locality aspects related to people and foods. The Bagh-Chehel-Sotoun as a Persian garden includes the pavilion and ancient garden with the 15-acre site. Moreover, this garden is one of the most spectacular and historical places of Isfahan, which has

been built by the Safavid King of Shah Abbas II (Khansari et al., 1998). The main parts of this garden include a pavilion garden with main axes of the garden, a pool as the most important manifestation of water behind the pavilion and 20 tall wooden columns supporting the entrance pavilion, which when reflected in the pool water are seen as totally 40 columns. The pavilion includes a rectangular hall covered with paintings, mirrors, stained- glass windows and inlaid works.

From vicious circles: Isfahan is one of the cities in Iran that has many local foods and traditional dishes as important local intangible factors (Table 1). These traditional foods are valuable resources for tourist attraction. For instance, one of the most known dishes in Isfahan is Bery^ani (grilled meat) that is minced and cooked meat fried in a special pan and served with traditional bread. Due to the observations, about 90% of commercial land uses around the garden are wholesale goods and handicrafts. Hence, there is no specific place to serve Isfahan local foods and beverages around this garden, except for two stores, which serve nonlocal fast foods. The location of the Chehel-Sotoun garden is in the vicinity of another famous historical region of Isfahan named as Naqsh-Jahan square. Hence, due to the existence of old markets and food stores in the Naqsh-Jahan region, there is no economic efficiency to establish stores for shopkeepers near the Chehel-Sotoun garden. During interviews with city executives and shopkeepers, it has resulted that the economic hub of Naqsh-Jahan affects the omission of food shops and restaurants around the Chehel-Sotoun garden. Furthermore, the regulations of UNESCO (2003) do not allow establishing any food marketing inside of the inscribed tangible Persian gardens. Hence, providing local and traditional food entrepreneurship around this garden needs a new business model comprised of food and nonfood services.

To virtuous cycles: Based on agricultural features and fieldwork investigations, there are old fruitless trees (over 2500 plant species), evergreen trees and flower planting in this garden. Because of the existence of these trees, the soil of this garden has become acidic during the centuries, hence the soil of the garden is not suitable for more agricultural activities. In this regard, an irrigation and drainage system could be considered based on traditional methods, facilitating the possible revitalizing of the indigenous farming and local gastronomic entrepreneurship and

preparing the fundamental materials of the local foods. Meanwhile, regarding the issue of indigenous entrepreneurship, we found that most of the workers inside the garden, including gardeners, ticket sales and guardians, are indigenous people in the city of Isfahan. The proximity of the garden to Naqsh-Jahan square has provided an important potential of local and traditional food marketing for these indigenous people without any prohibition of UNESCO regulations. The physical space between Chehel-Sotoun and Naqsh-Jahan actually seems to be a proper environmental situation to holding local food festivals and street food vendors on the urban scale.

2.5.2. Characteristics of Bagh-Fin

Due to the tangible aspects, the main parts of this garden include a pavilion with the intersection of the two main axes, a pool situated in the northern garden, two glorious bathrooms and a surrounding yard by ramparts and four circular towers. The architecture of pavilion into Bagh-Fin includes some precious paintings, mirrors, stained-glass windows and inlaid works. Therefore, there is a building called as National Museum of Kashan, built in 1966, in the northern garden. The museum has a special part named as a teahouse, which divides water branches to the whole garden. Besides, some residential buildings with historical construction are observed in the vicinity of the garden. In the current status, there is no food service or agricultural entrepreneurship, while a good potential of food services is observed outside of the garden through the traditional buildings and historical houses to expand local food and entrepreneurship.

From vicious circles: Kashan is one of the historical cities nearby Isfahan, and it attracts both native and foreign visitors and tourists during all season periods. There are many local foods, some of which are more famous, making different sense of tourist experiences in this city (Table 2). Khor^ake-Gousht-Loubi^a (meat and bean) is one of the traditional foods in this city. It is cooked in copper pots, which is made from lamb, vegetables, parsley, fenugreek, white beans, rice and onions. Furthermore, some gardens and livestock husbandry, which observed approximately to this location, could be considered as the basis of traditional materials of the local foods such as animal protein, dairy and vegetative products and fruits. However, in the current status, there is no observed any local food

services or facilities around the garden in relation to the circular utilization of the aforementioned principles of the local food.

To virtuous cycles: Agricultural surveying revealed that the water availability of traditional orchards depends on groundwater wells and traditional streams and channels. In this regard, the irrigation method corresponds to floating and flooding through narrow streams, basins and pools, which are located on the axes to circulate water around the garden (Farahani et al., 2016). The main soil type of the garden indicates alluvial sediments with proper fertility. Furthermore, the presence of trees is noticeable in the refreshing garden air in the whole space. There are about 600 cypress trees and ten large aged trees in the garden, which are between 100 and 500 years old. The number and history of these trees show that the shadowy and evergreen trees play an important role in designing the garden in the arid climate of the study area. Plants of Bagh-Fin are intended for shadows, harvest crops and decorative purposes. The mixed cultivation of orchards is one of the main characteristics of this garden. The owner and the workers of this place are indigenous people. Besides, around this garden, several shops present unique handicrafts of the Kashan city. These places can be transferred to market local and traditional foods and drinks. The traditional material of the local foods and drinks can be prepared from some gardens and livestock husbandry, which were observed approximately to this location.

2.5.3. Questionnaire results

To achieve better results to identify the local food entrepreneurship around this garden, the questionnaire forms were completed randomly with the participation of about 20 tourists (ten native visitors and ten foreign tourists). Questionnaire items were used in two-point scales of agreeing (high) and disagreeing (low) statements. For this purpose, to assess the reliability of the questionnaires, the coefficient of Cronbach's alpha (Chronbach, 1951) was obtained in SPSS software over 0.75 indicating reliability level.

In this research, two tables were extracted comprised of the profiles of participants (Table 2) and their classified responses (Table 3). Based on Table 2, most types of travels were classified in crowded forms for both gardens (75–80%). The visiting behavior in the Fin garden was completely categorized as

scheduled by tour agencies (90%). This behavior in the Chehel-Sotoun was closed to randomly and optional behavior due to the density of some historical sites and touristic hub of Naqsh-Jahan square in the vicinity of the garden. About 20–25% of participants were categorized as the local community involved in food business stockholders or farmers (12 participants).

According to Table 3, approximately 80–100% of visitors have an agreeable viewpoint for high level and sufficient status of accessibility from downtown, the attractiveness of the external environment, the architectural quality of interior buildings and agricultural quality of existing green spaces in both gardens. However, only approximately 50% of participants have a high satisfaction regarding local food and the quality of service. Subsequently, most of the participants (85–90%) had interest to test local and traditional foods around both gardens, but they had no sufficient awareness about Iranian traditional foods (below than 50%). Although the participants have a high positive image in two case studies (approximately 68–77%) concerning the environmental attractiveness and local food attributions, we concluded the lack of servicing and facilities to present and introduce local and traditional food by working the virtuous cycles. As a result, the findings are accordant with the food heritage concept that can change each place to a tourist destination by increasing local economic products and virtuous cycles (Ji et al., 2016; Cantino et al., 2016). This issue also can improve the competitive advantage, traditional values and new initiative opportunities (Dubini et al., 2013).

2.5.4. Comparative results

According to fieldwork observations and analyses of questionnaires, we defined some highlights for evaluating and comparing these two gardens that can be classified as follows:

Accessibility: Chehel-Sotoun garden is located in the central part of the Isfahan city. One of the most important and famous historical regions of Isfahan, called Naqsh-Jahan square, is near to this garden. Hence, it causes easier access and better navigation. Nevertheless, Fin garden is located in the marginal part of the Kashan city with a 6-km distance to the city core. Hence, the accessibility of the Chehel-Sotoun garden is better than Fin garden.

The attractiveness of the external environment: The evolution of food business and marketing systems around the Chehel-Sotoun garden has been affected by Naqsh-Jahan, such as enormous restaurants, handicraft shops and stores. Nevertheless, the external environment of the Fin garden is the lack of proper food business systems.

Architectural quality: Based on architectural principles, both gardens have a high level of historical, archeological and aesthetic qualities. Land terrain of the gardens indicates an engineering design to flow waters into the whole garden.

Agricultural quality: From agricultural views, dominant vegetation and plantation through traditional orchards have great adaptability with climatic conditions of the study areas. Therefore, the agricultural quality in both gardens indicates a high level.

Local food services: Despite many types of local foods in the study areas, there are no proper facilities and informational equipment to provide these foods as one of the main business factors by indigenous people in the study regions. Due to the location of the Chehel- Sotoun garden in the central part of the city, it has a better situation in this regard.

Overall, tangible and intangible factors of the Chehel-Sotoun garden are categorized as high level with a mean value of 77.14% compared to Fin garden with a mean value of 68.57% (Table 4). Distribution of foodservice facilities around the Chehel-Sotoun has a more proper situation to service visitors and tourists such as places for serving local foods and selling local handicrafts and local drinking around the garden.

2.5.5. To virtuous cycles

Although the gardens attract many tourists from the Iranian and foreign countries, their environment suffers certain backwardness for meeting the virtuous cycles. To reach this end, the most suitable areas to engage should be identified in the exterior environment of gardens. Suitable shops should be allocated to indigenous people that are local owners and workers of the gardens for developing the traditional food services. The locations can be selected by municipal offices or can be considered into popular institutions and buildings. Furthermore, the advantages for the implementation of place for presenting local food are also in

terms of economic benefits, such as (1) creating indigenous entrepreneurship for local people that can help to improve economic aspects; (2) helping to attract more tourists; (3) increasing income derived from presenting local food for local stakeholders. Moreover, the lack of association of food entrepreneurship is one of the most negative and impressive factors for the intangible credit of both gardens in long-term periods.

2.6. Discussion

As mentioned earlier, the present study has examined the experiences of both domestic and foreign visitors/tourists regarding the traditional food dishes, in two historical locations of Isfahan and Kashan, indicating above 85% visitors/tourists had interest to test local and traditional foods in the study environments, where there were not sufficient food-related services and information to satisfy them. The result revealed the lack of servicing, facilitating and planning for the development and not enough promotion of the local food industry and engagement in the marketing of traditional foods among the virtuous cycles. However, food is an integral part of the discovery and is considered a memorable experience, which influences the quality and success of the trips and touristic activities (Bessiere and Tibere, 2013).

This paper also partially focused on the relation between food heritage and tourism activities, contributing to Iranian cases of Persian Gardens. This result could be identified as an opportunity for tourist development and entrepreneurship in the food sector and could be used by the relevant authorities to improve tourism activities based on food heritage for the study areas. Previously, different researches have focused on the relation between local food heritage and tourism development in some Western countries. For instance, Bessiere (1998) has noted that the food, as a heritage component in cultural and rural tourism, is an essential factor in tourist attraction and integration in France. A literature review revealed that the food role in touristic regions depends on the organization of food service (Nield et al., 2000), local food consumption (Torres, 2002; Ryu and Jang, 2006; Kim et al., 2009), gastronomic experiences (Kivela and Crotts, 2006; Chang et al., 2011) and agro-food tourism (Hall et al., 2003; Ignatov and Smith, 2006). Recently, Mak et al. (2012) revealed the factors affecting food utilization in the

context of tourism, which can be classified into three key factors concerning the tourists (e.g. cultural, religious and sociodemographic status), the food in the destination (e.g. food content, method of preparation, food availability, price, value, quality) and the destination environment (gastronomic image, marketing communications, time and place). These researches provide rich theoretical discussions about food heritage and their role in local environmental development. Based on the local status in the present research, the key factors of tourist and food in the destination have sufficient potential to develop food heritage identification. Nonetheless, the third key factor of the destination environment, especially marketing communications, time and place, should be reconsidered for an entrepreneurial system planning to obtain a prosperous virtuous cycle due to a great part of the participants (above 50%) have not sufficient satisfaction about food-related services and information. Several scholars revealed the strong and positive relationship between service quality and customer loyalty within the tourism businesses (e.g. Antony et al., 2004; Guenzi and Pelloni, 2004; Prentice, 2013).

In a progressive background, tourist utilization of local food creates a sufficient marketing opportunity encouraging a cycle of sustainable entrepreneurship in traditional farming, food service, information and the local economy (Buller and Morris, 2004). Meanwhile, Sims (2009) claimed that that local food has the potential to enhance the visitor experience by connecting consumers to regional tourism and its historical culture and heritage. Ultimately, the results of this study support the previous findings by Boniface (2003), Ilbery et al. (2005) and Marsden (2004) indicating the ability of local food to encompass environmental and cultural sustainability.

2.7. Conclusions, implications and limitations

This study attempted to determine the potentials of two Persian gardens in Isfahan and Kashan cities, to enhance the attractiveness for tourists by developing local food businesses. Hence, the feasibility and usefulness of specific local food business initiatives for improving virtuous cycles and tourist attractiveness of heritage places were evaluated. For this reason, local people and tourists were surveyed using fieldwork operations. Then, several procedures such as interviews,

questionnaires, observation and empirical in situ operations were used. According to fieldwork, the evolution of food business and marketing systems around the Chehel-Sotoun garden has been affected by Naqsh-Jahan, such as enormous restaurants, handicraft shops and stores. Nevertheless, the external environment of the Fin garden is the lack of proper food business systems.

After that concerning local food and the quality of service, most visitors and tourists (85–90%) had interest to test local and traditional foods around both gardens, but they had no sufficient awareness about Iranian traditional foods (below than 50%). According to the tourists' interests, we concluded the lack of servicing and facilities to present and introduce local and traditional food for tourists. To reach virtuous cycles through two gardens, the most suitable areas to engage should be identified in the exterior environment of gardens. Suitable shops should be allocated to indigenous people that are local owners and workers of the gardens for developing the traditional food services.

Then, the results of this research indicate the following: (1) attention to local food of each region is essential for promoting business and economic aspects. (2) Agreement with a public decision-maker or creating a relationship with UNESCO is so important for solving some business problems such as putting local food outside of the heritage gardens. (3) Concerning the architecture of each place, a project manager can implement a business project to promote an economic scale. (4) Integrated viewpoint to create a cycle of sustainable entrepreneurship assessment of food heritage concerning food marketing is critical to the successful implementation of the food services in cultural and historical heritages due to the numerous issues and stakeholders involved in developing local food businesses. The participation not only by local government but also equally by individual dozens, community groups, institutions, agencies, businesses, governmental partners and other stakeholders should be comprised.

According to the Parma Declaration, food heritage plays an important role in defining each person's identity and is a key driver for intercultural dialogue, social inclusion, education, business, creativity, innovation, local learning and environmental protection for sustainable development in each local and regional scale (UNESCO, 2019). Owing to the indigenous entrepreneurship theory and

research results, the following strategies are suggested to achieve goals for case studies: (1) holding local food festivals and street food vendors in the environment of the gardens during spring and summer periods when the garden has the most significant number of tourists. (2) Integrating exhibitions of local foods and traditional handicraft by the indigenous people in the shops and stores in the vicinity of gardens. (3) Setting up the smart food application to show the locations of local food and drinks around the garden for tourists. (4) Recalling indigenous people to present different creative local foods and drinks to tourists. (5) Preparing agricultural resources (e.g. soil, water, seeds, etc.) to generate small-scale agriculture by tourists for introducing local fruits, vegetables and flowers.

Although the research recommendations were appropriate to improve the quality of the touristic service and facilities, some prohibitions exist toward food marketing in the inscribed tangible heritage due to UNESCO's regulations. Hence, to overcome this limitation, the locations can be selected by municipal offices or can be considered into popular institutions and buildings in the proper distance of gardens. Other limitations of this research can be considered as accessibility and reliability of inputs during the field survey, the inadequacy of data sampling (variables and respondents) and time effect curbs. We suggest repeating similar extensive questionnaire surveys in other historical locations in Iran with more respondents' volume and a bit more inferred variables during the different times to obtain a reliable result. Further researches can consider novel local food entrepreneurship or food heritage concerning their fieldwork comparing with the findings of this research.

The implication of this research can be considered for both practical and academic applications. The main practical implication of this research is to identify the influences of local food awareness in promoting the cultural tourism destitutions from vicious circles to virtuous cycles, applicable for a range of policymakers, urban planners and cultural affairs. Besides, the academic implication of this research is to associate the theoretical background of the relationships between food heritage, cultural tourism and indigenous entrepreneurial ecosystem, which can improve the local food marketing and management in Persian gardens. We believe that the results of this research could be interesting for tourism

organizations, municipalities and completely indigenous people in Isfahan and Kashan cities, Iran. As a result, this type of research should be repeated in the future using greater data sampling and multiple time windows.

Figure 2.1. Geographical position of the Bagh-Chehel-Sotoun garden, based on authors' elaboration after Google Earth
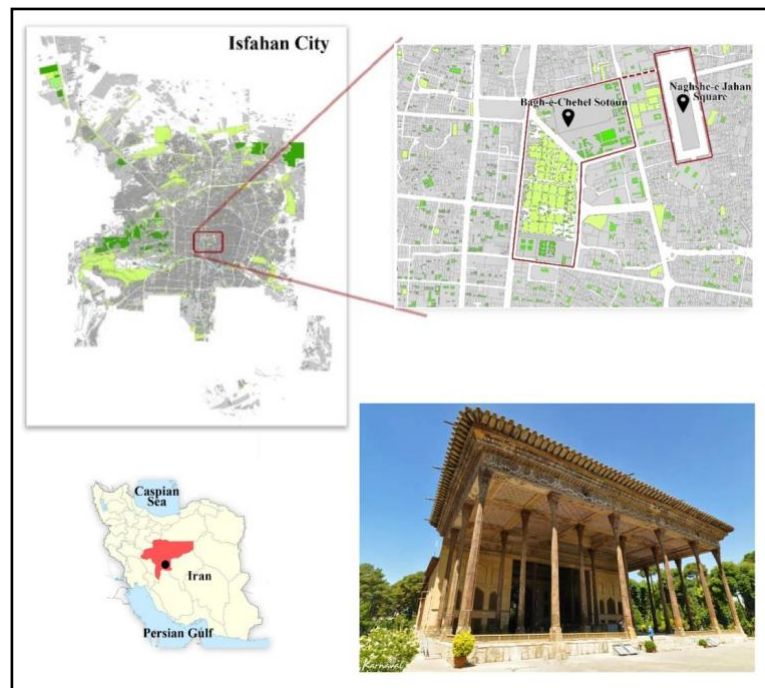
Figure 2.2. Geographical position of the Bagh-Fin garden, based on authors' elaboration after Google Earth
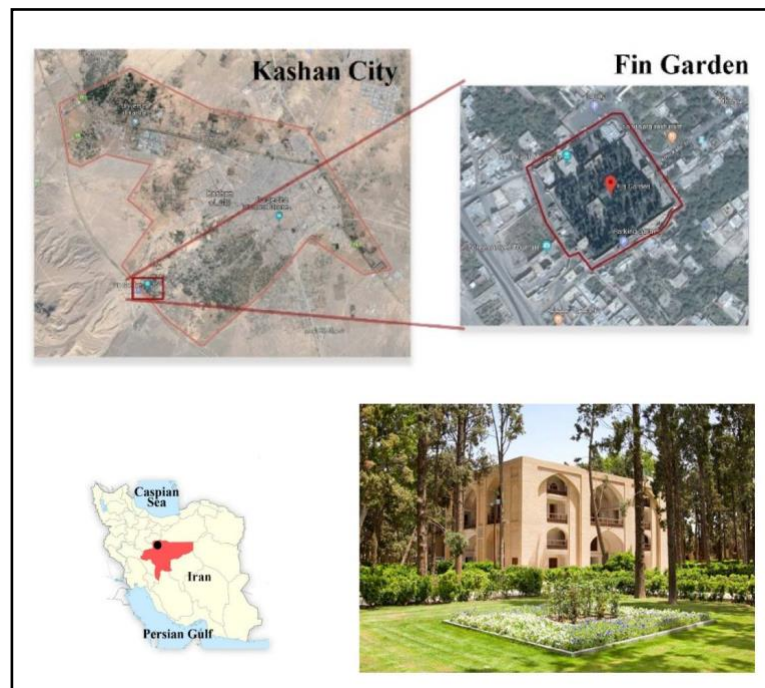
Table 2.1. The traditional foods in Isfahan

Original Persian Name	Type	Ingredient	Image
Beryâni	Cooked dish	Meat, onion, spice, liver of sheep, bread	
Halim Bâdemjân	Cooked dish	Rice, meat, eggplant, Kashk (dried type of yogurt), grain, verdure	
Khoresht Mâst	Cooked dish	Meat, onion, sugar, yogurt, egg, saffron	
Fereni	Dessert	Milk, sugar of date palm, rice flour	
Gaz	Candy	Sugar, Pistachio, rosewater, egg	
Poulaki	Candy	Sugar, sesame, cardamom	

Source(s): Authors' elaboration

Table 2.2. The traditional foods in Kashan

Original Persian Name	Type	Ingredient	Image
Khorâke-Gousht-Loubiâ	Cooked dish	Meat, beans, rice, onion, spice, verdure	
Koufteh Âb Somâgh Kâshâni	Cooked dish	Mincemeat, Chickpea flour, onion, sumac	
Jouje Tâskabâbi Kâshâni	Cooked dish	Meat, Pomegranate sauce, eggplant, tomato, salt and spice	
Pashmak	Dessert	Sugar, rosewater	
Golâb	rosewater	Water, flower	
Koloucheh	Dessert	Whole meal flour, Sugar	

Source(s): Authors' elaboration

Table 2.3. Summary of the profiles of visitors in Chehel-Sotoun and Fin gardens

No.	Profile of visitors	Item	Chehel-Sotoun	Fin

No.		Item	No.	%	No.	%
1	Native visitor	Yes	10	50	10	50
		No	10	50	10	50
2	Age	< 35 years	5	25	2	10
		> 35 years	15	75	18	90
3	Traveling by tour	Yes	12	60	16	80
		No	8	40	4	20
4	Type of travel	Single	4	20	5	25
		Crowded	16	80	15	75
5	Visiting behavior	Randomly	6	30	2	10
		Scheduled	14	70	18	90

Source(s): Authors' elaboration

Table 2.4. Classified responses of questionnaires in Chehel-Sotoun and Fin gardens

No.	Question's highlight	Item	Chehel-Sotoun		Fin	
			No.	%	No.	%
1	Accessibility from downtown	High	18	90	12	60
		Low	2	10	8	40
2	Attractiveness of the external environment	High	20	100	12	60
		Low	0	0	8	40
3	Architectural quality of interior buildings	High	17	85	18	90
		Low	3	15	2	10
4	Agricultural quality of existing green spaces	High	16	80	18	90
		Low	4	20	2	10
5	Quality of food services during the travel	High	10	50	11	55
		Low	10	50	9	45
6	Awareness of local and traditional foods	High	10	50	7	35
		Low	10	50	13	65
7	Interesting to test of local foods around this garden	High	17	85	18	90
		Low	3	15	2	10
8	Mean values	High	15.43	**77.14**	13.71	**68.57**
		Low	4.57	22.86	6.29	31.43

Source(s): Authors' elaboration

CHAPTER THREE (SECOND PAPER)-Accepted for publication by British Food Journal

"The relationship between food heritage and clan culture: is "familiness" the missing link?"

3.1. Abstract

Purpose – This paper empirically tests the relationship between food heritage, familiness, and clan culture, thus, highlighting the pivotal role of familiness in building robustly competitive food firms based on clan culture and food heritage.

Design/methodology/approach – The methodological approach adopted is based on a quantitative analysis with data from one eco-tourist city in Iran (Torqabeh). In this regard, we developed a structured questionnaire surveying 98 small- and medium-sized enterprises (SMEs) operating in the food industry. We then used partial least squares structural equation modeling (PLS-SEM) to carry out the analysis.

Findings – The results indicate the significant positive relationship between food heritage and clan culture, and highlight the role of familiness as a strong mediator, which is also associated with a strong relationship between food heritage and clan culture.

Research limitations/implications – In the present study, the main limitation was linked to the small sample size and data collection, which took place in only a single city; however, further research could overcome this limitation by investigating SMEs from a heterogeneous geographical context.

Originality/value – The value of this research relates to studies that have examined food heritage as a possible antecedent of familiness. Moreover, the novelty of this research is to study the concept of familiness in improving resource-based views and organizational theories.

Keywords: Clan culture, Familiness, Food heritage, Organizational culture, Resource-based view

3.2. Introduction

Organizational culture can be defined as "a set of values and assumptions" (Quinn and Rohrbaugh (1983, p. 66) that shape perceptions and behaviors (Schein, 1996). Since 1980, studies about organizational culture have increased (Hartnell et al., 2011), pointing attention to the different related aspects. According to Sanchez-Marın et al. (2018) and Ubius and Alas (2009), there are four types of organizational culture: clan culture, adhocracy culture, market culture, and hierarchy culture, which adapt to the competitive perspective of each organization. Clan culture is the collectivist ideal of a cultural context in terms of cultural attributes and its dominant archetype in general (Deshpande and Farley, 2004; Chuang et al., 2012).

In other words, clan culture is a family-like type of corporation with the commonality of goals and values (Claes, 2019). Miller and Le-Breton Miller (2005) found that clan culture allows family firms to successfully build a robust competitive community and connections, because clan culture, which emphasizes the flexibility and dependence of internal organizational directions, corresponds to strong human relations (Sanchez-Marın et al., 2018).

Hence, scholars have discovered that clan culture has more influence on family businesses, while market and hierarchy cultures are more relevant in nonfamily firms (Sanchez-Marın et al., 2015, 2016). This type of firm assumes a culture deeply rooted in family values and traditions (Dyer, 1986; Merino et al., 2015), considering that family members have the power and position to make the main organizational decisions either as owners or as managers (Sorenson, 2000). Family business is a popular topic analysed under different approaches and perspectives (Camison and Villar-Lopez, 2014; Filser et al., 2016; Basco et al., 2018; Sanchez-Marın et al., 2018; Kraus et al., 2019).

Strong traditional skills characterize the food business through small- and medium-sized family business companies (Dana et al., 2014; Giacosa et al., 2017), revealing the important role of the family business in food heritage. Food tradition can be considered as heritage, which is directly linked to the social memory of the communities and families (Bessiere, 2013). Hence, the present paper assumes the concept of food heritage instead of food tradition.

Food heritage is related to the standards of taste, as well as practical knowledge throughout a cultural field (Brulotte and Di Giovine, 2016). Moreover, this concept could consist of agricultural merchandise, elements, dishes, table manners, and the symbolic measurement of meals (Ramli et al., 2016). In many contexts, families are the main carriers of food heritage, and more generally, traditions about food, and they are also likely proud to preserve these traditions through business initiatives. Thus, in the context of food companies, food heritage is one of the essential reasons for an entrepreneur to obtain a family-oriented view because the transmission of knowledge occurs within families, such as the use of techniques drawn from the past (Bessiere, 2013). This means that food heritage is an essential part of businesses and is significant in many countries providing a pleasant hint of organizational culture.

Many researchers have tried to advance knowledge on the concept of familiness (Frank et al., 2010; Habbershon et al., 2010; Zellweger et al., 2010). The concept of familiness is relevant because it refers to understanding the distinction between a family business and a nonfamily business (Chrisman et al., 2005; Frank et al., 2010). Although a decision can help a person to make more money, the choice may be laid aside due to its possible issues or challenges for the family. This evidence is in contrast to what happens in nonfamily businesses. Looking at the literature, many researchers have studied familiness (e.g. Frank et al., 2010; Zellweger et al., 2010; Basco and Voordeckers, 2015; Basco et al., 2018), primarily, its consequences, such as its effect on clan culture (Sanchez-Marın et al., 2016). However, few studies have examined food heritage as a possible antecedent of familiness, i.e. whether food heritage results in food companies being driven by the value of the owning family, rather than by classical business and market logic (e.g. Giacosa et al., 2014; Vrontis et al., 2016). This approach leaves free space to analyze complex interrelations among food heritage, familiness, and clan culture.

Thus, the present research attempts to investigate these relationships, while suggesting that local food heritage can be a potential antecedent of familiness while ultimately affecting clan culture. In this vein, the role of familiness is intended as a mediator factor, thereby highlighting the missing link between food

heritage and clan culture. Hence, this paper empirically tests the simultaneous relationships between internal factors (familiness and culture) and external elements (food heritage). On this basis, 98 small- and medium-sized enterprises (SMEs) in Torqabeh, Iran were studied using the statistical technique of partial least squares structural equation modeling (PLS-SEM). Understanding how family SMEs seize opportunities for innovation, and thus, achieve superior performance is of substantial interest to family firm studies (Kallmuenzer and Scholl-Grissemann, 2017), as well as to the area of family food research (e.g. Giacosa et al., 2014; Dana et al., 2014).

This is the first paper investigating the relationship between food heritage and organizational culture in the field of the food business. This paper thus contributes to the field of familiness and food heritage in different ways. Although previous studies have attempted to study food heritage and food identity (Presas et al., 2014), very few studies have investigated the particular concept of food heritage as a possible precursor of familiness. Hence, we empirically institute the role of familiness as a mediator task through the relationship between food heritage and clan culture, explaining its improving approach to constitute the applicable clans and food heritage trades. This research also contributes to family business scholarship by providing an in-depth perception of family businesses as excellent organizational settings to promote the culture in a territory. Ultimately, this paper collects empirical data from a nonWestern country, where it is usually difficult or impossible to collect data, particularly from very small enterprises within communities. Although the sample size is perhaps small, obtaining the applicable data from such communities is notable.

Moreover, the present study is the first in which a scientific survey questionnaire is administrated to the owners of very small businesses in the study area, and the previous experience of researchers in this particular context has suggested that the number of questionnaire items be reduced without losing the meaning of the entire variable. For instance, Krause et al. (2018) have identified that a small number of items in reasonable and practical questionnaires (6–12 items) is sufficient to represent the key elements of food research in order to yield a reliable score.

The paper has been organized as follows. In the second section, a literature review of food heritage, familiness, and clan culture is conducted through the resource-based view (RBV) of organizational culture. Based on the theories, we propose two hypotheses. The third section discusses the methodology, including the description of variables and information on the data. The fourth section sets out the analysis and discussion of the results regarding the relationships between food heritage, familiness, and clan culture. Finally, the fifth section concludes the paper.

3.3. Literature review and hypothesis

3.3.1. The organizational source of clan culture

As mentioned by Deshpande and Webster (1989), culture is a set of shared assumptions and understandings about organizational functioning and refers to why things happen the way they do within a company (Crittenden et al., 2011). The concept of organizational culture is a key model imparted to guide the individuals of an agency and includes beliefs, expectations, and fundamental requirements (Sanchez-Marın et al., 2018). In this regard, Cameron and Quinn (1999) adopt a general model of culture, in which the organizational culture assessment instrument fits with the competing perspective of organizational culture (Stock et al., 2007) and can be useful to describe an organizational culture system and clan culture, which is consistent with human relations in organizational theory. This model is focused on the resilience of human relations, and association and internal organizational relations such as within family firms. In an organizational clan, individuals share common values and beliefs to constitute a culture to guide a firm's actions and to provide a perception of goal congruence among the human resources (Ouchi, 1980; Wilkins and Ouchi, 1983; Bu"schgens et al., 2013). Despite the variety of interpretations and cultural dimensions, a number of common themes and similarities can be identified in organizational culture research (Parker and Bradley, 2000), such as values, ideologies, beliefs, and processes (Cameron and Quinn, 2006). Several researchers have argued that strong organizational cultures are related to high levels of performance if they fit the organizational strategy to adopt resources

(Sørensen, 2002; Linnenluecke and Griffiths, 2010). Family firms, as the intangible resource of organizational culture, are more likely to satisfy the requirement of being rare and inimitable (Killen et al., 2012). In this regard, the RBV attempts to explain competitive advantage as stemming from firm resources that are rare, valuable, or hard or impossible to imitate, duplicate or substitute (Bromiley and Rau, 2016). As Sanchez-Marın (2016) mentioned, clan culture can be understood from the concept of the RBV, which has an interdepended relationship with other companies' resources (Hall et al., 2001). Moreover, this concept can be supported by entrepreneurship attributions. The existing literature on entrepreneurship has been concerned with the characteristics and behaviors of individuals or firms (Shane, 2003) caused by multifunctional interactions (Cardon et al., 2009, Campanella et al., 2017). In recent years, the term "entrepreneurship ecosystems" has been increasingly used (Malecki, 2018) based on the primitive studies of Cohen (2006), Isenberg (2010) and Feld (2012), exposing the significant role of culture in the entrepreneurial activities of businesses (Spigel, 2017; Scuotto et al., 2017).

2.2 The role of clan culture and connection with familiness and food heritage

From the viewpoint of familiness, clan culture can be considered as a different subject from family participation in the entrepreneurial activities of businesses (Merino et al., 2015; Sanchez- Marın et al., 2015). As a business can be expanded through the creation of intangible values, the family business structure can also be a proper place that would be created by food heritage. Family businesses demonstrate a critical job in most industrialist economies because of their commitment to the production of occupations and wealth generation (Feltham et al., 2005; Carrigan and Buckley, 2008; Randerson et al., 2015; Camison et al., 2016). Family businesses exist at the intersection of the two essential domains within society and economy, the domains of the family and businesses. As mentioned previously, a key concept to better understand family business is familiness (Frank et al., 2010). Habbershon and Williams (1999) have defined familiness as the unique resource of a specific firm, which includes the relationship between the family, individuals, and the business. The existence of

46

familiness may increase the confidence and achievements of family members (Dibrell and Moeller, 2011).

According to Basco et al. (2018), familiness can be divided into four categories: human capital, social capital, physical capital, and financial capital. Sharma (2008) has summarized these categories as follows: human capital addresses specialized technical and emotional capabilities and the mental capital of family and nonfamily members; social capital refers to the relationships among people and institutions that encourage activities and make build esteem; physical capital can include plant, system, and different physical belongings and resources of a firm; finally, financial capital refers to tolerant investments, which are made by individual families and their partners in the company (Basco et al., 2018).

The term cultural heritage has recently been changed, partially because of the parameters developed by the United Nations Educational, Scientific, and Cultural Organization (UNESCO). This term can include oral traditions, performing arts, social practices, celebrations, expertise, and practices regarding nature and the universe or the information and capabilities to provide traditional crafts (UNESCO, 2003). In this sense, according to the traditional knowledge and practices concerning nature and the universe's domain, food can be defined as a type of heritage (Brulotte and Di Giovine, 2016).

Food as heritage may additionally consist of activities such as meals fairs or cooking holidays (Hall and Sharples, 2008; Di Domenico and Miller, 2012) and result in the growth of local businesses through farmers markets, better neighborhood menu gadgets and the inclusion of domestically grown food merchandise within the hospitality supply chain (Telfer and Wall, 1996; Torres, 2002). Moreover, food can historically be introduced as a set of immaterial factors of meal cultures, which might be considered a shared legacy or a common good (Matta, 2013).

Ramli et al. (2016) have noted some measures for the characteristics of food heritage, including historical value, traditional originality, staple ingredients, flavor principle, cooking method, food presentation, variety and commonality, process and technology, and food preservation and identity (adopted from Rozin, 2006; Cleveland et al., 2009; Guerrero et al., 2009; Horng and Tsai, 2010;

Vanhonacker et al., 2010; Lin et al., 2011; Lertputtarak, 2012; Robinson and Clifford, 2012). In this regard, they revealed that these variables could help to preserve the identity of the food heritage in each nation for the next generation.

3.3.2. Hypotheses development

The development of SMEs can offer a special type of goods and services for food enterprises to fulfill basic human needs within the food sector (Frackiewicz, 2018). An entrepreneur engages innovation to create valuable goods, whether tangible or intangible (Yu and Si, 2012; Su et al., 2015), and hence, food heritage can be associated with agriculture, using the traditional method of production, environmental history, etc. (Ramli et al., 2016). Rooting in food heritage is an important value for entrepreneurs in the SME food sectors because, in many cases, these small enterprises have created a phase of local tradition (Dyer, 1986; Merino et al., 2015). In this case, these organizations are likely to develop on an external scale of value, so, cultural values and local community aspects have to do with are related to specific cultural attitudes. These cultural attitudes, when translated into organizational terms and organizational cultural terms (Crittenden et al., 2011), are highly compatible with clan culture.

Clan culture corresponds to the model of human relations in organizational theory (Sanchez-Marın et al., 2016) and is typical in companies that look for internal control of the organization (Durendez et al., 2011). So, it is reasonable to expect that in small enterprises in the food sector, where the rooting in food heritage is high, cultural values related to tradition, mutual help, and personal relationships would be highly important, and this is a response to clan culture at the organizational level. If we are talking about SMEs in the food sector, we consider those small businesses that root their businesses in local food heritage. This means those people will likely value local tradition and sets of behavior patterns that are highly consistent with what organizational literature defines as clan culture (e.g. Claes, 2019).

In some papers with a similar subject to this research, the scholars have designated several detailed hypotheses to explain relations (e.g. Durendez et al., 2011), effectiveness (e.g. Sadeghi et al., 2019) or mediations (van der Voort, 2017) between the research variables. We decided to synthesize detailed

hypotheses into two robust hypotheses, revealing and testing H1: the positive relationship between food heritage and clan culture, and H2: the mediator role of familiness in the above-mentioned relationship (Figure 3.1).

The first hypothesis examines the positive effect of rooting in food heritage on clan culture. The practices between food heritage and the general concept of culture have rarely been studied (e.g. Zeng et al., 2014; Abdul Raji et al., 2017), but without any statistical examinations, focusing on clan culture. Regarding the food heritage trades in the study area, the survival of family businesses improves a discriminate part of the culture covering cuisine, presence, and performance services. Consequently, the hypotheses are derived as follows:

H1.   In the small businesses of the food sector, the "rooting in food heritage" has a positive relationship with "clan culture."

By acknowledging different associates of food heritage, an entrepreneur can create a new perspective in their family business. "Familiness" is one of the aspects of entrepreneurship that leads to some exciting results referring to the analysis of collaborative actions in the family firm (Bresciani et al., 2016). Considering small businesses in the food sector, if they are based on food heritage as a business model, the family is often involved in business management. Although food heritage can be reflected from the environment history, ideology, and food technology of society in an era or period of time, it can be referred to in the context of traditional food, relating to the cultural background of each community (Ramli et al., 2016). Hence, there is a logical link between founding and carrying on a business based on food heritage and local food tradition, and the likelihood of operating this business in the generational way involving all components of family. If entrepreneurs want to leverage local tradition, they are likely to be very patient with local food that leads to share with family members. In this case, it is more likely that the enterprise, if successful, will involve family members (Gartner and Bellamy, 2009).

Family businesses have typical characteristics, which are very likely to result in clan culture at the organizational level because the concept of familiness can change the clan culture characterizations through the family business (Habbershon and Williams, 1999; Habbershon et al., 2003; Denison et al., 2004; Merino et al.,

49

2015). In the previous research, some sociocultural practices, values, and norms have been investigated as the driving force of entrepreneurial behavior (Hayton et al., 2002) and substantial resources, such as familiness (Gupta et al., 2011; Discua Cruz et al., 2017). Besides, a positive coefficient between clan culture and firm performance has been observed in some works (Hsueh and Tu, 2004; Bhaskaran, 2006; Durendez et al., 2011). As well, Craig et al. (2014) found evidence that the family can associate performance with mediated by organizational culture (Camison et al., 2016). Hence, familiness can be considered as a mediator variable in this study, which enhances the relationships between the variables of food heritage and clan culture. The mediator variable affects the association between an independent variable (such as food heritage) and an outcome variable (such as clan culture), providing information about how or why both variables and outcomes are vigorously associated (Bennett, 2000). The first intrinsic effect of rural family businesses on food heritage is the provision of local foods (Ismail et al., 2015). In this regard, women have very strong experience in the transmission of food heritage and practical knowledge (Nor et al., 2012). In the local culture of the study area, natural resources are usually used in the preparation of local foods, such as domestic meats, dairy products, and fruit oil–extractions. Therefore, family firms enhance these cultural attributes of food heritage. This fact leads us to the development of the second hypothesis:

H2. In the small businesses of the food sector, familiness acts as a mediator between "rooting in food heritage" and "clan culture."

3.4. Methodology

3.4.1. Study area and sampling

Torqabeh is one of the most populous and newly renovated rural areas in Binalood county, Khorasan Razavi province, Iran. In the 2016 census, there were about 17,000 inhabitants (MPT, 2016). This city is a major tourist destination for people from the second-largest city of Iran, Mashhad, located about 30 km to the east of the Torqabeh district.

Torqabeh has a rural history but has been converted to a city in the past decade due to socioeconomic factors. One of these factors depends on the existence of

SMEs, arising from family businesses in the study area. The SMEs have played an essential role in the sub-rural and small city economies of the region, and they have led to the promotion of the three dimensions of economy, namely services, tourism, and industry, in Torqabeh and have attracted a large number of domestic and foreign tourists from nearby villages and larger cities that are farther away, such as Mashhad. In Torqabeh, enterprises are generally small- scale, and the large-scale units are dedicated to welfare services. Significant economic interactions of this city are related to Mashhad city, the second-largest city in Iran, and tourists from Mashhad affect both the markets and SMEs.

According to the SME census in 2016 (Statistical Center of Iran, 2016), there were 857 SMEs in Torqabeh. Iran defines an SME as an enterprise that has less than 149 employees. In this regard, SMEs are subdivided into micro-enterprises (fewer than 10 employees), small enterprises (10–49 employees), and medium-sized enterprises (50–149 employees; (e.g. after Iran small industries and industrial parks organization (ISIPO) via http://isipo.ir/index.jsp? pageid5643&p51). Nevertheless, the reason for the selection of 857 SMEs in the study area is rooted in the local definition of small-sized enterprises having a threshold of 10 employees. Approximately 43.87% of companies relate to wholesale and retail activities, 18.20% to industrial activities, 8.05% to hotels and restaurants, and 8.28% to public services (Table 3.1). The rest of the economic activities have a share of less than 22% (MPT, 2016). Citizens and tourists commonly use the SMEs and facilities, such as traditional food markets, edible souvenir food stores, and food-based handicrafts, in this study area. One of the tourist-friendly local foods in Torqabeh is shashlik kebab, which is a grilled lamb and T-bone accompanied by rice. Thus, Dizi, Ash, and Halim, the same as broth and soup, are the traditional ones.

Among the 857 SMEs in Torqabeh, !300 of them were selected as the target sample due to their food-related activities. Then the questionnaires were distributed among them. Moreover, !98 complete questionnaires have been used in the analysis in this paper. The survey relied on respondents filling out a questionnaire that contained questions regarding food heritage, familiness, and

clan culture. Moreover, the questionnaires were filled electronically using a web-based procedure.

A similarly limited volume of respondents (between 90 and 100 cases) or small yielding rate of questionnaire filling (<50%) is repetitively observed in the categories of family business studies, and family firm attributes, even in developed or populated countries, such as in the works of Murzina et al. (2018) in Russia and Sharma and Rao (2000) in India.

3.4.2. Research tools and structure

As stated in the previous sections, we applied the practical findings of three international relevant references – Basco et al. (2018), Sanchez-Marın et al. (2018), and Ramli et al. (2016) – to build the questionnaire measuring the familiness, clan culture, and food heritage attributions, respectively. In this regard, the assessment of the entrepreneurial characterization of SMEs, including familiness, food heritage, and clan culture, was adopted using nine measures. The key aspects of familiness have been analyzed by Basco et al. (2018), who identifies four dimensions: human capital, social capital, financial capital, and physical capital. Among these four dimensions, we did not consider physical capital because, while human capital, social capital, and financial capital have been widely considered by the family firm literature as essential, physical capital has not been regarded as essential so far by most authors. For instance, several scholars have addressed only the three essential capitals (human, social, and financial) in their works (e.g. Hunter and Lean, 2014; Camison et al., 2016; Al-Abri et al., 2018).

Three measures in the fieldwork were considered to characterize the familiness variable, including human capital, social capital, and financial capital, in line with Basco et al. (2018). The chosen measures help to identify the familiness variable: Q1: There is a family member to identify the next company leader in the business, Q2: There is a plan for patient investment of the senior generation, and Q3: There is a family member to review each person's contribution to the business. The physical capital of familiness was ignored in this study due to avoid the physical effects.

According to Sanchez-Marın et al. (2016), three items were used for measuring the clan culture variable, including individual cultural dealings between persons, adhocracy cultural relationships among the organizational individuals, and market culture, which considers innovative approaches in marketing. These measures have helped us to generate the following questions to measure the clan culture variable: Q4: There is adequate assistance from the boss and colleagues in a difficult situation, Q5: There is a cordial relationship between the individuals and management in the organization, and Q6: There are loyalty and teamwork relationships between members of the organization.

Furthermore, food heritage was assessed using three measures to reflect three questions, after the variables collected by Ramli et al. (2016) from the several primitive and original studies by Rozin (2006), Guerrero et al. (2009), Cleveland et al. (2009), Horng and Tsai (2010), Vanhonacker et al. (2010), Lin et al. (2011), Lertputtarak (2012) and Robinson and Clifford (2012).

Ramli et al. (2016) considered eight measures, such as historical value (HV), traditional originality (TO), staple ingredients (SI), flavor principle (FV), cooking method (CM), food presentation (FP), variety and commonality (VC), process and technology (PT), and food preservation and identity (FI). In this research, historical value, traditional originality, cooking method and food preservation, and identity were selected to construct the questions about the food heritage variable as follows: Q7: The foods have historical value and traditional originality in the business, Q8: The cooking method and food presentation have not changed during generations in the business, and Q9: The food preservation and identity has not changed during generations in the business.

The aforementioned nine measures (Table 3.2) were ranked on a 5-point Likert-type scale in the questionnaire, where 1 5 strongly disagree, 2 5 disagree, 3 5 undecided, 4 5 agree, and 5 5 strongly agree.

3.5. Results and discussion

PLS-SEM was chosen to analyze the data extracted from the questionnaires in this study, using the SmartPLS software. Smart PLS is software with a graphical user interface for variance-based SEM using the PLS path modeling method, and PLS-SEM is a common approach in statistics and descriptive studies (Hair et al.,

2014). The entire data quality of the questionnaires was checked by computing the matrix of Pearson's correlation coefficients at the 0.05 level (Table 3.3), revealing the reasonable communalities of R > 0.72. PLS-SEM was carried out to estimate the direct charge between variables without potential elements of endogeneity. In this regard, we considered the possible problem of endogeneity, and to rectify it, we conducted a Hausman test. The Hausman test automatically referred to estimations through the use of the SmartPLS software.

In the next step, the discriminated validities obtained in the model were greater than one (1.056–1.063), explaining the direct correlations between the three main variables (Table 3.4). Meanwhile, Cronbach's alphas and average variance extracted (AVE) values were estimated to be higher than 0.9 and 0.75, respectively, revealing the strong inter-relationships between the three variables. Cronbach's alphas and AVE values showed the internal uniformity of indicators and convergence of validities (Helms et al., 2006), confirming the bias of the study.

Table 3.5 shows the regression coefficients determined using SmartPLS, and that the p-values are less than 0.01 (concerning the significance level of 0.05). Therefore all t-statistics, supporting the hypothesizes of this study, have significance at a confidence level of p > 99%. The p-value needs to be less than 0.05, by considering the significance level of 0.05 and 0.01 to have a significant hypothesis. Otherwise, the hypothesis is rejected. In addition, the greater T-statistic (T > 1) depends on greater evidence against the null hypothesis. Hence, the results in Table 3.5 revealed that the given hypotheses are evident and significant in the current study.

According to the results of the PLS-SEM analysis, it is confirmed that food heritage positively affects clan culture, as shown by the T-value of 2.875 and the p-value of 0.000 (rooting in Food heritage ! clan culture). Hence, food heritage indicates a positive relationship to generate a chain of organizational cultures, confirming H1. In addition, H2 is accepted, explaining that the mediated role of familiness in the relationship between food heritage and clan culture based on the T-values for other coefficients (i.e. rooting in Food heritage ! familiness,

familiness ! clan culture) were obtained as 203.228 and 6.023, respectively, in the significance at the confidence level of p > 99%.

A mediator test was conducted using SmartPLS to investigate the unique mediator role of the familiness (Table 3.6). As the results show, familiness can act as a mediator in the relationship between food heritage and clan culture by enhancing the effectiveness of this relationship (T 5 8.587). This result highlights the importance of the activities taking place in the family businesses in Torqabeh and approves the significant role of familiness in conveying cultural heritage to the next generations through these economic activities.

As a part of the second hypothesis, the results confirm that familiness, as a part of family firms, has a positive correlation and orientation towards clan culture. This result is consistent with several theoretical and empirical articles (Denison et al., 2004; Zahra et al., 2004; Sanchez- Marın et al., 2015, 2016; Leal-Rodrıguez et al., 2017). Hence, it indicates that more attention should be paid to the family businesses that are acting as SMEs in Torqabeh, as they play a vital role in maintaining and transferring the ancient food heritage in the region. Albeit, this result seems applicable for other ancient areas in Iran, and this relationship can also be tested for other cities and regions in this ancient country, which is filled with attractive traditions and cultural heritage, including tangible and intangible assets like arts and food.

Previously, scholars have applied the RBV in the field of entrepreneurship (e.g. Alvarez and Barney, 2004) or to the study of family firms (e.g. Eddleston et al., 2008; Chrisman et al., 2009), while this study examined the incorporation of food heritage and familiness by SMEs. Consequently, the results of the data analysis using SmartPLS software were summarized as a schematic pattern of the estimated general model, which describes the correlation between food heritage, familiness, and clan culture. Figure 3.2 represents the relationships between the three variables and their contribution to the nine measures (related questions).

3.6. Conclusions, implications, and limitations

3.6.1. Conclusions

This paper contributes to family business studies by highlighting the possible role of familiness as an antecedent of clan culture, at least in the contexts that are similar to the study area. Besides, the paper contributes to the literature of (food) heritage by highlighting its role as a possible antecedent of familiness and clan culture in food sector SMEs. The main socio- economic factors of Torqabeh depend on the existence of SMEs, arising from family businesses in the study area. Food markets in this region through the SMEs can be categorized as precursors of familiness, which seems to be mediated to exhibit the unique clan culture of the study area. For instance, the food heritage of cooking and preservation of shashlik kebabs are developed by the family firms in the current status.

Hence, the present paper hypothesized that food heritage might indicate a positive linear relationship to generate a chain of recourses in family businesses, therefore affecting clan culture. After that, familiness can be considered as a mediator variable, enhancing the relationships between food heritage and clan culture. The statistical analysis for the hypothesis test was carried out based on the regression coefficients using SmartPLS, where the p-values were less than 0.01, concerning the significance level of 0.05. Therefore, all T-statistics, supporting the hypotheses of this study, revealed the significance at a confidence level of $p > 99\%$. Based on the results, the mediator role of familiness in enhancing the relations between food heritage and clan culture was confirmed overall in addition to positive and direct relationships, thereby supporting the second hypothesis.

The results also exhibited that food heritage creates family businesses, which results in clan culture. Besides, the results from the mediator test showed that familiness is a strong mediator when considering the translation of food heritage into organizational clan culture. Food heritage has a positive consequence in the business structure that makes family businesses proper places to promote culture. Since food heritage is a tradition and a long-term idea, does not require huge capital and intends to pass the business on to the next generation, there is a strong relationship between food heritage, familiness, and culture.

3.6.2. Theoretical implications

This research evidenced the link between the extension of food heritage through family businesses, which carry out the clan type of local cultures, such as practical knowledge and traditional skills. As mentioned in the paper, some researchers have focussed on the advanced concept of familiness (e.g. Frank et al., 2010; Habbershon et al., 2010; Zellweger et al., 2010) and some other scholars have examined food heritage as a possible antecedent of familiness (e.g. Giacosa et al., 2014; Vrontis et al., 2016). However, the role of clan culture in addition to the food business on the familiness categories (same as defined by Basco et al., 2018) has not been investigated properly in the previous works. Hence, the theoretical implication of this research is important as a basis to fill the literature gap regarding familiness, which is a missing link between food business and clan culture, particularly on the local and regional scales. Hence, further research should consider the scale impacts on their case analyses using the firm-based data acquired to reduce the uncertainty.

3.6.3. Practical implications

Furthermore, a number of practical implications could be identified as below for several types of stakeholders. On the one hand, family business managers can understand the effective role of food heritage in their marketing and investing processes. On the other hand, decision makers can understand a novel branch of tourism attraction based on food heritage and the cultural potential of family entrepreneurship. For instance, the business managers could plan new ventures for their SMEs based on the food heritage tradition and tourism entrepreneurship with a prospective new business model. Furthermore, the local people can be empowered by enhancing the skills that originated from their cultural roots. The local people and family members will supply sustainable activities to protect their environmental and cultural traditions due to support their stable source of economic incomes in the future.

3.6.4. Limitations and avenues for further research

In the present study, the main limitation was related to the small sample size and data collection, which took place only in a single city. However, further research

could be done to overcome this limitation by investigating SMEs from a heterogeneous geographical context around the world, as well as by considering traditional areas other than food. The role of familiness can also be tested in fostering the transition of culture from one generation to another by considering other areas of business activities. Besides, more specifications of family businesses can be considered, and the most effective characteristics of the family businesses that make them a strong mediator can be investigated in detail. In addition, it could be of interest to study whether food heritage affects the development of business models and SMEs' continuous innovation in business models (e.g. Giacosa et al., 2017) or how green and sustainable innovation may be interrelated with business performance (Bresciani et al., 2016b).

Figure 3.1. The conceptual model of the relationship between food heritage and clan culture (H1), in addition to a mediation role of familiness in the mentioned link (H2)
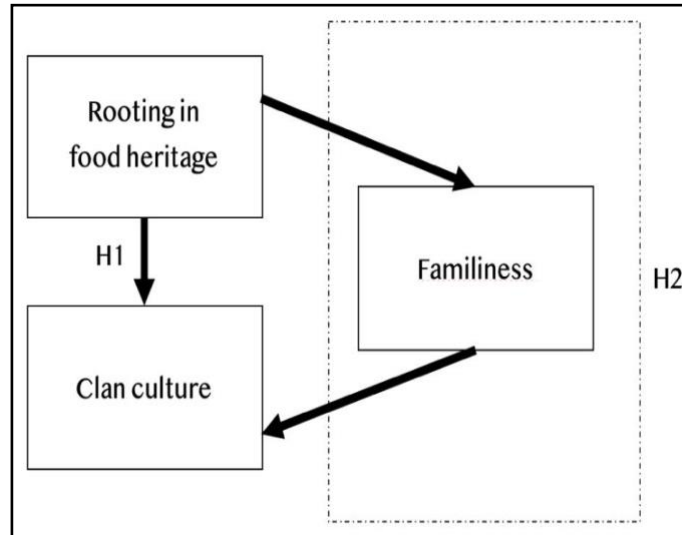
Figure 3.2. A schematic pattern of estimated general model based on the SmartPLS output
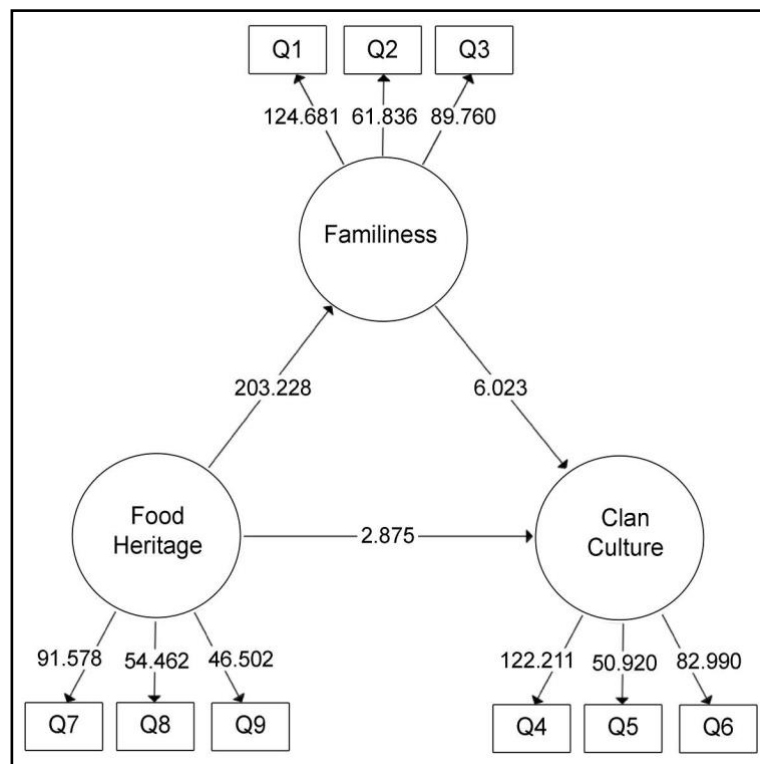
Table 3.1. The classification and number of small- and medium-sized enterprises (SMEs) in the study area (MPT, 2016)

Type of SME	Number of SMEs	Percent
Wholesale and retail activities	376	43.87%
Industrial activities	156	18.2%
Hotels and restaurants	69	8.05%
Public services	71	8.28%
Other economic activities	185	21.6%
Total	857	100%

Table 3.2. The description of research variables, questions and measures

Variables	Questions	Measures	Scholars
Familiness	Q1: There is a family member to identify the next company leader in the business.	Social capital	Basco *et al.* (2018)
	Q2: There is a plan to patient investment of the senior generation.	Financial capital	
	Q3: There is a family member to review each person's contribution to the business.	Human capital	
Clan culture	Q4: There is adequate assistance from boss and colleagues in a difficult situation.	Clan culture	Sánchez-Marín *et al.* (2018)
	Q5: There is a cordial relationship between the individuals and management in the organization.	Clan culture	
	Q6: There is a loyalty and teamwork relationships between members of organization.	Clan culture	
Rooting in food heritage	Q7: The foods have historical value and traditional originality in the business.	Historical value and traditional originality	Ramli *et al.* (2016)
	Q8: The cooking method and food presentation has not changed during generations in the business.	Cooking method and food presentation	
	Q9: The food preservation and identity has not changed during generations in the business.	Food preservation and identity	

Table 3.3. Correlation matrix of questions

Var.	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
Q1	1.000								
Q2	0.824	1.000							
Q3	0.872	0.799	1.000						
Q4	0.940	0.808	0.926	1.000					
Q5	0.820	0.948	0.738	0.783	1.000				
Q6	0.861	0.796	0.988	0.912	0.733	1.000			
Q7	0.929	0.807	0.913	0.985	0.777	0.899	1.000		
Q8	0.837	0.926	0.750	0.798	0.970	0.744	0.790	1.000	
Q9	0.788	0.800	0.872	0.804	0.721	0.883	0.805	0.723	1.000

Table 3.4. Measurement and structural model of hypothesized variables.

Measurement	R^2	Cronbach's alpha	Composite reliability	Average variance extracted (AVE)	Discriminant Validity		
					Familiness	Rooting in food heritage	Clan culture
Familiness	1.115	0.937	0.937	0.832	0.912		
Rooting in food heritage		0.911	0.911	0.774	1.056	0.880	
Clan culture	1.095	0.927	0.928	0.812	1.058	1.063	0.901

Table 3.5. Regression coefficients test results using SmartPLS.

Relationships	Original	Mean	Std. Dev.	T-statistic	P-value
Rooting in food heritage ➔ Familiness	0.976	0.977	0.005	203.228	.000
Familiness ➔ Clan culture	0.672	0.671	0.112	6.023	.000
Rooting in food heritage ➔ Clan culture	0.323	0.325	0.112	2.875	.004

Table 3.6. Mediator test results using SmartPLS.

Relationships	Original	Mean	Std. Dev.	T-statistic	P-value
Rooting in food heritage ➔ Familiness	1.056	1.056	0.012	9.243	.000
Familiness ➔ Clan culture	0.560	0.560	0.057	9.842	.000
Rooting in food heritage ➔ Clan culture	0.472	0.472	0.055	8.587	.000

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**"The influence of entrepreneurial ecosystem model on sustainable innovation
from a macro-level lens"**

4.1. Abstract

The present article investigates entrepreneurial sustainable innovations (ESIs) that work against the five elements (epolicy, finance, human capital, support and culture) of the entrepreneurial ecosystem (EE) model (Isenberg, 2011). By conducting empirical research on 14 European countries, the study addresses how an EE can support entrepreneurs in creating sustainable innovations. Overall, the study contributes to exploring the relations between the EE and the relevant classes of ESIs, providing entrepreneurs and policymakers a framework by using a holistic examination of the EE and contributing to more effective policy solutions to encourage sustainable and resilient entrepreneurship-led economic growth. As shown by a quantitative analysis, ESIs are positively correlated with policy, finance and support in terms of infrastructural and administrative support, whereas culture and human capital do not significantly influence ESIs. The results also highlight that the EE's key factors have different impacts on ESIs over time because the effect of EEs can be considered a complex system because of its heterogeneous and dynamic nature. In addition, the country-level capability of ESIs are measured, showing that Ukraine, Romania, Poland and the Czech Republic demonstrate a low-level capability of ESIs, while Germany, the UK, Sweden, Netherlands, France and Belgium show a high-level capability. By contributing to the entrepreneurial literature, the research invokes sustainable mechanisms of innovation to boost national economic performance in European countries.

Keywords: Entrepreneurial Ecosystem (EE), Entrepreneurs' Sustainable Innovations (ESIs), Correlation Test, Principal Component Analysis (PCA), Hierarchical Clustering Analysis (HCA)

4.2. Introduction

The role of entrepreneurial ecosystems (EEs) in fostering national economic growth has become a key priority (Bhawe and Zahra 2019). In recent years, attention towards EEs has increased drastically (Malecki 2018), highlighting the role of EEs in innovation rounds (Al-Abri et al. 2018; Spigel and Harrison 2018). An EE's multifactor conceptualisation has several implications on several scales, suggesting that policymakers can identify and use many types of metrics used in their evaluations (Roundy et al. 2018). However, computing entrepreneurial indicators for country-level contexts constitutes a challenge for EE research; hence, being able to analyse entrepreneurial indicators can contribute to a better understanding of the drivers and economic consequences of EE territories (Szerb et al. 2019).

The literature on EEs provides a definition of two essential components: entrepreneurial opportunities (Kuckertz and Prochotta 2018) and activity (Berger and Kuckertz 2016; Kuckertz et al. 2019). EEs are an emerging and novel theoretical stream (Cohen 2006; Adner et al. 2013; Ács et al. 2014; Spigel 2017) that carry increasing weight in entrepreneurship (Audretsch and Belitski 2017). Nowadays, EEs have been developed as a popular idea inside business enterprise strategy and professional networks (Spigel and Harrison 2018) concerning visual ecosystem key factors and elements (Theodoraki et al. 2018). An EE is defined as an interconnected group of actors in a local geographic community committed to sustainable development through the support and facilitation of new sustainable ventures (Cohen 2006). Six elements are used to describe an EE: policy, finance, markets, human capital, support and culture, along with some sub-elements: policy (leadership, government), finance (financial capital), culture (success stories, societal norms), supports (infrastructure, support professions) and human capital (labour and educational institutions) and markets (early customers, networks) (Isenberg 2011). Although an EE is relevant, the literature in entrepreneurship has been concerned with the characteristics and behaviours of entrepreneurs (Shane 2003) who show multifunctional interactions (Cardon et al. 2009). In addition, the literature on EEs' growth in a global network has been oriented toward lessons and transformations (e.g., Zahra and Nambisan 2011;

Kshetri 2014; Mason and Brown 2014; Stam 2015). As mentioned by Cavallo et al. (2018), the interaction among entrepreneurs and other contextual elements/actors is key (e.g., Neck et al. 2004; Kenney and Patton 2005). In addition, the EE has been defined as the influential role of community and culture on entrepreneurship, which can be seen through the studies of Cohen (2006), Isenberg (2010) and Feld (2012). Hence, a main gap emerges: the lack of studies on EE models that can directly enable entrepreneurs to develop sustainable innovations. Our work contributes to filling this gap by exploring the relations between some key factors of an EE (namely, policy, finance, culture, supports and human capital) and the relevant classes of entrepreneurial sustainable innovations (ESIs; e.g., environmental communication, resource conservation, corporate social responsibility, sustainability management and technology innovation). In this regard, we provide a framework that can help entrepreneurs and policymakers carry out a holistic examination of the EE, hence contributing to more effective policy solutions that can encourage sustainable and resilient entrepreneurship-led economic growth.

The need for an in-depth investigation of this topic can be seen in the fact that the connection between EE and ESIs is still scarce. In this line, the current paper addresses the matter of how the EE affects ESIs. We construct our investigation on the empirical analysis of 14 European countries from 2007–2016, selecting five out of the six elements (e.g., policy, finance, human capital, support and culture) because the market factor requires research at a much narrower level of the presence of early customers to join local supply chains (as mentioned by Spigel 2020). Within the literature on EEs, we find that recent research has established investigations on specific elements of EEs because of the complexity of the interactions among these elements to help policymakers in enhancing entrepreneurship (Cavallo et al., 2019).

Given this, the datasets depend on the EE's theoretical models and sustainable innovation, and the statistical data analysis relies on applying a principal component analysis (PCA), hierarchical clustering analysis (HCA) and correlation test procedures. In this regard, the present research relies on 11 databases as the data source, including the International Energy Agency (IEA), International

Labour Organization (ILOSTAT), International Monetary Fund (IMF), World Bank Doing Business Project (WBDBP) and World Bank staff estimates (WBSE). The research scenario conceptually conforms to recent entrepreneurship projects, such as the Global Entrepreneurship Monitor (GEM) project (see Bosma and Kelley 2018) and the Regional Entrepreneurship and Development Index (REDI) project for EU countries (see Szerb et al. 2017), long with a framework measurement of EEs (see Sternberg et al. 2019) that addresses the elements of EEs at the regional levels. The importance of investigating entrepreneurship indicators at the country level of the EU region connects to the venturing policies' contribution to improving economic growth (Aparicio et al. 2016). Investigations on the links between EE and ESIs can help policymakers make rapid and large-scale comparisons between countries, which has not been done before.

As a result, the current study suggests that leadership, government, infrastructure, nongovernment institutions and financial elements help entrepreneurs. Our findings indicate that the key factors of policy, finance and support (in terms of infrastructural and administrative) can positively influence the growth of sustainable innovations at the country level. Meanwhile, our findings show the correlations and the comparative results between the 14 European countries, here by presenting a clustering dendrogram of the countries based on sustainable innovations. Six countries with high sustainable innovations were identified; for instance, Ukraine demonstrates a low capability level, German and the UK have high ESI levels, and Italy and Spain have medium ESI levels. In conclusion, our results present the importance of sustainable innovations, revealing the weak role of labour, education, early customers and societal norms on ESIs in the studied European countries.

Several distinct contributions can support the development of a successful EE at the country level. Our results reinforce the literature that exercises the empirical and quantitative frameworks of an EE and its key factors regarding ESIs in each region (e.g., Cavallo et al. 2019; Ricciardi et al. 2021). Our research also provides evidence and insights, helping provide the regional and national norms of entrepreneurial actions that can create an appropriate ecosystem because an EE, as an aspect of entrepreneurship, plays an essential role in how ecosystems support

firm growth through their direct impact on entrepreneurs (Spigel 2020). A regional and complex agglomeration of EEs provides enhanced entrepreneurial activity benefiting the national economic and societal environment (Kuckertz 2019). Hence, theoretically, our research can help invoke the sustainable mechanisms of innovation to boost national economic performance.

The present study is structured as follows: In the introduction section, the importance and significance of the research are described. The theoretical background and hypotheses development section includes a literature review concerning the entrepreneurial ecosystem model, sustainable innovation procedure and hypotheses development. In the section on data and methods, 14 European countries' profiles are defined. In addition, the data collection procedure to prepare the formatted variables is described to measure the comparative variables within time series and spatial sequences. In the methodology subsection, a conceptual model is addressed to answer five research hypotheses using certain statistical and quantitative approaches, such as a PCA, an HCA, and correlation tests. In the results section, we reveal all the data estimations, correlations and clustering analysis. In the discussion section, we present the discussion of the results and the study's contributions. Finally, in the conclusions section, a set of conclusions is described, as well as the limitations of the study and implications for policymakers.

4.3. Theoretical background and hypotheses development

4.3.1. Entrepreneurial ecosystems and their key factors

Entrepreneurship is a crucial driver of job creation within EEs, and even though the EE is a preparadigmatic field, there is no single accepted definition for this concept (Spigel 2020). In recent years, the EE has been defined through different scholars' research (Ács et al. 2017; Audrestch and Belitski 2017; Bruns et al. 2017; Stam 2015; Mason and Brown 2014). All of these studies imply the same phenomenon. Ács et al. (2017) mention that the EE approach, just like the strategy and regional development literature, emphasising the interdependence between actors and factors, but entrepreneurship (new value creation by agents) is observed as the output of the EE (Spigel 2020). Stam (2015) also describes an EE

as a set of interdependent actors and factors coordinated to enable productive entrepreneurship. However, the definition used by Stam and Spigel (2018) is the most general and widely accepted for an EE: a set of interdependent actors and factors coordinated in a way to enable productive entrepreneurship within a particular territory. This definition has four key components: (1) interdependent actors and factors, (2) coordinating along with a given way, (3) enable productive entrepreneurship and (4) within a particular territory (Spigel 2020).

EEs are the framework for studying the interactions between the different actors interacting in a complex economic system, such as individuals, organisations, entities, local, regional and national institutions, policymakers and stakeholders in a national context (Cohen 2006; Nambisan and Baron 2013; Morris et al. 2015). EEs generate various conceptualisations that share many standard features and factors (Neck et al. 2004; Isenberg 2010; Feld 2012; Ács et al. 2014; Stam 2015; Spigel 2017). Some of these common elements are the supportive culture, venture capital, active networks of entrepreneurs, local government officials, investors, education and services (Neumeyer and Santos 2018).

Some researchers have developed new EE models (e.g., Isenberg 2010; World Economic Forum 2013; Spigel 2017; Stam 2015); these models attempt to explain the different elements of an EE and the way they support entrepreneurship. Because Isenberg's model (Isenberg 2011) is the most well-known and cited model in academic and policy work, we use it in the present research. This model describes six different EE factors: policy, finance, culture, supports, human capital and markets. Each of these factors is linked to more specific elements (Spigel 2020; Malecki 2018).

The policy factor is the first element, and it involves government and leadership aspects. Decisive leadership can hold entrepreneurs within the society, and good government can create stimulus policy and remove all the possible barriers for entrepreneurial activities (Maroufkhani et al. 2018). The finance element, which depends on the capital investment and funds received from local or nonlocal investors, can ease access to loans or supply the prevalence of informal investors (Vedula and Fitza 2019; Spigel and Harrison 2018; Feldman and Zoller 2012; Feld 2012; Isenberg 2010). The culture element reflects the degree to which

entrepreneurship is valued in society, which is analysed by measuring new firms' prevalence and self-employment (Stam 2018). The support element includes the physical infrastructure, such as the institutions and agencies providing various kinds of business support and advice (Spigel 2020). The human capital element, such as labour and educational aspects, provides sufficient knowledgeable human resources, including organisational development, structural design, system control, professional board membership and professional advisory committee (Stam 2018).

Furthermore, the market element is the presence of early customers and low barriers of entry for new ventures to join local supply chains (Spigel 2020), but it can relate to the potential customers who have viewpoints on new products and a cash flow that is conducive for an EE (Maroufkhani et al. 2018). Our paper is focused on a national level, which is consistent with just five of Isenberg's factors; the market factor, as Isenberg (2011) describes it, requires research at a much narrower level (the individual entrepreneur's network). Hence, a model with five key factors and eight elements has been made, here being comprised of policy (leadership, government), finance (financial capital), culture (societal norms), supports (infrastructure, support professions) and human capital (labour, educational institutions).

4.3.2. Entrepreneurial sustainable innovations (ESIs)

Starting from the idea that inflow and outflow knowledge processes generate innovations, an EE connects industries and innovations (Trägårdh 2018; Attia and Essam Eldin 2018; O'Connor and Kelly 2017; Bresciani 2017). An EE is defined as an interconnected group of actors in a local geographic community who are committed to sustainable development through the support and facilitation of new sustainable ventures (Cohen, 2006). In this scenario, enterprises pay more attention to the sustainability values (Horng et al. 2017) that drive innovations with the involvement of environmental communication (e.g., environmental education of guests), resource conservation (e.g., pay attention to recycling), corporate social responsibility (e.g., respect and protect the natural environment), culture innovation (e.g., combine local culture to enhance innovation value), sustainability management (e.g., assessment of greenhouse gas emissions and

carbon footprint) and technology innovation (e.g., cloud systems and electronic forms) (Salmones et al. 2005; Smerecnik and Andersen 2011; Horng et al. 2017). The notion of sustainable entrepreneurship has been raised more recently as a way to address the contribution of entrepreneurial activities towards sustainable development in a more comprehensive way (Schaltegger and Wagner 2011; Del Giudice et al. 2017); this, though, depends on a cycle of the prosperity of innovation, knowledge-based economies and national competitiveness policies to produce success entrepreneurship (Maroufkhani et al. 2017; Usai et al. 2018; Scuotto and Morellato 2013). In this regard, countries and regions encourage the creation of sustainable entrepreneurial ecosystems to increase the level of economic development (Cohen 2006; Cohen and Winn 2007; Isenberg 2011; Spigel 2017), and recent investigations demonstrate the importance of examining this concept in university settings (Regele and Neck 2012; Clarysse et al. 2014; Rice et al. 2014; Hayter 2016), which is where new entrepreneurs are nurtured (Verbano et al. 2017; Murray et al. 2018; Scuotto and Murray 2018). ESIs can offer solutions to entrepreneurial problems and benefit businesses through economies of scale, ultimately contributing to economic growth (Duvnäs et al. 2012; Hossain et al. 2017). In this regard, ESIs may also revolutionise an organisation, leading to a change in the relevant set of exploitable opportunities, providing a competitive advantage in generating new business performance (Miles et al. 2009; Del Giudice et al. 2019). For example, the innovative ways found in a specialised industry may be involved in shaping local/regional responses to the development crisis (Marsden and Smith 2005).

4.3.3. Hypotheses development

The concept of the EE gained momentum through the pioneering studies of Cohen (2006), Isenberg (2010) and Feld (2012), which show that the community and culture of a given place can have a significant impact on entrepreneurship contexts (Stam and Spigel 2016; Mack and Qian 2016; Spigel 2017; Scuotto et al., 2017). Much like financial capital performance (Cantele and Zardini 2018), all of the EE's key factors are related to certain ESIs in each business and industry (Maroufkhani et al. 2017).

Research on EEs has taken a bifurcated attitude towards the role of entrepreneurship policy (Spigel 2020). The challenge of ESI policy is to develop enabling policy frameworks, strategies and processes that support technological and institutional innovation in ways that encompass the economic, environmental and social dimensions of sustainability, leading to the promotion of ESIs. Based on this, policy regimes have been addressed regarding their innovation and environmental sustainability in different studies (Foxon et al. 2004).

In line with this, we state the following:

Hp.1: The higher the level of the policy element in the EE, the higher the ESI level will be.

Moreover, one part of the role of innovations is to provide financing, either directly or indirectly, by sharing information about the appropriate actors in the economy (Trägårdh 2018) because limited funding has been a challenge for successful entrepreneurship. According to Pope (2010), more than 97% of entrepreneurs fail to acquire financial capital. Finance can positively contribute to the development of ESIs (Cantele and Zardini 2018).

Hence, we declare the following:

Hp. 2: The higher the level of the finance element in the EE, the higher the ESI level will be.

The ecosystem's culture and institutional structure can help experienced entrepreneurs become mentors (Spigel 2017b). Culture is one of the most important influences on the entrepreneurship process, and the cultural impacts of an entrepreneurship have been investigated on entrepreneurial values and norms in numerous works (Malecki 2011; Spigel 2017b; Rezaei et al. 2017). Krueger and Kickul (2006) have mentioned that cultural norms play a role in promoting sustainable intentions and innovations.

Hence, we consider the following:

Hp. 3: The higher the level of the culture element in the EE, the higher the ESI level will be.

In addition, the importance of a global network of supporters in helping entrepreneurs scale is important in bringing their new ideas into world-leading companies (Spigel 2020). Contrarily, the impact of localised support of

professionals and dealmakers is limited (Kenney and Patton 2005). Support infrastructures such as innovation hubs or accelerators have popped up throughout the developing world (Friederici 2019). In this regard, advanced countries have innovative institutional ecosystems favourable to certain economic activity types that entrepreneurs can harness to increase business performance (Ratten et al. 2017). The business focuses on inducing an ecosystem to support business performance, but innovation is a system to create innovative methods, reduce time-to-market and increase collaborative values. An innovative ecosystem stems from entrepreneurial ecosystems and could be considered a narrower part of entrepreneurship that is focusing on the process of ESIs.

In this regard, we state the following:

Hp. 4: The higher the level of the supports element in the EE, the higher the ESI level will be.

A sustainability study needs to consider the role of capital, biological, social, technological, financial and cultural elements, along with the complex ways in which they interact. All capital forms derive their value, utility and application from human mental awareness, creativity and social innovation. This role makes human capital, including social capital, the central determinant of resource productivity and sustainability. The importance of human choice depends on the important link between human capital and sustainable development (Diebolt and Hippe 2019). The crucial role of ESIs in economic development and growth has been underlined by extensive literature in this area. According to Dameri and Ricciardi (2015), institutional and environmental capital are the relevant resources needed for an innovative ecosystem. According to Mercan and Göktas (2011), labourers' innovation ecosystems develop because of the changing economy and policy conditions. As mentioned by Jackson (2015), ESIs can be geographically localised or strategically linked between actors.

Therefore, we assert the following:

Hp. 5: The higher the level of the human capital element in the EE, the higher the ESI level will be.

4.4. Data and Methods

4.4.1. Sample description

The present paper uses a hierarchical clustering analysis for classifying the countries based on more appropriate correlations acquired between the indicators of the EE and those of ESIs. The current paper is focused on a set of 14 European countries with a total population above 10,000,000 inhabitants, a number derived from the population data in 2018 (World Bank 2018). These 14 countries are Belgium, the Czech Republic, France, Germany, Greece, Italy, Netherlands, Poland, Portugal, Romania, Spain, Sweden, Ukraine and the UK; together, they have 496 million inhabitants in total (Table 1). In addition to data accessibility and the completeness of time series, the main reason to select those countries depends on embracing the role of their multifaceted economies in entrepreneurship because of the population's labour force demographics (Bosma and Kelley 2018).

4.4.2. Data preparation

In the present study, the formatted variables (all 27 indicators) provided by the World Bank development indicators (World Bank 2018) were considered for measuring the comparative variables within time series and spatial sequences. For more details, please see Table 2. Furthermore, each indicator's description has been added in Table 3, and all indicators were obtained within an annual scale of 10 time windows as a research data depository. The current research collects different variables describing 21 independent characteristics of the EE model and six dependent variables of sustainable innovation indicators in the 14 European countries during the period 2007–2016. The scope is to compare the impacts of the EE on sustainable innovations among leading European countries. Hence, 27 annual time series, including quantitative raw indicators, were obtained to further combine them through a statistical approach.

In detail, the obtained variables were controlled using an originated source to obtain reliable data. All indicators correspond to the research methodological approach that applies the two main subjects of the EE model (Isenberg 2011; Spigel and Harrison 2018) and sustainability innovation (Horng et al. 2017).

According to each subject's conceptual basis and its key factors and elements, all indicators were classified into their respective factors and subjects (Table 4). Furthermore, the coordinated direction of indicators was detected in Table 4, which shows the respective subject and its definition. A simple method to standardise the positive directed or coordinated negative indicators was considered by dividing the values by the maxima. Standardisation of the variables was assumed because of the various units of the indicators.

Because of data accessibility and the completeness of the time series, one economic indicator of GDP growth was selected from the WBSE (2019) for all countries. As the primary World Bank collection of development indicators, this databank includes official international sources for present national staff estimations. The business-based database for research approaches—such as the five indicators of the business' extent of disclosure index, cost of business start-up procedures, start-up procedures to register a business, the time required to enforce a contract and time needed to start a business—was gathered from the WBDBP (2019). Another indicator—called access to clean fuels and technologies for cooking—was gathered from the World Bank, Sustainable Energy for All (SE4ALL 2019).

Five indicators related to contributions from family workers, employment in agriculture and services and labour force data were compiled from the International Labour Organization (ILOSTAT 2019). ILOSTAT is a United Nations agency whose mandate is to advance social justice and promote decent work by setting international labour standards. Four financial and revenue indicators comprised of domestic credit provided by the financial sector, domestic credit to the private sector, insurance and financial services, taxes on income, profits and capital gains were compiled from the IMF (2019).

three educational indicators related to current education expenditure, educational attainment and research and development expenditure were obtained from the UNESCO Institute for Statistics (UNESCO 2019). UNESCO is a specialised agency of the United Nations that focuses on promoting international collaboration in education, sciences and culture in the world. Three energy

indicators of electric power consumption, electricity production from renewable sources and energy use were gathered from the IEA (2019).

One technical indicator of machinery and transport equipment was gathered from the UN Industrial Development Organization (UNIDO 2019). Two indicators of carbon dioxide damage and natural resource depletion were obtained from Changing Wealth of Nations (CWN 2019), here based on Lange et al.'s (2018) research. Ultimately, two independent indicators titled high technology and tariff rates were collected from different sources of the UN Conference on Trade and Development (UNCTAD 2019) and the World Trade Organization's integrated data base (WTO 2019), respectively.

4.5. Methodology

4.5.1. Research model

The investigation of the sustainability potential of local businesses is a method used in the literature (Bosona and Gebresenbet 2011). Hence, the main procedure in the current study is to assess potential sustainability innovations using a quantitative analysis. Here, two main groups of dependent and independent variables (describing 21 independent characteristics of the EE model and six dependent variables of sustainable innovation indicators) were developed to uncover the relationships between the EE and ESIs. Statistical Package for Social Science (SPSS) software was used to analyse the quantitative data by measuring the range of correlation tests (Figure 1) and evaluate the mentioned hypotheses. The research model stems from the data collection and hypothesis development that occurred after an in-depth literature review, objective interpretation and study area description. Based on the spatial and temporal scale of the research, all key variables, which are based on theoretical models, EEs (Isenberg 2011) and sustainable innovation (Horng et al. 2017), were extracted, coordinated, standardised and combined in statistical analyses, a PCA, an HCA and correlation test procedures. The outputs of the model lead to answering the hypotheses and classifying the countries through a dendrogram (Figure 2).

4.5.2. Principal component and hierarchical cluster analyzes (PCA-HCA)

Because of our dataset's diverse sources, we have employed a PCA and an HCA. The main reason to carry out a PCA is to determine the quantity and character of linearly independent variables (factors) that are precisely expressing the interdependence of the initial variables. A PCA is functionally similar to a cluster analysis, which is used to classify cases into suitability classes (clusters) based on similarities within a group and dissimilarities between groups (Daneshvar et al. 2013). The purpose of a PCA is to identify the most important correlation structures between several variables to obtain a description of the major part of the overall variance, here with a few linear combinations being based on the original variables (Muñoz-Díaz and Rodrigo 2004). The PCA's retained scores can be subjected to an HCA to better identify different zones (e.g., Marzban and Sandgathe 2006). Like a PCA, an HCA is known for its ability to divide the dataset into homogeneous and distinct groups, creating members with similar characteristics (Shukla et al. 2000). Both the PCA and HCA methods are the most useful data mining tasks for discovering groups and identifying interesting patterns in the underlying data (Halkidi et al. 2001). There are hierarchical and nonhierarchical methods that can be used for a cluster analysis. Hierarchical methods are based on a distance matrix. The Euclidean distance is the most commonly used measure although many other distance measures exist (Gong and Richman 1995). The HCA and PCA are widely used for the clustering of geographical data (Daneshvar 2015).

In the first step, the total chosen variables (27 variables) were coordinated based on subject direction, standardised and averagely combined from 2007 to 2016 to overcome the effects caused by the scale differences of the variables. The standardizing of the raw values of the variables were carried out using Equations 1 and 2. Equation 1 was used for converged raw data, and Equation 2 was used for nonconverged raw data to produce the final coordinated and standardized variables.

$$X = \frac{X_{raw}}{X_{max}} \qquad\qquad \text{(Eq. 1)}$$

$$X = 1 - \frac{X_{raw}}{X_{max}} \qquad\qquad \text{(Eq. 2)}$$

where Xraw is the real and raw variable's value, Xmax is the maximum of the variable's value, and X is the converged and standardised variable value, which is estimated in each column of the data matrix. The combination of the standardised values was done based on Equation 3:

$$X_{mean} = \frac{1}{n}\sum_{i=1}^{n} X_i \qquad\qquad \text{(Eq. 3)}$$

where Xi is the converged and standardised value for variable X in column i, n is the number of variables {from i=1 to i=n}, and Xmean is the average of combined values for total variables in all columns of the data matrix.

In the second step, the PCA method was considered to make a proximity matrix from the distance correlations and dissimilarity measure of the squared Euclidean distance. In the final step, an HCA was used to cluster the cases. The Euclidean distance measure for the observations and Ward's method for the linkage rule were used. This combination can present distinctive groups for the data within the HCA. A PCA and an HCA were briefly performed for all 10 time windows (2007–2016), along with the following steps: (1) selecting, coordinating, standardising and combining the variables, (2) computing the correlation matrix of the variables, (3) estimating the correlation tests between dependent and independent variables and (4) clustering the cases (countries) for the appropriate correlation results of variables. Ultimately, a clustering dendrogram was considered to classify the cases (countries).

4.6. Results

4.6.1. Application of PCA

In this section, the total indicators (variables) were examined using a PCA to detect the homogeneity in the variables resulting from the similarity of the values. Here, the mean values of the standardised variables during 2007–2016 were summarised into the initial matrix. Based on a PCA in SPSS, a correlation matrix and communality matrix of variables were used to initially cluster the variables (Tables 5 and 6). The constant correlations were considered with a meaningfully

of R<-0.5 or R>0.5 at a confidence level P>90% (Sig.<0.1) between the dependent and independent variables. The distribution of the extracted communalities from 0.70 to 0.98 for all 27 variables revealed that each variable has sufficient membership capability in a dataset collection. Furthermore, the results of the correlation matrix revealed that the indicators could be clustered through seven components, explaining approximately 89% of the total variance, with eigenvalues greater than 1 (Table 7). The first and second components, which mainly comprise the EE factors, explain 47.11% of the total variance, with an eigenvalue of 12.72. The third and fourth components, mostly including sustainable innovation factors, explain 24.11% of the total variance, here with an eigenvalue of 6.51. The other components with different members explain 28.78% of the total variance, with an eigenvalue of 7.77. Overall, the correlation matrix and descriptive component analyses of the variables illustrated some main correlative factors to categorise the dependent and independent indicators (variables) in the next step.

4.6.2. Correlation tests

Here, the Pearson correlation coefficients between the dependent and independent variables were produced. Initially, the dependent and independent variables were summarised based on their combined values of the component indicators for the 14 countries and period of 2007–2016. For this purpose, the standardised mean values of six indicators for sustainable innovations and 21 indicators for EE were summarised in new matrices, respectively (Tables 8 and 9). As mentioned earlier, the tables initially revealed that three countries—Germany, the Czech Republic and Sweden—have a higher degree of sustainable innovations. Also, the UK, France and Sweden have higher degrees of EEs. The correlation between the indicators of EE and ESIs is presented in Fig. 3.

Based on this, the correlation tests between the key factors of the EE and ESI variables were used to examine the five hypotheses. The correlation results revealed the mean relatively significant and positive correlations (R=+0.30 to +0.39, P>70 to 75%) between the key factors of policy, finance, support and ESIs, exposing the influential role of leadership, government, infrastructure, nongovernment institutions and financial elements on ESIs (Table 10). In Table

10, the relatively significant correlations were considered to be dominant at a confidence level of P>75% (Sig.<0.25). Some correlations between sustainable innovations and EE factors (e.g., finance in 2009, 2014 and 2015) are entirely significant at the confidence level of P>99% (Sig.=0.00), while some other correlations (e.g., policy in 2007, 2008 and 2011) are relatively significant at a confidence level of P>80% (Sig.< 0.2).

Contrarily, negative correlations (R=-0.20 to -0.27) were observed between the key factors of human capital, culture and SI. Furthermore, the correlation results revealed that the key factors of policy, finance and support could positively sustainable innovations, supporting three research hypotheses (Hp. 1, Hp. 2 and Hp. 4). Contrarily, three hypotheses (Hp. 3 and Hp. 5) were rejected because the key factors of culture and human capital negatively influenced sustainable innovations. This revealed the weak role of labour, education, early customers and societal norms on sustainable innovations in the studied European countries.

4.6.3. Application of HCA

An HCA was performed to group the sustainable innovations using Ward's method. The mean standardised value of eight indicators for sustainable innovations was used (see Table 8). The HCA was then carried out to obtain a proximity matrix based on the squared Euclidean distance (Table 11) and consequent clustering, which is illustrated graphically as a dendrogram, as shown in Fig. 2; this graph has a rescaled distance cluster combination of 25. According to Fig. 2, the case studies of 14 countries were classified into three main clusters: high, medium and low levels of sustainable innovations. The four critical countries with low sustainable innovations were Ukraine, Romania, Poland and the Czech Republic. Contrarily, the stable six countries regarding high sustainable innovations were Germany, UK, Sweden, Netherlands, France and Belgium. The other four countries—Italy, Spain, Portugal and Greece—were classified as having a medium level of ESIs.

4.7. Discussion

In the last decade, the concept of entrepreneurship has been transformed (Jafari-Sadeghi et al. 2021). EE is an aspect of the entrepreneurship domain that plays an

important role in enterprises' sustainable innovation growth through local or national norms and support (Spigel 2020; Malecki 2018). Investigations into the links between EEs and ESIs can help policymakers make a rapid and large-scale comparison between countries, which has not been done before, particularly when it comes to an analysis that uses global data. Hence, it is important to understand how the elements of an EE (e.g., policy, finance, human capital, support and culture) can affect ESIs. By developing five hypotheses, the research attempted to understand the elements of an EE and their role in ESIs. Our findings supported three hypotheses (Hp. 1, Hp. 2 and Hp. 4), exposing the positive influence of the entrepreneurial key factors of policy, finance and support on sustainable innovations. The innovations that entrepreneurs introduce into an EE can also produce coherence in agents' actions and values (Muñoz and Encinar 2014; Roundy et al. 2018), such as in policy and finance configurations. For instance, they essentially can help innovative start-ups by providing information about the financial resources to overcome the cost of the obstacles towards innovation (Hsu 2007; Bjørgum et al. 2013).

In particular, the study analyses the correlation of five out of six elements of the EE model using the ESIs from a sample of 14 European countries between 2007 and 2016. The correlation test results indicate a mean weak positive correlation ($R=+0.27$, $P>60\%$) between the EEs and ESIs in each country. The correlation test revealed the mean relatively significant and positive correlations ($R=+0.30$ to $+0.39$, $P>70$ to 75%) between the key factors of policy, finance, supports and ESIs, exposing the influential role of leadership, government, infrastructure, nongovernment institutions and financial elements. Having found support for hypotheses Hp. 1, Hp. 2 and Hp. 4, our results reveal that the key factors of policy, finance and support (in terms of infrastructural and administrative) could positively influence ESIs at the national level. Supporting three hypotheses, the results highlight that an EE's key factors have different impacts on ESIs over time. Similarly, as mentioned in the literature, the effects of an EE can be considered as a system that is complex because of its heterogeneous nature and as dynamic or adaptive because it changes over time (Ács et al. 2016; Spigel 2017; Borissenko and Boschma 2017; Cavallo et al. 2019). Also, on average, among the

key elements, policy, finance and support components had an influential role in the ESIs during the studied period. Here, an intervention policy's role in improving the mechanisms of the businesses is important (Varese and Bonadonna 2019).

However, we found that culture and human capital exposed the weakest and most negative impacts on ESIs (Hp. 3 and Hp. 5). This may relate to governments' attention to enhancing the level of technology instead of the socio-cultural improvement of human capital and social support. For instance, industrial districts in Italy play a major role in new venture creation and support innovative start-ups (Cavallo et al. 2018). This finding highlights the need for further research to uncover the role of the supply chain network and how it contributes to the success of local businesses (Gruchmann et al. 2019). The lack of human capital initially limits the ability to establish certain types of ventures, for example, in high-technology enterprises (Roundy et al. 2018). The lack of the influence on human capital is a big concern because the world is moving towards Society 5.0 (Konno and Schillaci 2020), which utilises a human-centred approach where the government and policymakers should give more relevance to the intellectual capital of human beings in developing new innovations (Dabic et al. 2020; Chierici et al. 2020; Orlando et al. 2020).

The current study contributes to the literature on entrepreneurship and innovation by relating time to the specific elements of an EE. By considering this link, the present study has demonstrated that the different elements of an EE simultaneously develop tools to support innovations over time. Our findings shed light on providing a dynamic empirical study that analyses the elements of an EE instead of the static models (e.g., Ács et al. 2016; Alvedalen and Boschma 2017). Furthermore, from the viewpoint of time series, the finance and culture correlations with ESIs showed a promoting trend, while the other correlations presented decreasing trends during the study period. Following Randerson et al. (2015), this relates to the increasing effects of family members working in a business and the private sector's function (as the indications of the cultural and financial key factors) in the innovations of all the studied European countries. The importance of family on entrepreneurship and family business is preponderant,

where about 85% of all established ventures start with family backing (Astrachan et al. 2003).

Moreover, an HCA procedure was used to classify the case studies of 14 countries into three main clusters: high, medium and low levels of ESIs. The most stable six countries regarding high sustainable innovations were Germany, UK, Sweden, Netherlands, France and Belgium. European countries have innovative institutional ecosystems that are favourable to certain economic activity types that entrepreneurs can harness to increase business performance. Hence, a long-term investigation of the effects of an EE on ESIs can be beneficial for entrepreneurship management when it comes to new product development and innovative approaches to sustainable business operations. In the present paper, we assumed a long-term investigation during a 10-year time series (2007–2016), while previous studies on EEs have shown a static framework without using a time series (Ács et al. 2016; Alvedalen and Boschma 2017; Borissenko and Boschma 2017).

The contribution of the current research can be considered for both practical and academic applications. Recent research has found a link between EEs and ESIs (e.g., Al-Abri et al. 2018; Walter and Zondo 2016; Rampersad 2016; Stam 2018). We have taken this further by trying to investigate this issue using country-level databases. Moreover, the present paper attempts to show the correlations and can benefit from comparative results among the given countries. These relationships go beyond short-term contractual agreements and become long-term relationships that act as a valuable information source in EE studies (Prajogo and Olhager 2012).

Consequently, the current study has contributed to the literature of entrepreneurial ecosystems by reviewing the key factors of entrepreneurial ecosystems by referring to the new impacts of these factors and providing an expanded view of EE for further research in this field. From a broader perspective, the current study associates various theoretical backgrounds by using accessible data sets and indicators, improving the concept of entrepreneurial and innovative ecosystems. Theoretically, the present research can create sustainable mechanisms of innovation to boost national economic performance. Similarly, Stam (2013)

probes the knowledge level and employees of an EE in a country-level analysis. Also, Szerb et al. (2019) have analysed the relevance of EE's quantity and quality for regional and national performance. Our study complements these macro-level analyses by offering a comprehensive investigation using a 10-year time series to examine the role of EEs in ESIs. Our framework describes and specifies the distinct practices in which an EE shapes new ventures, here looking at the impactful drivers of sustainability in a national economy.

4.8. Managerial Implications

Research has identified the influences of an EE for entrepreneurs and businesses in advanced economies. For instance, the worldwide focus is on understanding EEs from a macro-perspective (Autio et al. 2014; Zahra et al. 2014; Colombelli et al. 2019), along with a micro-outlook (Cantino et al. 2017; Corazza et al. 2019; Alvedalen and Boschma 2017; Cavallo et al. 2019). However, a comprehensive approach has not been considered to analyse the interrelated research between EEs and ESIs within the literature, while a range of policymakers have shed light on the importance of developing all the aspects of EE to facilitate the development of ESIs. It also highlights that if policymakers want to encourage ESIs, they need to pay more attention to strengthening the dimensions of EE. In this regard, policymakers can significantly appraise their performance levels to identify the organisations' innovation levels, significantly enhancing the EE in respected subjects. Therefore, they can facilitate the individualities of an EE to promote sustainable innovation levels in organisations by using telecommunications, technical experts and advisors, private equity, venture capital funds and venture friendly legislations. All of these mentioned prospects could strengthen the overall support, financial and policy elements of EE employees by implementing sustainable innovations and creative manners, along with providing appropriate feedback. As mentioned by Noelia and Rosalia (2020), innovative entrepreneurships face serious obstacles in their innovation processes because of the costs of innovations, lack of managerial competencies and difficulties in cooperating agents. Hence, the reduction of obstacles through the development of ESIs using the dynamic nature of EEs is crucial for managers and policymakers.

4.9. Conclusions and research limitations

The limitations of the current research can be divided into four categories. The first limitation depends on the actual accessibility, durability and reliability of the indicators during the long-term temporal windows and the countries' broad case studies. The second limitation depends on the data sampling; here, the current study was based on a confined sample (14 countries in 10 points in time and 27 indicators). This type of analysis should be repeated in other countries with multiple time periods and a larger indicator set to reach more robust findings. This would also allow for the feedback effects of the systemic outputs of the entrepreneurial ecosystem. The third limitation is the exclusion of the market element because of its dependence on early customers and low barriers of entry for new ventures to join local supply chains. As a final limitation, the lack of a practical field study to prepare the data is another limitation that results in some possible uncertainties. Most data sets in the obtained data banks are observed from 2010 up to 2018.

To overcome this problem, further research needs to take novel approaches concerning data mining, validating and forecasting in addition to using field data. Regarding the market, further research should provide new distribution channels, evolving customer needs, the possibilities for the expansion of existing product ranges, new functional requirements and multiple commercial uses of technologies on a regional scale. Also, regarding the case studies, the low level of capacity of ESIs in the countries of Ukraine, Romania, Poland and the Czech Republic should be examined more to understand the causes behind this. There might be location-based effects that could influence the confidence level of the results. For instance, we suggest new research focusing on the innovative start-up level of these countries instead of the innovation status. Here, we have conducted a pilot testing of the nation-level correlations between five of Isenberg's elements of an EE and ESIs, finding that only some of these elements of an EE are actually correlated to ESIs, thus paving the way for further studies on what are the core elements of an EE that actually nurture ESIs at the macro-level and why. Apart from the European countries, further research could consider the other regions around the world to compare the results. In line with this, a comparative analysis

could be made to offer the differences between these two categories of countries (European countries and other developed or developing countries). In this regard, a qualitative methodology can be applied to understand the EE in a company with sustainable innovation.

The current article focused only on a general category of business, so further research can develop empirical methods such as a panel data analysis, trend analysis or spectral analysis to reveal other sectors of businesses. Consequently, a holistic examination of an EE can help researchers better understand the relationships between geography, personality and the entrepreneurial phenomenon, contributing to more effective policy solutions to encourage sustainable and resilient entrepreneurship-led economic growth. Our findings have supported some of our hypotheses, exposing the positive influence of the entrepreneurial key factors of policy, finance and support on sustainable innovations. The innovations that entrepreneurs introduce into an EE can also produce coherence in agents' actions and values, such as the policy and finance configurations. Innovative entrepreneurships face serious obstacles in their innovation processes because of the costs of innovations, lack of managerial competencies and difficulties in cooperating agents. Hence, the reduction of obstacles through the development of ESIs by using the dynamic nature of EEs are crucial for managers and policymakers. Overall, an EE promotes and has a key role in spurring new ESIs by supporting start-ups and policymakers to identify the key elements and resources needed to sustain start-ups' innovations and establish the most important priorities.
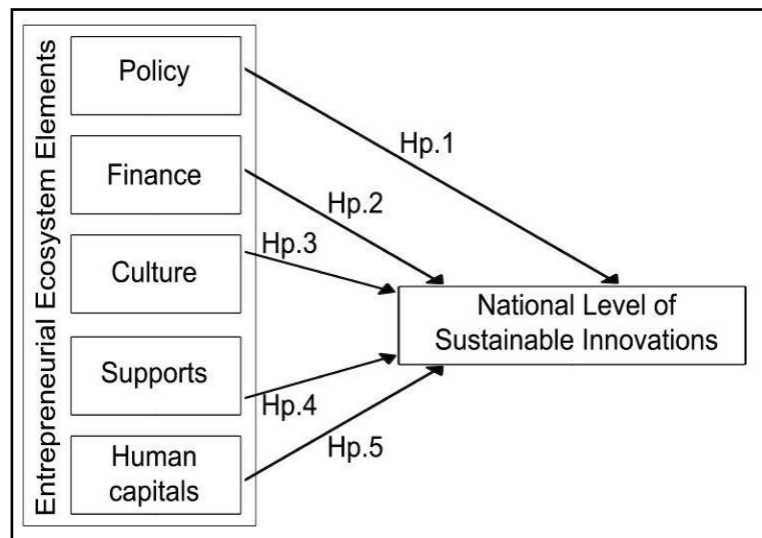
Figure 4.1. Research model (Source: our elaboration)
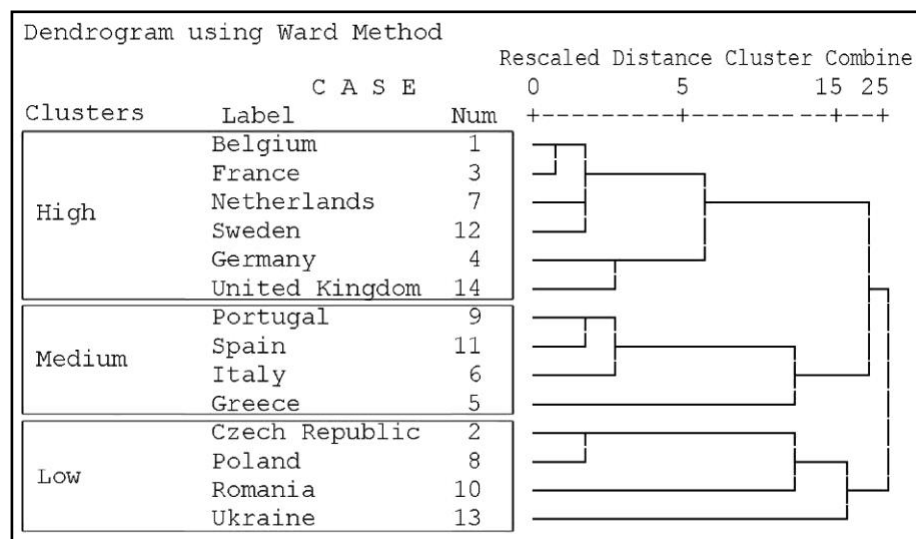
Figure 4.2. Clustering dendrogram of the countries based on sustainable innovations in an HCA (Source: extracted from SPSS software)
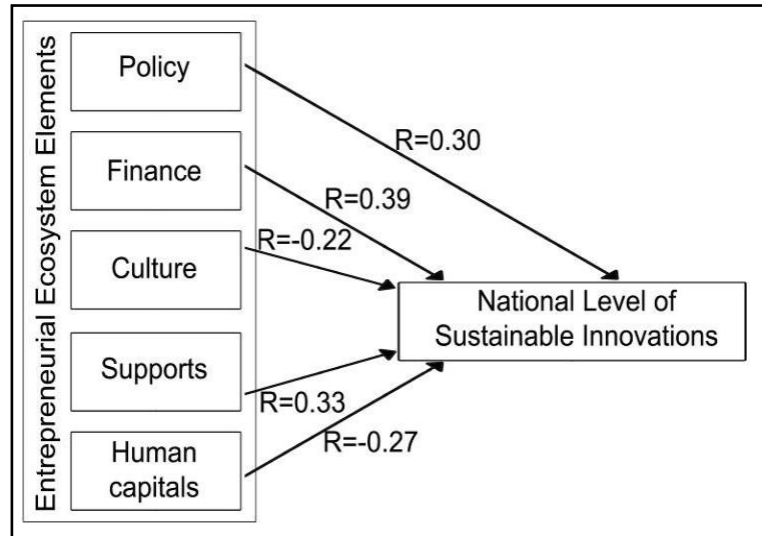
Figure 4.3. Research results

Table 4.1. The summarized profile of the selected European countries

Country Name	Country Code	Population	Area (Km^2)	Pop. Density
Belgium	BEL	82927922	30280	2739
Czechia	CZE	66987244	77220	867
France	FRA	66488991	547557	121
Germany	DEU	60431283	349360	173
Greece	GRC	46723749	128900	362
Italy	ITA	44622516	294140	152
Netherlands	NLD	37978548	33690	1127
Poland	POL	19473936	306190	64
Portugal	PRT	17231017	91605.6	188
Romania	ROU	11422068	230080	50
Spain	ESP	10727668	499564	21
Sweden	SWE	10625695	407310	26
Ukraine	UKR	10281762	579290	18
UK	GBR	10183175	241930	42

Table 4.2. The title (unit), code, source and accessible site of obtained indicators

Indicator title (unit)	Code	Source	Site
Adjusted savings: carbon dioxide damage (% of GNI)	[01]	Changing Wealth of Nations (CWN)	https://openknowledge.worldbank.org/handle/10986/29001
Adjusted savings: natural resource depletion (% of GNI)	[02]		
Electric power consumption (kWh per capita)	[03]	International Energy Agency (IEA)	https://www.iea.org/
Electricity production from renewable sources, excluding hydroelectric (% of total)	[04]		
Energy use (kg of oil equivalent per capita)	[05]		
Contributing family workers, total (% of total employment)	[06]	International Labour Organization (ILOSTAT)	https://www.ilo.org/global/lang--en/index.htm
Employment in agriculture (% of total employment)	[07]		
Employment in services (% of total employment)	[08]		
Labour force with advanced education (% of total working-age population with advanced education)	[09]		
Labour force, total	[10]		
Domestic credit provided by financial sector (% of GDP)	[11]	International Monetary Fund (IMF)	https://www.imf.org
Domestic credit to private sector (% of GDP)	[12]		
Insurance and financial services (% of commercial service exports)	[13]		
Taxes on income, profits and capital gains (% of revenue)	[14]		
High technology (current US$)	[15]	UN Conference on Trade and Development (UNCTAD)	https://unctad.org/en/Pages/Home.aspx
Machinery and transport equipment (% of value added in manufacturing)	[16]	UN Industrial Development Organization (UNIDO)	https://www.unido.org/
Current education expenditure, total (% of the total expenditure in public institutions)	[17]	UNESCO Institute for Statistics	http://uis.unesco.org/
Educational attainment, at least completed upper secondary, population 25+, total (%) (cumulative)	[18]		
Research and development expenditure (% of GDP)	[19]		
Business extent of disclosure index (0=less disclosure to 10=more disclosure)	[20]	World Bank Doing Business Project (WBDBP)	https://datacatalog.worldbank.org/dataset/doing-business
Cost of business start-up procedures (% of GNI per capita)	[21]		
Start-up procedures to register a business (number)	[22]		
Time required to enforce a contract (days)	[23]		
Time required to start a business (days)	[24]		
GDP growth (annual %)	[25]	World Bank staff estimates (WBSE)	https://databank.worldbank.org/source/world-development-indicators/
Access to clean fuels and technologies for cooking (% of the population)	[26]	World Bank, Sustainable Energy for All (SE4ALL)	https://datacatalog.worldbank.org/dataset/sustainable-energy-all
Tariff rate, applied, simple mean, all products (%)	[27]	World Trade Organization's Integrated Data Base (WTO)	http://tariffdata.wto.org/

Table 4.3. The essence definition of each indicator

Indicator code	Definition
[01]	Cost of damage because of carbon dioxide emissions from fossil fuel use and the manufacture of cement, as US\$30 per tonne of CO_2.
[02]	Natural resource depletion is the sum of net forest depletion, energy depletion and mineral depletion.
[03]	Electric power consumption measures the production of power plants and combined heat and power plants less transmission, distribution and transformation losses and own use by heat and power plants.
[04]	Electricity production from renewable sources, excluding hydroelectric, includes geothermal, solar, tides, wind, biomass and biofuels.
[05]	Energy use refers to the use of primary energy before transformation to other end use fuels.
[06]	Contributing family workers are workers holding self-employment jobs as own-account workers.
[07]	Employment in the agriculture sector consists of activities in agriculture, hunting, forestry and fishing.
[08]	Employment in the service sector consists of commercial, residential, transport, storage, business services and social services.
[09]	The percentage of the working-age population with an advanced level of education who are in the labour force.
[10]	Labour force comprises people aged 15 and older who supply labour for the production of goods and services during a specified period.
[11]	Domestic credit provided by the financial sector includes all credit to various sectors on a gross basis.
[12]	Domestic credit to the private sector refers to financial resources provided to the private sector by financial corporations, such as loans.
[13]	Insurance and financial services cover freight insurance on goods exports and other direct insurance.
[14]	Taxes are levied on the actual net income of individuals, on the profits of corporations and enterprises and on capital gains.
[15]	High technology are products with high research and development (R&D) intensity, such as aerospace, computers, pharmaceuticals, scientific instruments and electrical machinery.
[16]	Value added in production for industries classified in machinery and transport equipment.
[17]	Current expenditure is expressed as a percentage of direct expenditure in public educational institutions.
[18]	The percentage of population aged 25 and over who attained or completed upper secondary education.
[19]	Gloss domestic expenditures on research and development (R&D), expressed as a percentage of GDP.
[20]	Disclosure index measures the extent to which investors are protected through disclosure of ownership and financial information.
[21]	Cost to register a business is normalised by presenting it as a percentage of gross national income (GNI) per capita.
[22]	Start-up procedures are those required to start a business, including interactions to obtain necessary permits and licences and to complete all inscriptions, verifications, and notifications to start operations.
[23]	Time required to enforce a contract is the number of calendar days from the filing of the lawsuit in court until the final determination.
[24]	Time required to start a business is the number of calendar days needed to complete the procedures to legally operate a business.
[25]	Annual percentage growth rate of GDP at prices is based on constant local currency.
[26]	Access to clean fuels and technologies for cooking is the proportion of total population primarily using clean cooking fuels and technologies for cooking.
[27]	Tariff is the unweighted average of effectively applied rates for all products and trades.

Table 4.4. Distribution of the indicators and their key factors and elements based on main subjects of entrepreneurial ecosystem and sustainability innovation

Subject	Key factor	Element	Indicator title [code]	Direction*
Entrepreneurial ecosystem	Policy	Leadership	Start-up procedures to register a business [22]	-
			Business extent of disclosure index [20]	+
		Government	Research and development expenditure [19]	+
			Taxes on income, profits and capital gains [14]	-
			Tariff rate [27]	-
			Cost of business start-up procedures [21]	-
	Finance	Financial capital	GDP growth [25]	+
			Domestic credit provided by the financial sector [11]	+
			Domestic credit to private sector [12]	+
	Culture	Societal norms	Contributing family workers, total [06]	+
	Supports	Infrastructure	Electric power consumption [03]	+
			Energy use [05]	+
			Machinery and transport equipment [16]	+
		Support administrative	Time required to start a business [24]	-
			Time required to enforce a contract [23]	-
			Insurance and financial services [13]	+
	Human capital	Labour	Labour force, total [10]	+
			Employment in agriculture [07]	+
			Employment in services [08]	+
		Educational institutions	Labour force with advanced education [09]	+
			Current education expenditure [17]	+
Sustainability innovation	Environmental communication	Environmental education of guests	Educational attainment [18]	+
	Resource conservation	Pay attention to recycling	Electricity production from renewable sources [04]	+
	Corporate social responsibility	Respect and protect the natural environment	Adjusted savings: natural resources depletion [02]	-
	Sustainability management	Assessment of greenhouse gas emissions and carbon footprint	Adjusted savings: carbon dioxide damage [01]	-
			Access to clean fuels and technologies for cooking [26]	+
	Technology innovation	Cloud systems and electronic forms	High technology [15]	+

* Coordinated direction of indicators concerning the respected subject, including +: positive direction and -: negative direction.

Table 4.5. Correlation matrix between 27 indicators (variables)

Code	[01]	[02]	[03]	[04]	[05]	[06]	[07]	[08]	[09]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]
[01]	1.00	0.78	0.44	0.56	0.30	-0.03	-0.55	0.54	0.48	-0.01	0.48	0.39	0.27	-0.50	0.17	0.16	-0.07	0.60	0.48	0.38	0.03	0.37	-0.17	0.34	0.17	0.29	0.94
[02]	0.78	1.00	0.46	0.56	0.31	-0.26	-0.63	0.47	0.10	-0.02	0.35	0.23	-0.03	-0.34	0.03	0.00	-0.16	0.40	0.47	0.06	-0.25	0.07	-0.35	0.02	-0.04	0.50	0.75
[03]	0.44	0.46	1.00	0.15	0.83	-0.47	-0.64	0.66	0.17	-0.16	0.31	0.29	0.07	-0.01	0.26	0.40	0.10	0.37	0.89	0.06	0.34	0.55	0.21	0.20	0.08	0.46	0.27
[04]	0.56	0.56	0.15	1.00	-0.06	-0.24	-0.35	0.33	0.37	0.06	0.65	0.60	0.13	-0.42	-0.18	-0.10	0.08	-0.04	0.24	0.08	-0.08	-0.02	-0.24	0.10	-0.12	0.40	0.46
[05]	0.30	0.31	0.83	-0.06	1.00	-0.56	-0.71	0.64	-0.10	0.06	0.20	0.03	0.13	-0.07	0.43	0.44	0.24	0.43	0.85	-0.09	0.34	0.54	0.39	0.23	0.20	0.50	0.18
[06]	-0.03	-0.26	-0.47	-0.24	-0.56	1.00	0.80	-0.68	0.10	-0.11	-0.56	-0.48	-0.27	0.22	-0.09	-0.24	-0.33	0.07	-0.58	0.25	-0.15	-0.14	-0.21	-0.12	0.19	-0.90	0.15
[07]	-0.55	-0.63	-0.64	-0.35	-0.71	0.80	1.00	-0.85	-0.04	-0.25	-0.61	-0.46	-0.43	0.45	-0.23	-0.36	-0.18	-0.41	-0.74	0.03	-0.06	-0.26	-0.09	-0.12	0.02	-0.86	-0.40
[08]	0.54	0.47	0.66	0.33	0.64	-0.68	-0.85	1.00	0.28	0.17	0.80	0.69	0.45	-0.54	-0.01	0.11	-0.04	0.21	0.67	0.10	0.19	0.36	0.12	0.31	-0.24	0.75	0.31
[09]	0.48	0.10	0.17	0.37	-0.10	0.10	-0.04	0.28	1.00	-0.23	0.43	0.64	0.28	-0.29	0.13	-0.14	0.00	0.21	0.04	0.46	0.34	0.39	0.08	0.06	0.21	0.04	0.45
[10]	-0.01	-0.02	-0.16	0.06	0.06	-0.11	-0.25	0.17	-0.23	1.00	0.21	0.19	0.57	-0.18	-0.31	0.50	0.27	0.06	0.16	0.24	0.06	-0.24	0.31	-0.04	0.05	0.28	-0.11
[11]	0.48	0.35	0.31	0.65	0.20	-0.56	-0.61	0.80	0.43	0.21	1.00	0.89	0.34	-0.65	-0.18	-0.06	0.03	0.03	0.35	0.05	0.12	0.14	0.00	0.27	-0.38	0.61	0.24
[12]	0.39	0.23	0.29	0.60	0.03	-0.48	-0.46	0.69	0.64	0.19	0.89	1.00	0.46	-0.48	-0.19	-0.07	-0.06	-0.12	0.27	0.15	0.26	0.10	0.02	0.16	-0.36	0.49	0.18
[13]	0.27	-0.03	0.07	0.13	0.13	-0.27	-0.43	0.45	0.28	0.57	0.34	0.46	1.00	-0.46	-0.07	0.38	0.20	0.35	0.28	0.49	0.35	0.19	0.32	0.28	0.12	0.27	0.17
[14]	-0.50	-0.34	-0.01	-0.42	-0.07	0.22	0.45	-0.54	-0.29	-0.18	-0.65	-0.48	-0.46	1.00	0.37	0.16	-0.16	0.03	-0.07	-0.44	-0.02	-0.22	0.00	-0.32	0.16	-0.32	-0.35
[15]	0.17	0.03	0.26	-0.18	0.43	-0.09	-0.23	-0.01	0.13	-0.31	-0.18	-0.19	-0.07	0.37	1.00	0.45	0.16	0.64	0.26	-0.35	0.11	0.21	0.14	-0.18	0.52	0.07	0.32
[16]	0.16	0.00	0.40	-0.10	0.44	-0.24	-0.36	0.11	-0.14	0.50	-0.06	-0.07	0.38	0.16	0.45	1.00	0.55	0.53	0.61	0.12	0.38	0.23	0.52	0.03	0.53	0.13	0.12
[17]	-0.07	-0.16	0.10	0.08	0.24	-0.33	-0.18	-0.04	0.00	0.27	0.03	-0.06	0.20	-0.16	0.16	0.55	1.00	0.02	0.30	0.32	0.42	0.48	0.58	0.05	0.60	0.24	-0.11
[18]	0.60	0.40	0.37	-0.04	0.43	0.07	-0.41	0.21	0.21	0.06	0.03	-0.12	0.35	0.03	0.64	0.53	0.02	1.00	0.43	0.21	0.04	0.25	0.12	0.63	0.12	0.12	0.72
[19]	0.48	0.47	0.89	0.24	0.85	-0.58	-0.74	0.67	0.04	0.16	0.35	0.27	0.28	-0.07	0.26	0.61	0.30	0.43	1.00	0.11	0.47	0.52	0.41	0.31	0.20	0.55	0.29
[20]	0.38	0.06	0.06	0.08	-0.09	0.25	0.03	0.10	0.46	0.24	0.05	0.15	0.49	-0.44	-0.35	0.12	0.32	0.21	0.11	1.00	0.33	0.58	0.21	0.37	0.38	-0.08	0.32
[21]	0.03	-0.25	0.34	-0.08	0.34	-0.15	-0.06	0.19	0.34	0.06	0.12	0.26	0.35	-0.02	0.11	0.38	0.42	0.04	0.47	0.33	1.00	0.55	0.80	0.45	0.24	0.19	-0.12
[22]	0.37	0.07	0.55	-0.02	0.54	-0.14	-0.26	0.36	0.39	-0.24	0.14	0.10	0.19	-0.22	0.21	0.23	0.48	0.25	0.52	0.58	0.55	1.00	0.33	0.57	0.42	0.19	0.26
[23]	-0.17	-0.35	0.21	-0.24	0.39	-0.21	-0.09	0.12	0.08	0.31	0.00	0.02	0.32	0.00	0.14	0.52	0.58	0.12	0.41	0.21	0.80	0.33	1.00	0.05	0.47	0.01	-0.26
[24]	0.34	0.02	0.20	0.10	0.23	-0.12	-0.12	0.31	0.06	-0.04	0.27	0.16	0.28	-0.32	-0.18	0.03	0.05	0.63	0.31	0.37	0.45	0.57	0.05	1.00	-0.22	-0.06	0.14
[25]	0.17	-0.04	0.08	-0.12	0.20	0.19	0.02	-0.24	0.21	0.05	-0.38	-0.36	0.12	0.16	0.52	0.53	0.60	0.12	0.20	0.38	0.24	0.42	0.47	-0.22	1.00	-0.07	0.33
[26]	0.29	0.50	0.46	0.40	0.50	-0.90	-0.86	0.75	0.04	0.28	0.61	0.49	0.27	-0.32	0.07	0.13	0.24	0.12	0.55	-0.08	0.19	0.19	0.01	-0.06	-0.07	1.00	0.16
[27]	0.94	0.75	0.27	0.46	0.18	0.15	-0.40	0.31	0.45	-0.11	0.24	0.18	0.17	-0.35	0.32	0.12	-0.11	0.72	0.29	0.32	-0.12	0.26	-0.26	0.14	0.33	0.16	1.00

Table 4.6. Extracted communalities for 27 indicators (variables)

Indicator abbreviation	Indicator code	Extraction	Indicator abbreviation	Indicator code	Extraction
Carbon dioxide	[01]	0.967	High technology	[15]	0.828
Natural resources	[02]	0.877	Machinery	[16]	0.822
Electric consumption	[03]	0.841	Education expenditure	[17]	0.950
Electricity production	[04]	0.695	Educational attainment	[18]	0.972
Energy use	[05]	0.941	Research development	[19]	0.907
Family workers	[06]	0.948	Business extent	[20]	0.869
Employment agriculture	[07]	0.964	Cost of business	[21]	0.862
Employment in services	[08]	0.934	Start-up procedures	[22]	0.913
Labour force advanced	[09]	0.966	Time contract	[23]	0.813
Labour force total	[10]	0.916	Time business	[24]	0.786
Credit financial	[11]	0.913	GDP growth	[25]	0.969
Credit private	[12]	0.971	Clean fuels	[26]	0.888
Insurance	[13]	0.836	Tariff rate	[27]	0.980
Taxes on income	[14]	0.723			

Table 4.7. Total variance of main components of all indicators explained by the PCA

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	8.24	30.54	30.54
2	4.47	16.57	47.11
3	3.33	12.35	59.45
4	3.18	11.77	71.22
5	2.13	7.87	79.10
6	1.48	5.47	84.56
7	1.22	4.50	89.06

Table 4.8. Mean standardized value of sustainable innovation indicators from 2007–2016

Country	Year										Total
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
Belgium	0.676	0.677	0.678	0.675	0.687	0.735	0.695	0.715	0.744	0.746	7.030
Czechia	0.768	0.744	0.786	0.798	0.803	0.838	0.805	0.818	0.813	0.836	8.009
France	0.680	0.672	0.677	0.677	0.677	0.746	0.688	0.694	0.697	0.700	6.907
Germany	0.829	0.795	0.790	0.787	0.800	0.839	0.790	0.818	0.841	0.843	8.132
Greece	0.612	0.608	0.620	0.624	0.628	0.631	0.648	0.671	0.703	0.702	6.446
Italy	0.646	0.631	0.642	0.652	0.674	0.724	0.699	0.709	0.701	0.726	6.805
Netherlands	0.807	0.740	0.754	0.772	0.755	0.734	0.713	0.739	0.724	0.791	7.528
Poland	0.633	0.645	0.700	0.714	0.679	0.727	0.691	0.719	0.708	0.714	6.931
Portugal	0.773	0.761	0.737	0.737	0.737	0.741	0.728	0.729	0.721	0.742	7.406
Romania	0.459	0.465	0.548	0.584	0.552	0.564	0.548	0.577	0.548	0.619	5.463
Spain	0.726	0.711	0.730	0.729	0.718	0.749	0.724	0.725	0.725	0.728	7.266
Sweden	0.825	0.799	0.818	0.813	0.802	0.798	0.782	0.785	0.786	0.794	8.003
Ukraine	0.171	0.169	0.170	0.170	0.168	0.327	0.174	0.176	0.175	0.177	1.878
UK	0.686	0.632	0.641	0.696	0.691	0.743	0.682	0.724	0.733	0.754	6.982

Table 4.9. Mean standardized value of entrepreneurial ecosystem indicators from 2007–2016

Country	Year										Total
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
Belgium	0.564	0.540	0.499	0.550	0.535	0.495	0.528	0.550	0.545	0.549	5.354
Czechia	0.463	0.434	0.345	0.441	0.433	0.482	0.424	0.462	0.468	0.455	4.406
France	0.609	0.587	0.546	0.606	0.603	0.576	0.605	0.609	0.604	0.613	5.958
Germany	0.618	0.591	0.498	0.628	0.615	0.613	0.588	0.591	0.583	0.595	5.921
Greece	0.362	0.348	0.267	0.295	0.272	0.176	0.368	0.443	0.435	0.435	3.402
Italy	0.467	0.458	0.370	0.475	0.459	0.378	0.438	0.469	0.477	0.484	4.475
Netherlands	0.571	0.540	0.476	0.551	0.549	0.543	0.561	0.584	0.572	0.578	5.525
Poland	0.453	0.439	0.485	0.459	0.458	0.477	0.453	0.477	0.470	0.470	4.641
Portugal	0.516	0.508	0.459	0.519	0.487	0.381	0.492	0.508	0.507	0.511	4.889
Romania	0.567	0.567	0.437	0.500	0.533	0.560	0.579	0.568	0.558	0.564	5.433
Spain	0.483	0.465	0.397	0.455	0.479	0.403	0.476	0.540	0.545	0.543	4.787
Sweden	0.654	0.635	0.539	0.681	0.643	0.618	0.666	0.684	0.696	0.687	6.503
Ukraine	0.477	0.454	0.211	0.480	0.480	0.422	0.465	0.362	0.382	0.489	4.223
UK	0.665	0.639	0.575	0.651	0.639	0.635	0.663	0.672	0.659	0.659	6.457

Table 4.10. Correlation tests between entrepreneurial ecosystem key factors and sustainable innovations based on countries (N=14)

Factor	Test	Sustainable Innovations										
		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Mean
Policy	R	0.43	0.41	0.31	0.34	0.41	0.36	0.27	0.20	0.14	0.18	0.30
	Sig.	0.13	0.14	0.28	0.24	0.15	0.21	0.35	0.49	0.64	0.54	0.32
	N	14	14	14	14	14	14	14	14	14	14	14
Finance	R	0.25	0.12	0.75	0.27	0.06	0.11	0.17	0.87	0.87	0.40	0.39
	Sig.	0.39	0.69	0.00	0.36	0.85	0.71	0.57	0.00	0.00	0.15	0.37
	N	14	14	14	14	14	14	14	14	14	14	14
Culture	R	-0.35	-0.31	-0.20	-0.16	-0.22	-0.34	-0.19	-0.17	-0.18	-0.11	-0.22
	Sig.	0.22	0.28	0.49	0.59	0.46	0.24	0.51	0.56	0.53	0.71	0.46
	N	14	14	14	14	14	14	14	14	14	14	14
Supports	R	0.38	0.33	0.29	0.31	0.35	0.39	0.29	0.38	0.30	0.32	0.33
	Sig.	0.19	0.25	0.31	0.29	0.22	0.17	0.32	0.18	0.30	0.27	0.25
	N	14	14	14	14	14	14	14	14	14	14	14
Human Capital	R	-0.25	-0.29	-0.30	-0.26	-0.30	-0.19	-0.31	-0.23	-0.28	-0.29	-0.27
	Sig.	0.38	0.32	0.29	0.37	0.30	0.53	0.28	0.42	0.34	0.32	0.36
	N	14	14	14	14	14	14	14	14	14	14	14

Table 4.11. Proximity matrix for the 14 countries (case studies) based on the squared Euclidean distance in an HCA

Country	Belgium	Czechia	France	Germany	Greece	Italy	Netherlands	Poland	Portugal	Romania	Spain	Sweden	Ukraine	UK
Belgium	0.00	2.65	0.85	2.06	4.58	1.83	1.29	3.40	1.79	3.99	2.27	1.38	5.28	2.23
Czechia	2.65	0.00	2.55	2.27	4.77	3.36	1.68	1.52	3.59	4.01	3.35	2.40	4.92	4.42
France	0.85	2.55	0.00	1.07	4.79	1.99	1.22	3.41	2.07	3.88	2.11	1.28	4.47	1.40
Germany	2.06	2.27	1.07	0.00	5.42	2.23	1.83	3.06	2.75	4.87	2.02	1.92	5.37	1.86
Greece	4.58	4.77	4.79	5.42	0.00	2.50	4.40	5.40	3.08	6.12	3.56	6.42	5.08	6.55
Italy	1.83	3.36	1.99	2.23	2.50	0.00	2.27	3.33	1.52	4.86	1.52	3.71	4.63	3.01
Netherlands	1.29	1.68	1.22	1.83	4.40	2.27	0.00	3.32	1.73	4.30	2.24	1.24	4.62	2.08
Poland	3.40	1.52	3.41	3.06	5.40	3.33	3.32	0.00	4.10	2.49	3.30	4.02	5.00	4.67
Portugal	1.79	3.59	2.07	2.75	3.08	1.52	1.73	4.10	0.00	4.31	1.39	2.73	4.31	2.96
Romania	3.99	4.01	3.88	4.87	6.12	4.86	4.30	2.49	4.31	0.00	5.48	5.22	4.52	5.09
Spain	2.27	3.35	2.11	2.02	3.56	1.52	2.24	3.30	1.39	5.48	0.00	3.30	4.75	2.50
Sweden	1.38	2.40	1.28	1.92	6.42	3.71	1.24	4.02	2.73	5.22	3.30	0.00	6.59	2.69
Ukraine	5.28	4.92	4.47	5.37	5.08	4.63	4.62	5.00	4.31	4.52	4.75	6.59	0.00	5.97
UK	2.23	4.42	1.40	1.86	6.55	3.01	2.08	4.67	2.96	5.09	2.50	2.69	5.97	0.00

CHAPTER FIVE

Conclusion and implications and further research

5.1. Conclusion

Entrepreneurship in the global economy is consumed as novel ideas to create progress from the production to the commercialization stage. Dynamic nature of the economies recipients of entrepreneurship due to the way stakeholders advocate for innovation (Brown et al. 2019, Ratten 2020). It is also essential to explore how an entrepreneur can influence sustainable innovations that remain under-researched during grand challenges that we face. By focusing on finding ways for overcoming the unsustainable challenges in the business and entrepreneurial systems, the present dissertation attempted to investigate the role of entrepreneurship to improve sustainable innovations in local cultural destinations and small-and-medium-sized companies of a non-western country (Iran) in addition to in the several national-level countries of the EU. Entrepreneurial activities were investigated through three research papers in the same line.

Hence, in the first paper, the feasibility and usefulness of specific local food business initiatives for improving virtuous cycles and tourist attractions of heritage places were evaluated for the objective of this thesis. For this purpose, the potentials of two Persian gardens in Isfahan and Kashan cities (Iran) were determined to enhance tourists' attractiveness by developing local food businesses (within 2017). Several procedures such as interviews, questionnaires, observation, and empirical in situ operations were used. According to fieldwork, the evolution of food business and marketing systems around the mentioned gardens has been defined point-by-point. The results of the first paper indicated that the local food of each region is an essential portion of business systems and entrepreneurial ecosystems in their around environment.

Furthermore, the endogen potentials of architecture in each garden can create a managerial implementation at microeconomic levels. Integrated viewpoint to create a cycle of sustainable entrepreneurship, for instance, food marketing, is critical to the successful implementation of the food services in cultural and historical heritages due to the numerous issues and stakeholders involved in

developing local businesses. The participation by the local government and equally by individual dozens, community groups, institutions, agencies, businesses, governmental partners, and other stakeholders should be comprised.

In the second paper, the main socio-economic factors of the given area (Torqabeh city, Iran), relating to the family businesses in 857 SMEs (within 2016), can be categorized as precursors of familiness, which seems to be mediated to exhibit the unique clan culture of the study area. Hence, the first paper hypothesized that food heritage might indicate a positive linear relationship to generate a chain of recourses in family businesses, affecting clan culture. After that, familiness can be considered a mediator variable, enhancing the relationships between food heritage and clan culture. Based on the results, the mediator role of familiness in enhancing the relations between food heritage and clan culture was confirmed overall in addition to positive and direct relationships. Also, results revealed that familiness is a strong mediator when considering the translation of local food heritage into organizational clan culture, where the entrepreneurial structure of the region makes family businesses in proper places to promote organizational culture and education.

In the third paper, we analyzed the panel data correlations between five elements of the entrepreneurial ecosystem model and the entrepreneurial sustainable innovations for a sample of 14 European countries during 2007-2016. In this regard, some hypotheses were developed. Based on the quantitative analysis, we understand that sustainable innovations can positively be correlated with policy, finance, and support in terms of infrastructural and administrative support, whereas culture and human capital do not significantly influence sustainable innovations. The results highlighted that the entrepreneurial ecosystem impacts sustainable innovations over time because it can be considered a complex system with dynamic nature. The country-level capability of innovations is measured and showed that Ukraine, Romania, Poland, and the Czech Republic demonstrate a low-level capability, while Germany, the UK, Sweden, Netherlands, France, and Belgium show high capability.

We think that the aforementioned findings make significant additions to the literature, covering the grand challenges gap. From the first paper to the third one, some findings have been observed over the effective factors to promoting the entrepreneurship structures and ecosystems from local to national levels. The first paper results indicated that local business in each region could be an essential portion of business systems and entrepreneurial ecosystems in their around environment. The second paper results revealed that familiness is a strong variable in the entrepreneurial structure of each region, which makes family businesses in proper places to promote organizational culture and ecosystem. Ultimately, the third paper's results highlighted that the entrepreneurial ecosystem on the country-level scale could represent different impacts on sustainable innovations over time because it can be considered a complex system with dynamic nature. In this regard, the policy, finance, and support factors, involving government and leadership aspects, financial capital, entrepreneurial infrastructure, and support professions can promote entrepreneurial sustainable innovations in each country.

5.2. Implications

5.2.1. Implications for theory

The present thesis contributes to a better understanding of entrepreneurship in several ways concerning the described research framework and analysis in three published papers. Overall, a concluded examination of the study will help researchers better understand the relationships between geography, personality, and the entrepreneurial phenomenon, contributing to more effective policy solutions to encourage sustainable and resilient entrepreneurship-led economic growth. Accordingly, a list of appropriate implications is interpreted by addressing the aforementioned papers.

In the first paper, the results showed how food entrepreneurship and the advanced knowledge of indigenous entrepreneurship could help entrepreneurs improve virtuous cycles and tourist attractions of heritage places. Hence, this research's theoretical implication was to associate the theoretical background of the relationships between food heritage, cultural tourism, and indigenous

entrepreneurial ecosystem, which can improve the local food marketing and management in the sample area (Persian gardens). Some scholars such as Kivela and Crotts (2006) and Butler and Hinch (2007) have focused on tourism entrepreneurs by explaining the role of local food businesses and indigenous culture and heritage. In general, results of the first paper attempted to answer the calls into the recent research of scholars (e.g., Mynttinen et al., 2015; Cuevas et al., 2017; Raji et al., 2017; Roy et al., 2017; Sthapit, 2017; Vecco, 2010; Del-Barrio et al., 2012; Lee, 2015; Abbas et al., 2016), concerning the food entrepreneurship and cultural heritage in Western countries. Hence, this paper contributed to the research stream by exploring the mentioned entrepreneurial structure in non-Western countries by improving indigenous entrepreneurship.

In the second paper, the research model indicated that the food heritage could trigger a chain of recourses in family businesses, affecting clan culture. This research's theoretical implication was to fill the literature gap regarding familiness, which is a missing link between food business and clan culture, particularly on the local and regional scales. Our results indicated the significant role of food heritage on familiness and clan culture and highlighted the pivotal role of familiness in building robustly competitive food firms based. Several scholars (e.g., Frank et al., 2010; Habbershon et al., 2010; Zellweger et al., 2010) have investigated the advanced concept of familiness theoretically in their works. Besides, the results of the second paper responded to the calls into the recent research of scholars (e.g., Frank et al., 2010; Zellweger et al., 2010; Basco and Voordeckers, 2015; Basco et al., 2018; Sanchez-Marın et al., 2016) that there is a relationship between familiness on clan culture. Hence, this paper contributed to the research stream of RBV theory by discovering the simultaneous relationships between internal factors (familiness and culture) and external elements (food heritage).

Finally, in the third paper, the research model showed how five key factors of the entrepreneurial ecosystem could influence on entrepreneurial sustainable innovations. This paper contributed to the literature of entrepreneurial ecosystems by reviewing the key factors of entrepreneurial ecosystems and providing an

expanded view of its effects for further research. Moreover, from a broader perspective, the paper associated various theoretical backgrounds by using accessible data sets and indicators, improving the concept of entrepreneurial and innovative ecosystems. Theoretically, the paper produced a sustainable mechanism of innovation to boost national economic performance, where some scholars have focused on the entrepreneurial ecosystem concept (e.g., Stam 2013; Szerb et al. 2019; Al-Abri et al. 2018; Walter and Zondo 2016; Rampersad 2016; Stam 2018; Spigel 2019). Furthermore, the paper suggested an empirical use of macro-level databases in entrepreneurship analysis. The results of the third paper responded to the calls into the recent research of scholars (e.g., Al-Abri et al. 2018; Walter and Zondo 2016; Rampersad 2016; Stam 2018) that there is a link between entrepreneurial ecosystems (EE) and entrepreneurial sustainable innovations (ESI). Hence, this paper contributed to the research stream of EE and ESI by trying to investigate the systemic elements using country-level databases.

5.2.2. Implications for practice

Owing to our published results, the present dissertation provides different recommendations for policymakers and entrepreneurs in the public institutions for addressing sustainability challenges and conditions with the potential of entrepreneurship leveraged by the expected targets. On the other side, the published findings also help entrepreneurs to view themselves as co-builders of complex and resilient eco-socio-technical systems. In detail, the practical implications of the first paper were to identify the influences of local food awareness in promoting the cultural tourism destitutions from vicious circles to virtuous cycles, applicable for a range of policymakers, urban planners, and cultural affairs. The practical implications of the second paper were several allegations for several types of stakeholders. In this regard, family business managers could understand the effective role of food heritage in their marketing and investing processes. Decision-makers could understand a novel branch of tourism attraction based on food heritage and the cultural potential of family entrepreneurship. The business managers could plan new ventures for their SMEs based on the food heritage tradition and tourism entrepreneurship with a prospective new business model.

Furthermore, the local people could be empowered by enhancing the skills that originated from their cultural roots and protecting their environmental and cultural traditions due to support their stable source of economic incomes in the future. Moreover, addressing the third paper, the practical implications were a range of suggestions for policymakers to develop all the aspects of EE to facilitate the ESIs, encouraging the policymakers to pay more attention to strengthening EE's dimensions to obtain ESIs targets. In this regard, we recommended that policymakers significantly appraise their performance levels to identify the organizations' innovation levels by enhancing the EE in respected subjects. Therefore, they could facilitate the individualities of an EE to promote sustainable innovation levels in organizations by using telecommunications, technical experts and advisors, private equity, venture capital funds, and venture-friendly legislations. These mentioned suggestions could strengthen the overall support, financial, and policy elements of EE employees by implementing sustainable innovations and creative manners and providing appropriate feedback. Overall, our findings have extended the previous research of scholars such as (Vedula and Fitza 2019; Szerb et al. 2018; Cavallo et al., 2018; Isenberg, 2010) to supports the current field to better contact with sustainable innovations.

5.3. Further Research

The present thesis provides a valuables grasp to fill the gap of grand challenges and entrepreneurship by doing business in different ways (papers) such as education (entrepreneurial ecosystem: EE). Entrepreneurship and entrepreneurial learning are the ways to solve grand challenges. More entrepreneurial education can be a boost inside the global network of an ecosystem. EEs are networks, which can afford the grand challenges innovatively and sustainably.

Further research can also support this way through doing business with the innovative aspect of digital entrepreneurship, i.e., the digital entrepreneurial ecosystem (DEE). The digital ecosystem and the entrepreneurial ecosystem were integrated to create a new concept of a digital entrepreneurial ecosystem (DEE) to study better the role of digital technologies in the frame of entrepreneurial activities and understand the interactions of agents and users. Hence, we encourage further studies by demonstrating a fine-grained evaluation of DEE

effects on the businesses and industries, e.g., at the country level. From the sustainability perspective, digital technology can address sustainability and novel technologies in the development of organizational and national economics.

On the other sides, in a globalized sphere, the business should be defined as entrepreneurship, applying information and communication technology to create digitalization and innovation in cyberspace (e.g., Jelonek 2015, Chung et al. 2016). Thus, we can recommend investigating the effects of an integrated concept, namely globalization, on local, regional, and national economics. For instance, through businesses and industries, globalization can be investigated to define their shifts in technological and sustainable innovations.

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