# Benchmarking knowledge potentials of clusters: a comparative study in the tourism industry

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**Abstract:** Clusters have been identified as influential mechanisms to drive knowledge-based innovations. Despite this acknowledgement, there have not been many attempts to evaluate their knowledge potentials. This is a pioneering study that benchmarks the knowledge potential of two tourism clusters from Finland and Turkey using the emerald model. The study benchmarks the clusters in terms of their educational attractiveness, talent attractiveness, R&D and innovation attractiveness, ownership attractiveness, environmental attractiveness, cluster attractiveness and knowledge dynamics. As a result, the underlying strengths and weaknesses of the two clusters are evaluated and concrete action plans and policy recommendations are generated for the managers of both clusters.

**Keywords:** clusters; knowledge; emerald model; tourism; benchmarking; Finland; Turkey; Jyväskylä; Sarıyer.

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## 1 Introduction

Clusters are geographic concentrations of interconnected firms and institutions in a particular field, linked by commonalities and complementarities in providing a related group of products or services (Porter, 1998; Sölvell et al., 2008). Members of a cluster include competitors, suppliers, distributors, collaborators from related industries, buyers, regional development agencies, universities, colleges, laboratories, research institutes, trade associations, cluster organisations, banks, venture capitalists, private equity firms, angel investors and media (Sölvell, 2008). Clusters are classified according to the types of products and services they produce (e.g., automotive, financial services, tourism), according to the nature of their locational dynamics (e.g., traded, local, resource-dependent), according to their stages of development (e.g., emerging vs. mature clusters), according to their locations (e.g., clusters in advanced economies vs. clusters in developing economies) and according to their knowledge-base (Morosini, 2004; Sölvell et al., 2008).

Clusters provide three types of benefits to the firms within them (Sölvell et al., 2008). First of all, firms in a cluster achieve higher levels of efficiency as they gain access to more specialised assets and suppliers within close proximity in shorter reaction times. Secondly, higher levels of innovation can be achieved by close interactions of firms, users, suppliers, collaborators from related industries and research institutes. Face-to-face interactions, labour mobility and informal social networks in the cluster create relationships based on trust and stimulate creation of new ideas through knowledge transfer and spillovers. Thirdly, thanks to creation of new ideas, the rate of new business formation is higher in clusters. As a result, presence of strong clusters has positive impacts on new business formation, start-up employment and survival, employment growth, growth of wages and patenting rates (Porter, 2003; Delgado et al., 2010, 2012). There have been multiple cluster initiatives around the world designed to create these benefits for local economies. The European Union has developed cluster-based strategies as a viable solution to drive growth and employment. On 22 October 2008 the European Cluster Policy Group was established by a decision of the European Commission to strengthen the quality of cluster programs in Europe. Performances of clusters and cluster initiatives are being benchmarked to find out best-in-class practices in both developed and developing economies (Sölvell et al., 2003; Ketels et al., 2006).

There are also contradictory views on benefits of clusters. McDonald et al. (2007) argue that clustering leads to employment growth in manufacturing industries but not necessarily to international export success. Furthermore, market positioning of firms is found to be a more important criterion in driving firm competitiveness than purely spatial

proximity and co-location (Hendry and Brown, 2006; Eriksson and Lindgren, 2009). While innovative performance improves when innovative firms co-locate with other innovative firms in the same industry, co-location of non-innovative firms will produce negative externalities (Beaudry and Breschi, 2003; Folta et al., 2006). Clustering seems to benefit more those firms with higher knowledge stocks and younger firms with higher uncertainty (McCann and Folta, 2011). Moreover, it is argued that clustering may not be equally beneficial to all types of firms, so a positive relationship between clustering and innovation and entrepreneurship is difficult to generalise (Rocha, 2004). Hence, there is yet room for research to understand differences in performance between different clusters as well as between firms in the cluster and firms outside the cluster (Malmberg and Maskell, 2002).

This research adopts the knowledge-based view and assumes that knowledge stocks and absorptive capacities of firms in clusters play key roles in driving innovations and new business formation (see Giuliani, 2005; Gilbert et al., 2008; McCann and Folta, 2011; Huber, 2012; Jankowska and Pietrzykowski, 2013). Therefore the aim of this research is to develop and operationalise a suitable framework to assess the knowledge potentials of clusters.

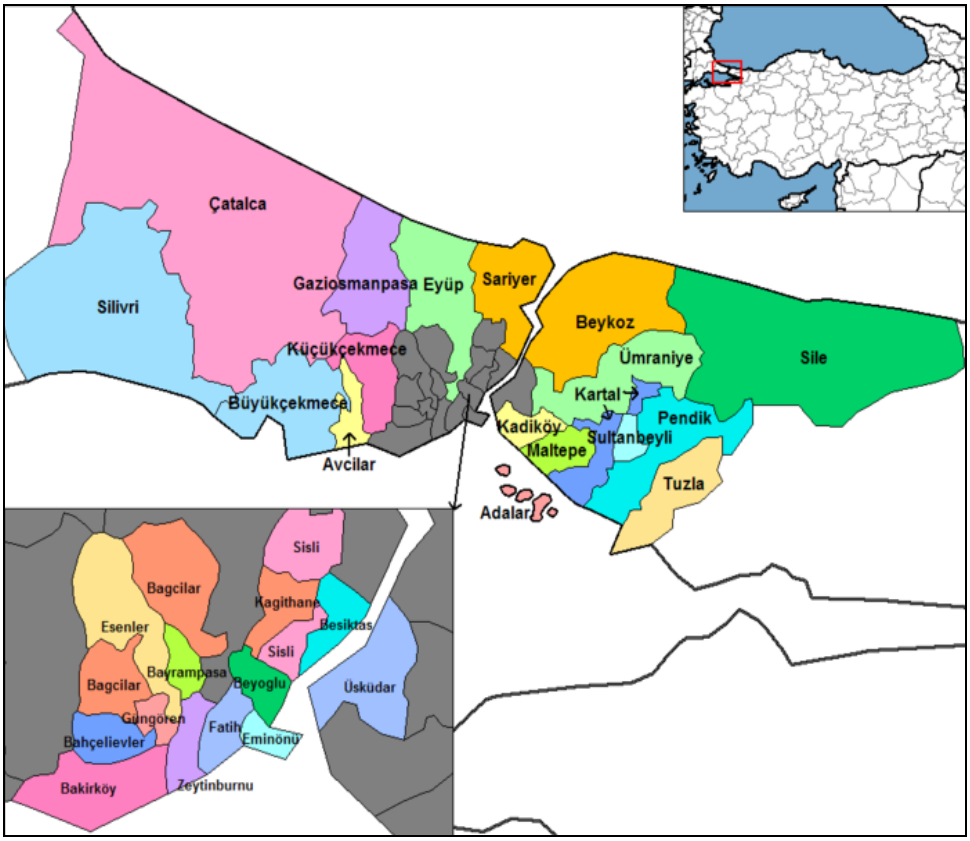
To achieve this aim the emerald model by Sasson and Reve (2012) was applied to measure, compare and contrast knowledge potentials of two tourism clusters from Turkey and Finland. As such, this is a novel approach in the comparison of two clusters from two different countries. The first cluster is located in Sarıyer, a municipality of the city of İstanbul in Turkey. Turkey is the sixth country in the world in terms of international tourist arrivals (World Tourism Organization, 2012a). Tourism revenues are about 27 billion USD representing 2% of Turkey's gross domestic product (GDP). The industry is acknowledged to be one of the pillars in Turkey's 2023 growth strategy targeting to receive 50 million visitors per year and 50 billion USD tourism revenues by 2023 (T.R. Ministry of Culture and Tourism, 2007). Despite these encouraging figures, Turkey ranks 46th in the world for its competitiveness in tourism and travel (Blanke and Chiesa, 2013). According to Turkish Statistical Institute (2013) the major reasons for visiting Turkey are identified as sightseeing, entertainment, sports and culture (61.8% of all foreign visitors in 2012), followed by people accompanying the visitors (16.4%) and visit of friends and family (8.4%).

İstanbul with ca. 9.8 million foreign visitors was the second city in Turkey (following Antalya) and the tenth in the world in 2011 in terms of international arrivals (Euromonitor International, 2013). Moreover it is identified as the most competitive city in Turkey according to the city competitiveness index (Bulu, 2011). The city's index point, calculated with 42 variables in four dimensions (human capital and life quality, branding skill and innovation, trade skill and production potential and accessibility), is much higher than any other city in the country.

The district of Sarıyer is located on the European side of İstanbul (see Figure 1). It is spread over an area of 151 $km^2$ comprising of both urban and rural areas with a population estimated to be close to 400,000. In the environmental layout plan of İstanbul, Sarıyer was considered as not suitable for industrial development due to the zoning law (İstanbul Büyük Şehir Belediyesi İmar ve Şehircilik Daire Başkanlığı Şehir Planlama Müdürlüğü, 2009). Known to be one of the nature-based tourism areas in the city, Sarıyer has advantages in the tourism industry with its proximity to İstanbul's city centre, its long coastline along the Bosphorus, its forests and its renowned fish restaurants. However, the

number of tourists coming solely to Sarıyer cannot be identified as all the tourism statistics in the country are held for cities rather than districts.

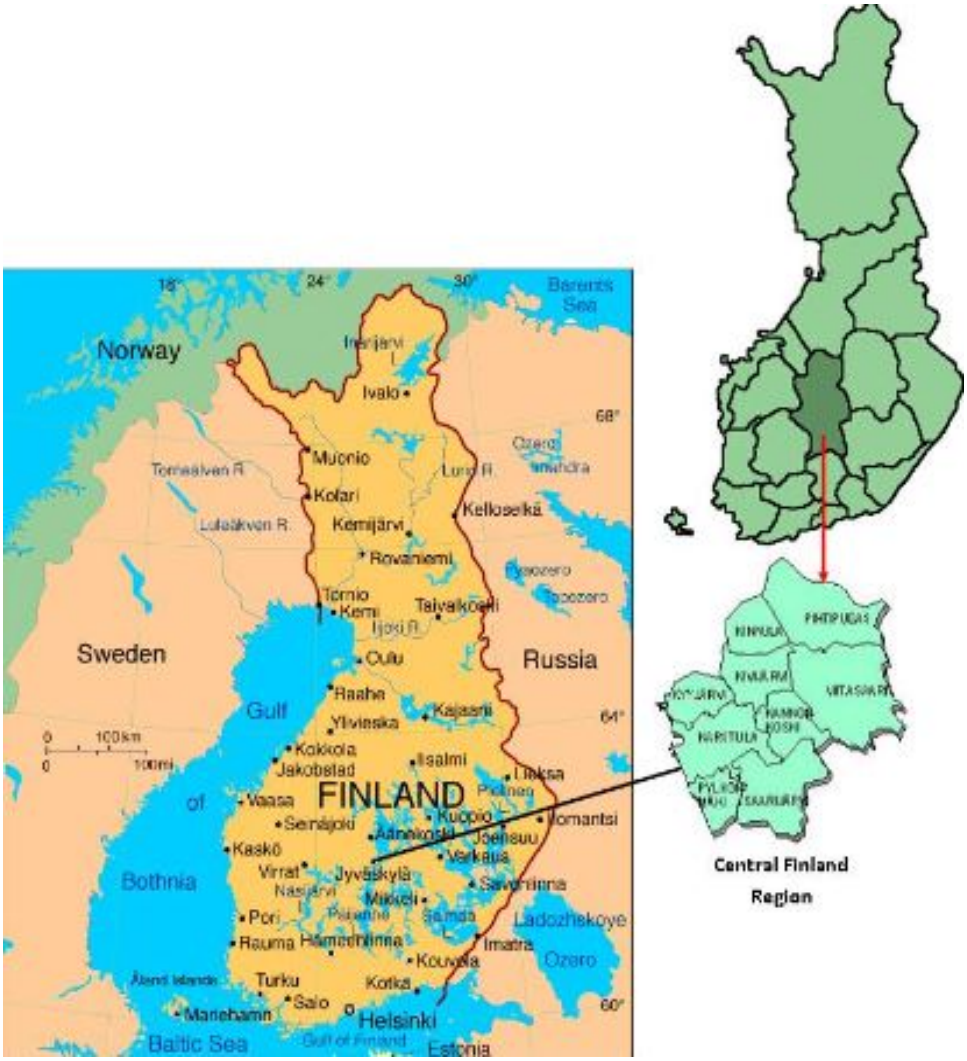
**Figure 1** Map of Sarıyer in Istanbul and Turkey (see online version for colours)




*Source:* Adapted from İstanbul City Guide (2013)

The second cluster is located in the region of Central Finland (see Figure 2). Finland received 7.3 million foreign visitors in 2011 and generated 5.6 billion USD tourism revenues representing 2% of its GDP (World Tourism Organization, 2012a). The country ranks among the first 20 countries in the world for its competitiveness in tourism and travel (Blanke and Chiesa, 2013). The region of Central Finland covers 23 municipalities with a total population of 275,000 and Jyväskylä is the largest city in the region (the seventh largest city in Finland) with a population of 132,000 people (City of Jyväskylä, 2013). Jyväskylä is not a destination selected only by nature lovers for relaxation in lakeside cottages. It has an increasing share in congress tourism (hosted at Paviljonki congress and trade fair centre). It also hosts the Finland leg of the World Championship Rally and a museum of world famous architect Alvar Aalto. On average ca. 500,000 tourists visit Jyväskylä annually and 10% of these visitors are international. Regarding international tourist arrivals, leading countries are Russia and Germany each with ca. 11,000 tourists and Estonia with ca. 7,000 tourists.

**Figure 2** Map of Jyväskylä in Finland (see online version for colours)




*Source:* From City of Jyväskylä (2013)

The rest of the paper[1] is organised as follows. Following this introduction, the theoretical framework and methodology are described in Sections 2 and 3 respectively. Then the results are shared in Section 4 and finally the paper ends with a discussion in Section 5.

## 2 Theoretical framework

The aim of this research is to evaluate the knowledge potentials of the Sarıyer and Jyväskylä tourism clusters. There is a vast amount of literature regarding the creation of knowledge within clusters. Despite globalisation trends with extremely low transaction costs of data and rapid advances in information and communication technology enabling

the emergence of global production networks and trends in outsourcing, empirical research shows that geographical proximity has become a vital factor for progress in the creation of knowledge (Arbonies and Moso, 2002; Evers et al., 2010). With the growth of knowledge societies, the importance of regional, local and cultural aspects is even more emphasised and the relevance of location tends to increase rather than decrease (Sölvell et al., 2008).

The 'learning-centred theory of clustering' aims to explain why firms can gain competitive advantage by being located in a cluster and argue that the 'local buzz', consisting of information flows, gossip and news, encourages interactive learning and problem solving within the cluster (Bathelt et al., 2004). The knowledge benefits of the cluster are in two ways. On the one hand, the firm gets informed about the features, production factors, costs and quality of its competitors' products and on the other hand, the new ideas generated by suppliers, customers or service providers are combined with the firm's own suggestions and become the source of further ideas (ibid). Knowledge spillovers occur in the cluster intentionally or unintentionally through monitoring and imitation of competitors, formation of spin-offs from existing organisations, or mobility of qualified labour between firms (Malmberg and Power, 2003; Tödtling et al., 2009; Jankowska and Pietrzykowski, 2013).

Measuring knowledge potential and knowledge-based development is complex and challenging as knowledge cannot be always expressed in monetary value (Carrillo and Batra, 2012). In order to evaluate the knowledge potentials of clusters, existing performance assessment models were reviewed in terms of their potential for operationalisation.

The diamond model (Porter, 1990) has been used widely in studying competitive advantage of countries and regions. In this model, a region has competitive advantage depending on its factor conditions, demand conditions, existence of strong related and supporting industries in the region and firm strategy, structure and rivalry. However, it is not perfectly suitable for the purpose of this study for two reasons. The first reason is that the unit of analysis in this study is the cluster which is one of the four determinants in the model. Secondly, some of the variables in the model (especially regarding demand conditions and firm strategy, structure and rivalry) are not easy to operationalise.

According to the competitiveness framework by the World Economic Forum a region's competitiveness determines productivity levels for firms, which operate in the region and this in turn affects the region's growth (Sala-i-Martin et al., 2013). In this framework competitiveness is measured in 12 pillars including institutions, infrastructure, macroeconomic environment, health and primary education, higher education and training, goods market efficiency, labour market efficiency, financial market development, technological readiness, market size, business sophistication and innovation (ibid.). The pillars in this framework are used to measure a country's level of competitiveness, called the global competitiveness index. This is a very comprehensive framework for understanding competitiveness at a regional level, but it is too general and difficult to implement at cluster level.

A more focused assessment tool is the tourism and travel competitiveness index, conducted to compare countries on the extent to which they possess the conditions necessary to support a strong tourism industry (Blanke et al., 2013). The index is based on 14 pillars under categories of the regulatory framework, the business environment and infrastructure and the human, cultural and natural resources. Table 1 indicates both scores and rankings of Turkey and Finland in these pillars. Although the index is focusing on the

tourism industry, it is still quite general and difficult to implement for measuring knowledge potential at cluster level.

**Table 1** Scores and ranks of Turkey and Finland in the travel and tourism competitiveness index

| *Pillars* | *Turkey's score* | *Turkey's rank* | *Finland's score* | *Finland's rank* |
|---|---|---|---|---|
| Policy rules and regulations | 4.90 | 46 | 5.40 | 7 |
| Environmental sustainability | 4.30 | 50 | 5.90 | 3 |
| Safety and security | 4.60 | 56 | 6.50 | 1 |
| Health and hygiene | 4.90 | 64 | 6.30 | 15 |
| Prioritisation of travel and tourism | 4.50 | 63 | 4.60 | 53 |
| Air transport infrastructure | 4.50 | 29 | 5.30 | 11 |
| Ground transport infrastructure | 4.10 | 52 | 5.20 | 20 |
| Tourism infrastructure | 4.80 | 45 | 4.80 | 44 |
| ICT infrastructure | 3.10 | 71 | 5.40 | 13 |
| Price competitiveness in the industry | 4.00 | 112 | 3.80 | 118 |
| Human resources | 4.90 | 68 | 5.80 | 4 |
| Affinity for travel and tourism | 5.00 | 35 | 4.70 | 64 |
| Natural resources | 3.40 | 78 | 3.90 | 54 |
| Cultural resources | 5.20 | 19 | 4.30 | 26 |
| Overall | 4.44 | 46 | 5.10 | 17 |

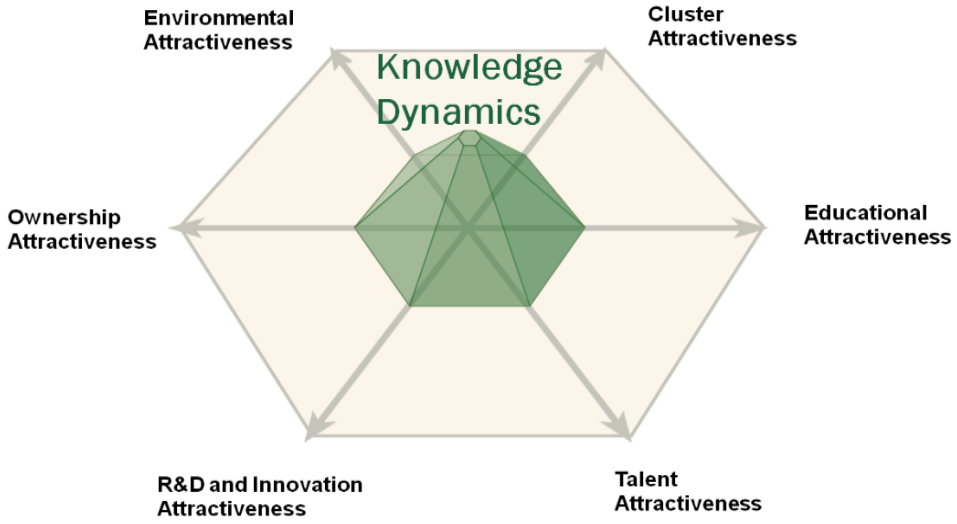
*Source:* Adapted from Blanke and Chiesa (2013)

A new conceptual model was developed for the tourism industry to measure its competitiveness by using comparative advantages like climate, sceneries and wild life along with competitive advantages such as tourism infrastructure, the quality of management, workers' skills and government policies (Fernando and Long, 2012). This model argues that development of tourism industry depends on factors like strategy, plans, support given by public sector, investment in infrastructure and joint marketing efforts (ibid). Despite the comprehensiveness of the model and its tailored approach to tourism clusters, it is difficult to operationalise as the framework is still at the conceptual stage.

Following the review of the above models, the emerald model was adopted in assessing the knowledge potentials of the two clusters (Sasson and Reve, 2012). The model which visualises competitiveness as industrial attractiveness was originally developed to assess the attractiveness of a location as a global knowledge hub. Also called the global knowledge hub model, the model identifies six dimensions of attractiveness and one moderator. The dimensions are educational attractiveness, talent attractiveness, R&D and innovation attractiveness, ownership attractiveness, environmental attractiveness, cluster attractiveness and the moderating element is knowledge dynamics (see Figure 3). Accordingly, locations differ in their abilities to attract advanced educational institutions, talented employees, academics, R&D projects,

competent and willing owners and investors, creation and implementation of environmental solutions and formation of a diverse and sizeable cluster of related firms (ibid.). The effects of these dimensions are moderated by the degree of flow of knowledge in the cluster.

**Figure 3** The emerald model (see online version for colours)




*Source:* Adapted from Sasson and Reve (2012)

Education is an essential element for developing knowledge in the cluster. Educational attractiveness examines the popularity of the cluster's field of education and existence of high quality educational institutions in the cluster, attracting high number of students from the region and abroad.

The second dimension is talent attractiveness which assesses the ability to attract talent to the cluster. Talent refers to the existence of qualified human resources who are key knowledge assets to come up with new ideas for new business development in the cluster.

R&D and innovation attractiveness is the third dimension. It assesses the existence of R&D personnel in the cluster as well as R&D expenditures and patents for innovations. R&D and innovation are positively correlated with knowledge creation.

Ownership attractiveness, the fourth dimension, addresses the cluster's ability to attract foreign ownership as well as financing (e.g., venture capital) for start-ups. As the availability of finances may be a key determinant for enabling new business development, one can assume that this dimension evaluates the cluster's potential to turn knowledge into business activities.

The fifth dimension is environmental attractiveness which evaluates the cluster's attitude for producing its products and services with environment-friendly operations. Sensitivity for environmental concerns may lead to knowledge in the development of more sustainable products and services.

Cluster attractiveness, the sixth dimension, measures the level of agglomeration and the level of specialisation in the cluster. A larger cluster with a higher degree of specialisation is assumed to have more potential for generating industry specific knowledge.

Finally, knowledge dynamics is the moderator in the model. It is the degree at which knowledge flows efficiently in the cluster resulting in dynamic interaction and relationships between related firms and institutions and as a result leading to higher levels of knowledge-based innovations.

By adopting this theoretical framework this research deviates from most of earlier research on tourism clusters (see Flowers and Easterling, 2006; Jackson and Murphy, 2006; Bulu and Eraslan, 2007; Shakya, 2009).

## 3 Methodology

The methodology used in this study is cluster benchmarking which is a goal-oriented method that assesses how the cluster is placed and performs in relation to another cluster. In order to assess the underlying strengths and weaknesses of these clusters in two different countries, a novel methodology was used by adapting the dimensions of the emerald model.

In this study, tourism was selected as it is considered to be one of the fastest growing industries worldwide and at the same time a major source of value creation and employment. The industry has experienced continued expansion over the past six decades and the number of international tourist arrivals has grown from 277 million in 1980 to 528 million in 1995 and to 983 million in 2011 (World Tourism Organization, 2012b). The industry had USD 2.1 trillion direct contribution and about USD 6.6 trillion indirect contribution to the worldwide GDP in 2012 (World Travel and Tourism Council, 2013). In 2012 it generated around 101 million direct jobs (3.4% of total world employment) and 261.4 million indirect jobs (ca. 9.0% of all jobs in the world) (Turner et al., 2013).

In the study, a tourism cluster in Sarıyer, a municipality of İstanbul in Turkey was benchmarked against a tourism cluster in Jyväskylä, located in the region of Central Finland. The clusters were selected as they are important employers in the regions of the researchers of this paper. It was a deliberate decision to select a municipality of İstanbul to achieve comparability at least in terms of cluster size. The cluster in the city of İstanbul would be too large to compare with that of Jyväskylä. In doing that, one should be aware that thanks to close proximity, the cluster in Sarıyer could benefit from spillover effects from the cluster in İstanbul, the tenth biggest city in the world regarding international tourist arrivals in 2011 (Euromonitor International, 2013) and the most competitive city in Turkey (Bulu, 2011).

One benefit can be that tourists visiting İstanbul may stay in Sarıyer or decide to visit Sarıyer for a day. Another benefit can be through collaboration and competition between clusters in Sarıyer and other municipalities of İstanbul. Despite these possible spillover effects, the benchmarking of two clusters through the application of this framework is expected to provide learning opportunities for both clusters.

The variables in the study were educational attractiveness, talent attractiveness, R&D and innovation attractiveness, ownership attractiveness, environmental attractiveness, cluster attractiveness and knowledge dynamics. A variety of measures were used in measuring these variables (see Table 2).

**Table 2** Measures for the variables and sources of data

| *Independent variables* | *Measures* | *Data sources* |
|---|---|---|
| Educational attractiveness | Annual number of students accepted to university degree programs in tourism related fields, ratio of students studying tourism to all students (%), number of bachelor, master and doctoral graduates per year and number of graduates from vocational programs in tourism related fields per year | University websites, universities in Sarıyer, and Statistics Finland |
| Talent attractiveness | Purchasing power parity adjusted average wage per employee in the clusters and index of average wage per employee in the cluster versus average wage per employee in the country | HAY Group salary survey 2012, Statistics Finland and interviews. |
| R&D and innovation attractiveness | Ratio of annual R&D spending to revenues (%), annual number of patent applications per firm, number of researchers in the cluster, ratio of people with advanced degrees, amount of formal trainings given to employees (man hour per year) and number of improvement projects per year per firm | OECD, UNWTO, Turkish Statistical Institute, Statistics Finland and interviews. |
| Ownership attractiveness | Ratio of foreign direct investment (FDI) stock in the cluster to total investment stock (%) and ratio of venture capital stock in the cluster to investment stock (%) | OECD, UNWTO, Turkish Statistical Institute, Statistics Finland and interviews. |
| Environmental attractiveness | Level of air pollution (particulate matter concentration (PM10) and amount of waste (kg) per person per day | WHO, Turkish Statistical Institute, Ministry of Environment and Urban Planning, IBB, Anıl et al. (2009) Statistics Finland and air quality in Finland |
| Cluster attractiveness | Absolute cluster size (no. of employees), regional agglomeration (location quotient) and cluster size as percentage of regional employment | European Cluster Observatory, Turkish Statistical Institute, Statistics Finland, interviews, firm visits and field research |
| Knowledge dynamics | Degree of cooperation in the cluster, degree of competition in the cluster and employee turnover rate | Interviews |

Data for the study was collected from secondary and primary sources (see Table 2). Main sources of secondary data were databases of Statistics Finland (2013), OECD (http://stats.oecd.org/), European Cluster Observatory (http://www.clusterobservatory.eu/), Turkish Statistical Institute (http://www.turkstat.gov.tr), UNWTO – World Tourism Organisation (http://statistics.unwto.org), HAY Group salary survey 2012 (http://www.haygroup.com), air quality in Finland (http://www.ilmanlaatu.fi/index.php), IBB – İstanbul Büyük Şehir Belediyesi Air Pollution Modelling (http://www.ibb.gov.tr/sites/airqualİstanbul/documents/modeling.htm), Ministry of Environment and Urban Planning Turkey (http://www.csb.gov.tr/turkce/index.php) and WHO – World Health Organisation (http://who.int/whosis). As primary data eight interviews were conducted in Jyväskylä (with managers of three restaurants, one hotel, one congress centre, one ski resort, one pub and one museum) and 22 interviews were conducted in Sarıyer (with managers of 14 restaurants, four touristic shops, two hotels, one beach and one organisation and event centre). The interviews were semi-structured including both closed and open questions. There were a few limitations in accessing cluster-level statistics. In such cases (e.g., talent attractiveness measures), either country-level (Turkey and Finland) or city level (İstanbul) data was used as best estimates to extrapolate for cluster-level data. Triangulation from a variety of sources in each measure contributed to the verification of the results.

To enable an easy comparison, a new methodology was formulated and added to the emerald model where each numerical measure for the selected variables were converted into categorical measures from one to three using minimum, average and maximum values from global statistics as classification criteria. In this classification, level 1 means low degree of attractiveness, level 2 means moderate degree of attractiveness and level 3 means high degree of attractiveness. Each variable in every dimension was given equal weight and categorical measures for the dimensions were calculated as the averages of the categorical measures for the variables under the dimensions.

Moreover, new measures on R&D and innovation attractiveness were also introduced due to the nature of the tourism industry. The industry is not high-tech or R&D intensive and as such it is distinct from other industries as it has to combine a multitude of products and activities from different industries for the satisfaction of the tourists' needs (Aldebert et al., 2008). Therefore, it was inadequate to use only classical measures such as patent numbers or R&D investments to assess the R&D and innovation activities in the tourism industry. A novel approach was to take into consideration not only technological innovations but also non-technological ones (Jacob et al., 2003). Different measures had to be developed in order to evaluate levels of non-technological innovations. The methodology generated by Orfila-Sintes et al. (2005) and Tugores (2012) involves the evaluation of new products or services, changes in technological processes and improvements in existing products and services, as well as the implementation of environmentally innovative measures to reduce waste. These criteria were shown to be closely correlated to the percentage of employees with university degrees, the positive attitude towards training and education and the willingness to participate in improvement projects (ibid.). In line with these views, in this study R&D and innovation attractiveness was assessed by assessing the ratio of R&D spending to revenues, the annual number of patent applications per firm, the number of researchers in the cluster, the ratio of people with advanced degrees, the amount of formal trainings given to employees (man hour per year) and the number of improvement projects per year per firm.

## 4 Results

### *4.1 Educational attractiveness*

There are five universities with campuses in Sarıyer admitting a total of 11,606 students per year. These universities admit altogether 180 students for tourism-related studies, reflecting a popularity index of 1.5%. The total number of students who graduated from this field within the last five years is equal to 383, all with undergraduate degrees in the field as there were not any master or doctorate degrees offered within those years. Boğaziçi University's vocational school of tourism and hotel management was closed within the recent years, but the university still offers some vocational certificate programs in hotel management, travel agency management, catering, hospitality and tourism.

There is a university and a university of applied sciences in Jyväskylä admitting around 4,400 students per year. JAMK University of Applied Sciences offers a bachelor program in tourism and hospitality with intake of 40 students per year (popularity index of 0.9%). The number of graduates in 2011 was 36. There is not any master or doctoral programmes offered in this field. However, the vocational schools in Central Finland offer vocational trainings in tourism and hospitality as well as hotel and restaurant fields. In 2011 there were 52 graduates in tourism and hospitality and 293 graduates in hotel and restaurant fields.

In Sarıyer there are more students and more graduates than in Jyväskylä in bachelor level tourism studies. There are not any master or doctoral degrees offered in both clusters. After scaling each numerical measure from level 1 to level 3 (see Table 3), it can be concluded that Sarıyer cluster is moderately attractive (level 2 in Table 3 and Figure 4) for education while Jyväskylä cluster is not attractive (level 1 Table 3 and in Figure 4).

### *4.2 Talent attractiveness*

The number of people employed in approximately 195 enterprises in Sarıyer tourism cluster is estimated to be around 4,000 excluding a significant amount of non-registered employees. Most of the employees are graduates of secondary schools. According to the HAY Group salary survey, the average wage of those working in the tourism industry is 780 Euros per month, which is 50% (index of 0.5) of the aggregate average wage level in Turkey. There is an important limitation in that the amount of tips paid by customers in most of restaurants and hotels in Turkey is not available thus not included in the calculations. Despite that, from a wage perspective, tourism is not an attractive industry for talented people in Turkey.

In the Jyväskylä region, total of 2,621 people were employed in the tourism cluster in 2011. Out of these 2,084 were employed in restaurants and the rest in hotels. Out of these, 308 had master degree, six had doctoral degree and one had licentiate degree. Average wage was 2,128 euros per month which is 67% (index of 0.67) of the aggregate average wage level in Finland. Tourism is not an attractive industry for talented people in Finland, either.

To conclude, taking into account the purchasing power parity, although the employees in Finland's tourism clusters earn on average better than their peers in Turkey, tourism is not an attractive industry for talented people in either country (level 1 in Table 3 and Figure 4). This restricts significantly the knowledge potential of both clusters.

### 4.3 R&D and innovation attractiveness

Results show that both clusters are not very much open to technological R&D and innovation activities. This is evident in figures from both clusters in that there are no researchers and no innovation patent applications and the amount of R&D spending is insignificant compared to revenues. Similar conclusions can be drawn regarding the assessment of non-technological innovations. The ratio of employees with advanced degrees (e.g., doctoral degrees) is next to zero in both clusters. In addition, there is not any formal training given to employees other than on the job service trainings and the number of improvement projects carried out by the cluster firms is reported to be insignificant.

Thus, the clusters are not attractive in R&D and innovation (level 1 in Table 3 and Figure 4) and this may be a major hindrance to the knowledge potential of the clusters.

### 4.4 Ownership attractiveness

There is not any significant inward FDI in tourism in Sarıyer and Jyväskylä districts. Most of the tourism enterprises can be classified as small to medium firms largely owned and run by families in both regions. As the industry does not offer high growth possibilities, it is not attractive for venture capital.

Other factors which decrease ownership attractiveness include high level of competition in restaurant business in Jyväskylä, lack of venture capital and high interest rates for borrowing in Turkey, the seasonal nature of the industry and its vulnerability to general economic conditions. As a result, ownership attractiveness is low both in Sarıyer and Jyväskylä (level 1 in Table 3 and Figure 4).

### 4.5 Environmental attractiveness

According to World Economic Forum's tourism and travel competitiveness index (Blanke and Chiesa, 2013), Turkey ranks 95th while Finland ranks third in the environmental sustainability pillar among 140 countries. This difference is evident in figures. Air is much more polluted in Turkey with annual mean particulate matter concentration (PM10) of 66 ug/$m^3$ than in Finland with average annual PM10 of 19 ug/$m^3$. The corresponding figures for Sarıyer and Jyväskylä are 52 ug/$m^3$ and 12 ug/$m^3$ respectively. The amount of waste per person in Sarıyer is 2.58 kg/person/day, and this is much larger than Jyväskylä's corresponding figure of 1.10 kg/person/day. Based on these comparisons Jyväskylä has significantly high knowledge potential in environmental issues (level 3 in Table 3 and Figure 4) while Sarıyer's attractiveness is limited at level 1 (see Table 3 and Figure 4).

### 4.6 Cluster attractiveness

There are about 195 tourism enterprises in Sarıyer employing around 4,000 people, representing 4.2% of the employment in the region. The regional agglomeration of Sarıyer in tourism is 1.05 (compared to Turkey) and Turkey´s national agglomeration is 1.02 (compared to Europe). This makes the overall regional agglomeration of Sarıyer 1.07 (in comparison to Europe). As a result, despite its small size, Sarıyer cluster has moderate level of cluster attractiveness (level 2 in Table 3 and Figure 4).

The size of the cluster in Jyväskylä is relatively small with 2,621 employees. Jyväskylä's regional agglomeration in tourism is 0.97 (compared to Finland) while Finland's national agglomeration is 1.35 (compared to Europe). This makes the overall regional agglomeration of Jyväskylä 1.31 (in comparison to Europe). The tourism cluster in Jyväskylä accounts for 2.3% of total employment in the region. As a result, the tourism cluster in Jyväskylä has moderate level of cluster attractiveness (level 2 in Table 3 and Figure 4).

### *4.7 Knowledge dynamics*

In Sarıyer the restaurant sector has the most competitive environment while there is moderate amount of competition among hotels, beaches and touristic shops. There is limited cooperation between the tourism cluster firms such as procurement of goods from local suppliers or sponsoring events of the museums in the district. Turnover of employees is relatively high in the Sarıyer cluster. As a result, knowledge dynamics in the cluster is at moderate level (level 2 in Table 3 and Figure 4). The development action plan report generated by the Sarıyer Municipality incorporates several action plans with short, medium and long implementation periods (Sarıyer Belediyesi, 2011). Among the 227 action plans, 78 would have direct and another 75 would have indirect effects on the development of the tourism industry, but most of the action plans were not yet implemented as of 2013. Their implementation is likely to increase cooperation and as a result knowledge dynamics in the cluster.

In the Jyväskylä cluster there is moderate competition and limited cooperation among tourism enterprises. However, the level of employee turnover in general is low except in restaurants. As a result, knowledge dynamics in the cluster is at low level (level 1 in Table 3 and Figure 4).

### *4.8 Summary*

Table 3 shows the detailed assessment of the knowledge potentials of the two clusters for the selected variables.

**Table 3** Comparative assessment of the clusters

| *Measures* | *Values for Sarıyer* | *Values for Jyväskylä* | *Assessment criteria* | *Assessment (1…3) for Sarıyer* | *Assessment (1…3) for Jyväskylä* |
|---|---|---|---|---|---|
| Annual number of students accepted to university degree programs in tourism related fields | 180 | 40 | 1: 0–50; 2: 51–100; 3: >100 | 3 | 1 |
| Ratio of students studying tourism to all students (%) | 1.5% | 0.9% | 1: <1%; 2: 1–3%; 3: >3% | 2 | 1 |
| Number of bachelor graduates per year | 77 | 36 | 1: 0–50; 2: 51–100; 3: >100 | 2 | 1 |
| Number of master graduates per year | 0 | 0 | 1: 0–15; 2: 16–30; 3: >30 | 1 | 1 |

**Table 3** Comparative assessment of the clusters (continued)

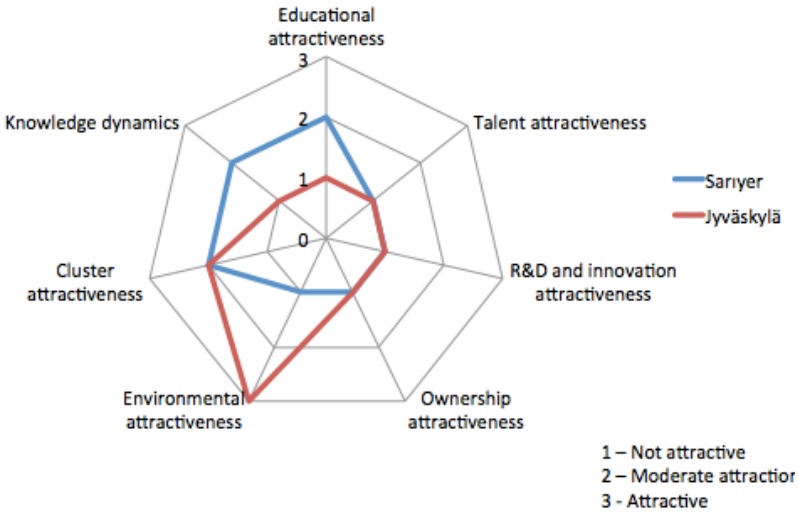
| *Measures* | *Values for Sarıyer* | *Values for Jyväskylä* | *Assessment criteria* | *Assessment (1…3) for Sarıyer* | *Assessment (1…3) for Jyväskylä* |
|---|---|---|---|---|---|
| Number of doctoral graduates per year | 0 | 0 | 1: 0–5; 2: 6–10; 3: >10 | 1 | 1 |
| Number of graduates from vocational programmes in tourism related fields per year | 0 | 345 | 1: 0–50; 2: 51–100; 3: >100 | 1 | 3 |
| Overall rating for educational attractiveness | | | | **2** | **1** |
| Purchasing power parity adjusted average wage per employee in the clusters (Euro) | 780 | 2,128 | 1: 0–2,500; 2: 2,501–4,000; 3: >4,000 | 1 | 1 |
| Index of average wage per employee in the cluster versus average wage per employee in the country | 0.50 | 0.67 | 1: 0–0.8; 2: 0.8–1.2; 3: >1.2 | 1 | 1 |
| Overall rating for talent attractiveness | | | | **1** | **1** |
| Ratio of R&D spending to revenues (%) | 0% | 0% | 1: <1%; 2: 1–3%; 3: >3% | 1 | 1 |
| Annual number of patent applications per firm | 0 | 0 | 1: <1; 2: 1–2; 3: >2 | 1 | 1 |
| Number of researchers in the cluster | 0 | 0 | 1: 0–10; 2: 11–30; 3: >30 | 1 | 1 |
| Ratio of people with advanced degrees (%) | 0% | 0% | 1: <10%; 2: 11–20%; 3: >20% | 1 | 1 |
| Amount of formal trainings given to employees (man hour per year) | Not recorded/ insignificant | Not recorded/ insignificant | 1: <20; 2: 21–40; 3:>40 | 1 | 1 |
| Number of improvement projects per year per firm | None | None | 1: <1; 2: 1–2; 3: >2 | 1 | 1 |
| Overall rating for R&D and innovation attractiveness | | | | **1** | **1** |
| Ratio of FDI stock in the cluster to total investment stock (%) | 0% | 0% | 1: <10%; 2: 10–30%; 3: >30% | 1 | 1 |

**Table 3** Comparative assessment of the clusters (continued)

| *Measures* | *Values for Sarıyer* | *Values for Jyväskylä* | *Assessment criteria* | *Assessment (1…3) for Sarıyer* | *Assessment (1…3) for Jyväskylä* |
|---|---|---|---|---|---|
| Ratio of venture capital stock in the cluster to investment stock (%) | 0% | 0% | 1: <1%; 2: 1–5%; 3: >5% | 1 | 1 |
| Overall rating for ownership attractiveness | | | | **1** | **1** |
| Level of air pollution (particulate matter concentration (PM10) | 52 | 12 | 1: >60; 2: 30–60; 3: <30 | 2 | 3 |
| Amount of waste (kg) per person per day | 2.58 | 1.10 | 1: >2.5; 2: 1.5–2.5; 3: <1.5 | 1 | 3 |
| Overall rating for environmental attractiveness | | | | **1** | **3** |
| Absolute cluster size (number of employees) | 4,000 | 2,621 | 1: 0–5,000; 2: 5,001–10,000; 3: >10,000 | 1 | 1 |
| Regional agglomeration (location quotient) | 1.07 | 1.31 | 1: <1; 2: 1–2; 3: >2 | 2 | 2 |
| Cluster size as percentage of regional employment | 4.2% | 2.3% | 1: <1%; 2: 1–3%; 3: 3% | 3 | 2 |
| Overall rating for cluster attractiveness | | | | **2** | **2** |
| Degree of cooperation in the cluster (Likert scale 1…5) | 1.3 | 2.0 | 1: 1–2.5; 2: 2.6–3.5; 3: 3.6–5 | 1 | 1 |
| Degree of competition in the cluster (Likert scale 1…5) | 3.3 | 3.3 | 1: 1–2.5; 2: 2.6–3.5; 3: 3.6–5 | 2 | 2 |
| Employee turnover rate (Likert scale 1…5) | 3.7 | 1.9 | 1: 1–2.5; 2: 2.6–3.5; 3: 3.6–5 | 3 | 1 |
| Overall rating for knowledge dynamics | | | | **2** | **1** |

Figure 4 summarises the results from Table 3 for the dimensions of the emerald model.

**Figure 4** Results of the comparative study (see online version for colours)




The overall conclusion is that both clusters score low (level 1) in most of the dimensions. Exceptions are that Sarıyer cluster scores moderate (level 2) in educational attractiveness, cluster attractiveness and knowledge dynamics and Jyväskylä cluster scores moderate in cluster attractiveness and high (level 3) in environmental attractiveness.

## 5 Discussion

This study took a novel approach and benchmarked the knowledge potentials of two tourism clusters using the recently developed emerald model. This model is easier to operationalise at cluster level than other models like the diamond model (Porter, 1990) or the competitiveness framework by the World Economic Forum (Sala-i-Martin et al., 2013). However, there are certain challenges and limitations. The analysed units should have well-established statistical databases. This is especially challenging in the cases of small, regional clusters from emerging economies where statistics are difficult to access and not always reliable. To overcome this challenge, the emerald model was adapted based on the availability of data in choosing the right criteria for each of the seven attractiveness dimensions. Despite this limitation, the model proves to be useful for soliciting suggestions for policy makers. Another challenge is about the comparability of clusters from different regions and industries. Contextual differences may impact the dimensions of the model and the resulting knowledge potentials of the clusters. In this study the selected clusters were comparable at least in terms of their size. It should be noted, however, that the cluster in Sarıyer may benefit from the larger cluster in İstanbul since Sarıyer is a municipality of this metropolitan city. It was considered as an alternative to study the cluster in İstanbul, but this would not be fair given its huge size in comparison to the cluster in Jyväskylä.

From educational point of view, Sarıyer performs better than Jyväskylä thanks to high number of students at bachelor programmes, but actions may be taken in Sarıyer to introduce more vocational trainings in tourism for individuals and enterprises. There are already five universities located in the district and their facilities and resources can be used for organising training programs. Qualified staff with sales and service quality mentality is very important in service industries because they are in direct contact with customers and thus have direct impact on success. Offering programs at master and doctoral levels could contribute to improve educational attractiveness in both clusters.

From talent point of view, tourism could be made more attractive for talent in both Sarıyer and Jyväskylä by increasing the salary levels. Attracting qualified and competent individuals to the clusters would help to improve the knowledge potentials and lead to increased competitiveness levels. It is argued that in the future, a region's share in the tourism market will be not be defined by its stock of natural resources, but rather by how they are managed for creating competitive advantage (Fernando and Long, 2012).

R&D and innovation is another weak dimension in both clusters. Without R&D it is difficult to design innovative products and services to customers. Tourism is considerably affected by recent developments in technology and the industry has become the locus of an intense innovation activity over the last 20 years (Aldebert et al., 2008). Competitive advantage in tourism is increasingly based on created resources driven by knowledge and innovation (Fernando and Long, 2012). Hence an urgent improvement in the R&D and innovation activities in both Sarıyer and Jyväskylä is essential in order to stay competitive. Given the relatively small resources of firms, especially technical R&D could be carried out through a collective effort under the leadership of a neutral agent (perhaps a cluster organisation). Moreover, firms in both clusters have to get involved with more trainings and improvement projects to improve their attractiveness regarding non-technological R&D and innovation.

There is again room for improvement regarding ownership attractiveness and cluster attractiveness in both Sarıyer and Jyväskylä. The results of a research carried out in Antalya, another tourism cluster in Turkey, show that in addition to the primary factors of growth such as the natural resources and characteristics of the region, enriching factors such as foreign investments and the number and variety of the tourism associations contribute to the development of tourism clusters (Öztürk, 2011). Based on the findings of this study, to increase attractiveness in both ownership and cluster attractiveness dimensions, enterprises offering complementary products and services along with foreign investors and venture capital firms should be attracted in both regions. Furthermore, some cluster players are missing in both clusters. There is for example a serious need for the establishment of specialised firms and institutions providing information and financial capital for the tourism industry. These improvements can be achieved under the leadership of active cluster organisations.

Environmental attractiveness is an extremely important factor given that both Sarıyer and Jyväskylä are well known for their natural tourist attractions. As Finland ranks third in the environmental sustainability pillar of the tourism and travel competitiveness index, Turkey and Sarıyer may have a lot to learn from Finland's and Jyväskylä's experiences in handling of waste as well as preparation and enforcement of environmental regulations.

There is also room for improvement regarding the knowledge dynamics in both clusters, as effective knowledge management is becoming more important than ever in the industry. The paramount factor to achieve that is increased cooperation among the

cluster members. Earlier research indicates the importance of an appropriate institutional environment in the cluster for cooperative relationships and new institutional set-ups in fostering knowledge spillovers and knowledge transfers in clusters (Arıkan, 2009; Öztürk, 2011; Jankowska and Pietrzykowski, 2013). Lack of an appropriate institutional environment in the cluster for cooperative relationships is the most important reason leading to knowledge creation failure (Arıkan, 2009). Thus a cooperative environment can provide small to medium sized local enterprises growth opportunities with improved quality of services and business results through higher flexibility, sharing of marketing information, innovation and entry to other national or cross-border networks and clusters, resource development and knowledge transfer (Novelli et al., 2006). Arıkan (2009) describes a vicious cycle of knowledge generation in clusters in which capable and knowledgeable firms use external knowledge effectively to create new knowledge inside the firm and then feed it back into the cluster.

Clusters are significant forces in the development of tourism as they market the local area and provide cooperative opportunities for greater exposure and reach which would not be possible with individual marketing budgets (Jackson and Murphy, 2006). In order to profit fully from the expectations of the cluster theory, it is necessary to generate active collaboration projects facilitated by cluster organisations to promote the local industry for the future. Furthermore, according to Öztürk (2011) institutional organisations, such as non-governmental organisations and trade associations, have become important in tourism regions due to the stimulation they provide to the development of collaborations and joint projects with related actors. The existence of social capital in a tourism cluster, i.e., a collaborative environment and emerging linkages between actors and organisations, has direct influence on its competitiveness (ibid.). For instance, execution of the development action plan under the leadership of the newly formed Sarıyer Tourism Development Committee can contribute to both the future development and competitiveness of the Sarıyer tourism cluster.

While Finland is argued to be more competitive according to the travel and tourism index (Blanke and Chiesa, 2013), our findings suggest that the Jyväskylä cluster is not any better than the Sarıyer cluster except for environmental attractiveness. Indeed, the low scores of both clusters can explain why they have not been able to reach the level of knowledge generation to differentiate them from their competitors and relieve their dependence on natural resources as main sources of tourist attraction. The low levels of knowledge potential in this industry hints why less competitive countries like Turkey which are rich in natural touristic resources are able to attract more tourists. Competitive countries like Finland have not yet succeeded to create the knowledge to reverse the situation. The reason for that lies in their low knowledge potential in the tourism industry as exemplified in this study in the context of the Jyväskylä cluster.

The developed assessment scheme in Table 3 is the key contribution of this study to the emerald model by Sasson and Reve (2012). Despite some limitations in data collection, the emerald model is identified as a useful framework to analyse the strengths and weaknesses of clusters. Moreover, such a comparative study offers rich insights for assessing the knowledge potential and identifying areas for improvement in clusters. In future research the framework can be applied to other tourism clusters in the world or clusters from different industries in order to identify their knowledge potentials. Reproduction of similar studies would test the credibility of the framework in different contexts and contribute to its improvement. In another future research avenue, the results from a large set of clusters can also be linked with some performance measures such as

the level of entrepreneurial activity or the amount of new business development in the cluster. Such research would in turn enable the testing of the relationship between knowledge base of clusters and their performances.

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## Notes

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