CROSS-CITATION AND AUTHORSHIP ANALYSIS OF HOTEL PERFORMANCE STUDIES

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ABSTRACT
This study develops a literature review of hotel performance studies, and provides insights by adopting a cross-citation network approach. Two research questions are defined. First question focuses on the most cross-cited papers and journals, and identifies salient trends. Second question considers who are the most popular cross-cited and citing authors. This work is rooted in bibliometric studies, and adopts a relational approach. Based on cross-citations, a network is built by using 734 papers published during the period 1996 to 2015, as nodes and the cross-citations between them as links. Exploratory analysis reveals spectacular growth of outputs, with the last time period (2011-2015) including 56% of outputs. The most cross-cited papers possess the characteristics of: being older; representing 1% of sample but accounting for 14% of cross-citations. The 734 papers are published in 164 journals, but they show a clear core-periphery structure with International Journal of Hospitality Management ranked first.

Keywords: Hotel performance; Bibliometric analysis; Citation; Cross-citation; network analysis.

1. Introduction
The growth in the number of published papers in hospitality and tourism is triggered in part by the creation of new journals (Cheng et al., 2011) together with those already in existence (Park et al., 2011). Furthermore, journals outside the "hospitality, leisure, sport & tourism" field (as defined by the Journal Citation Reports) continue to attract hospitality and tourism studies (García-Lillo et al., 2016; Leung et al., 2017). Collectively, this trend has dramatically increased the amount of contributes (i.e. Koc and Boz, 2014).
A number of hospitality related reviews have been published, with the aim of identifying and rationalising some emerging trends. Köseoglu et al. (2016b) found 190 reviews published between 1998-2015 with the temporal trend showing a progressive increase. This study reports a list of theme-focused reviews published in leading hospitality and tourism journals, catogorised by disciplines and topics. Within "management and business", marketing accounts for the highest percentage (39%), followed by information systems (13%), human resource management (10%) and finance (10%). There is only one paper exploring the hotel performance research stream (Sainaghi, 2010a).
This paper aims to make a contribution to this gap, by developing a bibliometric approach, which is able to identify leading papers, authors, journals and time trends in the field of "performance measurement systems" or "hotel performance". The relevance of this topic, for both theory and practice, is related to the central role that competitive advantage plays in management. Based on the Porterian approach, competitive advantage is defined as "the firm's ability to achieve superior performance (compared to competitors)" (Porter, 1985, p. 3). The resource-based view of the firm (Wernerfelt, 1984, 1995) with the presence of unique resources and capabilities (Dierickx and Cool, 1989) that generate performance above the mean (Barney, 1991) is pertinent. For this reason, performance measurement lies at the heart of competitive advantage (Venkatraman and Ramanujam, 1989).
Some published reviews focused on hotel performance are based on content analysis and have explored the disciplinary structure of this field by identifying relevant topics. Sainaghi

(2010a) and Sainaghi et al. (2013) classify performance measurement papers according to the four balanced scorecard perspectives, while Pnevmatikoudi and Stavrinoudis (2016) distinguish between financial and non-financial indicators. The recent study of Sainaghi et al. (2017) develops a framework structured around three dimensions of the tourism performance measurement literature: the unit of analysis (destination, cluster, and firm level), the approaches (efficiency; competitiveness; tourism productivity; metrics in use; performance measurement systems) and the disciplines (accounting and financial management; economics; strategy). Overall these studies have clearly analysed the internal structure of this field.

An important gap of these hotel performance reviews is the absence of any study based on *bibliometric approach*. The present paper, by looking at the actual citation and referencing behaviour of academics in terms of their outputs, will provide some fresh insights. Cross-citations (as later described) is a bibliometric method which can provide reliable linkages to illustrate relationships between academics (Gomezelj, 2016). Discovering popular scholars and their work can assist in understanding evolution of theory and practice (Yang and Wang, 2015; Zehrer and Pechlaner, 2010). Moreover, in light of the current growing pace in hospitality performance measurement research, we believe that it is an appropriate time to take stock of the research generated over the last two decades.

Based on some recurrent topics in bibliometric (as later analysed), the core research questions explored by this study, using a longitudinal analysis, are the following.

The first enquiry, focuses on the most cross-cited papers and journals and identifies salient trends.

Research question 1.A What are the most cross-cited and cross-citing papers?
Research question 1.B What are the top cross-cited journals?
Research question 1.C Are there some time trends of cross-cited hotel performance articles?

The second research question explores popular cross-cited and citing authors.
Research question 2 Who are the popular cross-cited and citing authors?

The structure of this paper is as follows. First, we make the case for the measurement of impact, and introduce bibliometrics with emphasis on cross-citations. Second, the research methodology is considered with details pertaining with sample selection, and network approach. Third, we present the results and discussion for research questions one and two. Finally, conclusions, limitations and future research are proffered.

2. Literature review: bibliometric studies

Within an interdisciplinary field, traditional qualitative literature reviews tend to be limited in terms of the volume of data they can handle and are reliant on subjective judgments. In comparison, a bibliometric citation analysis can consider large datasets for quantitative analysis. A bibliometric approach evaluates and monitors the progress of given disciplines by sorting data, including citations, author affiliations, keywords, themes discussed, and methods employed for published studies in the disciplines via basic/advanced statistical techniques (Leung et al., 2017). As suggested by Hall (2011), bibliometrics has become an increasingly significant issue in tourism studies, while the application in hospitality is considerably less developed (Köseoglu et al., 2016a). Citations are objective measures, which illustrate the exchange of ideas within any field of enquiry (García-Lillo et al., 2016). Researchers will cite papers they believe to be important for their research (Benckendorff, 2009). Collectively, citations are influential as they represent quality at the journal and individual level (Köseoglu et al., 2016b).

In recent years, there have been attempts to systematically analyse the hospitality and tourism management field (Köseoglu et al., 2016a). Citation based measures are less prone to

systematic biases than subjective (Baumgartner and Pieters, 2003). Citations are one of the measures used to judge research quality and impact and have been a feature of a number of hospitality and tourism studies. Commencing with the work of Weaver and McCleary (1989), the application of bibliometrics to assess knowledge domains in hospitality and tourism are a feature of a number of studies.

Benckendorff and Zehrer (2013) categorise bibliometric methods into two groups: evaluative techniques and relational techniques. Evaluative techniques focus on the impact of academic studies by assessing performance with productivity measures, impact metrics, and hybrid metrics (Hall, 2011). Relational techniques delve into relationships among published research by considering their citations, authors, author affiliations, and keywords to conduct co-occurrence (Figueroa-Domecq et al., 2015). Relational evaluation has been applied much less frequently to understand tourism research activity and to date most studies have focused on co-authorship analysis (Ye et al., 2013). In fact, the majority of papers (190 contributes) analysed by Köseoglu et al. (2016a) are reviews (157, 83%) or evaluative studies (13%), while relational articles are marginal (4%). The present research contributes to this gap by adopting a relational approach, using cross-citation analysis (as later explained) in the field of hospitality and in particular in sub-research stream of hotel and performance.

The few relational papers are mainly based on network analysis (Benckendorff and Zehrer, 2013; Figueroa-Domecq et al., 2015; Gomezelj, 2016; Hu and Racherla, 2008; Köseoglu et al., 2015; Racherla and Hu, 2010; van der Zee and Vanneste, 2015; Ye et al., 2013; Yuan et al., 2014). In fact, this methodology helps to represent co-citation, co-authorship and more generally, interaction and relationships among scholars, universities or journals. For this reason, the present paper adopts this approach.

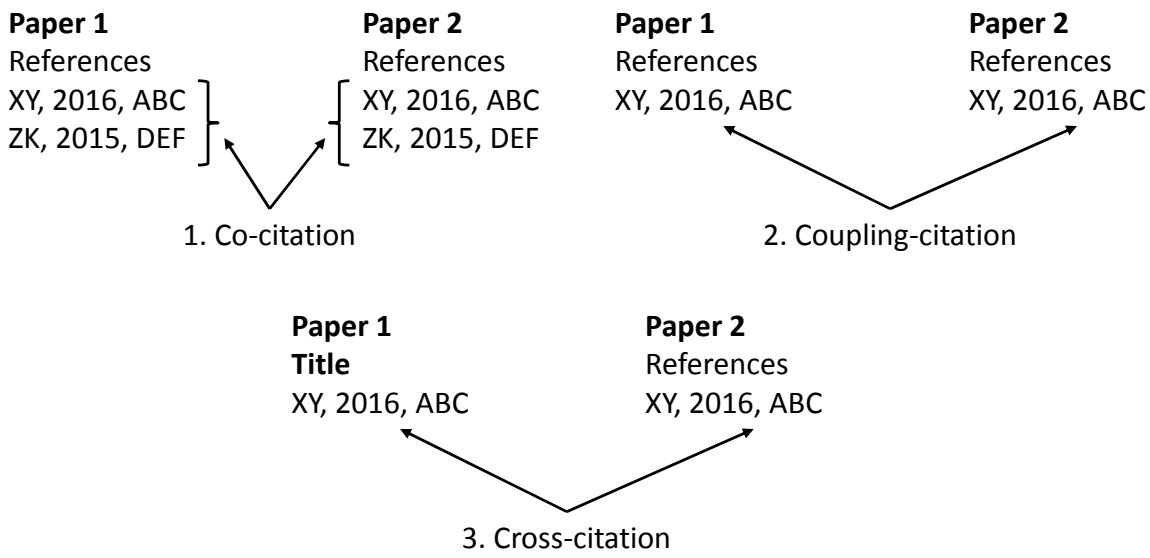
Bibliometric papers – both evaluative and relational – are mainly oriented to identify leading papers (Jamal et al., 2008), scholars (Schmidgall et al., 2007), journals (Svensson et al., 2009a, 2009b) research collaboration (Köseoglu et al., 2015; Zehrer and Pechlaner, 2010) or showing temporal trends (Cheng et al., 2011). These gaps have inspired the research questions previously stated.

Having clarified the positioning of this study, it is important to operationalise the relational approach. Citation relationships among authors can be categorized in three key ways: co-citation, coupling and cross-citation (Wang et al., 2012) (Figure 1). *Co-citation* analysis use pairs of documents which often appear together in reference lists and have something in common (Xiao and Smith, 2008). This methodology, as reported in Figure 1, focuses on references and, in this sense, explores the pillars of a specific research stream. In this sense, co-citation analysis has proved to be a useful empirical technique for describing the intellectual structure of disciplines (Benckendorff and Zehrer, 2013).

Two articles are bibliographically coupled if their reference list share one or more of the same cited documents (Yuan et al., 2015). Two papers must cite the same source to be *coupled*, whereas co-citation rely on any papers listed in another's reference list. The coupling strength increases as the number of citations they share. Also in this case, as reported in Figure 1, coupling-citation refers to the reference structure of a specific research stream.

Cross-citation analysis assesses the relationships among journals, articles and/or authors to identify patterns (Howey et al., 1999). Two papers are cross-cited, if one of them cites the other one, as reported in Figure 1. This methodology differs profoundly from the first two. In fact, while co-citation and coupling-citation both focus on reference structure, cross-citation analyses relationships among papers (and therefore authors and journals) of a sample of contributes. Given the interest on hotel performance community, a cross-citation approach was adopted in this study.

Figure 1. Co-citation, coupling-citation and cross-citation



3. Methodology

This study performs a cross-citation analysis within the sub-field of "hotel performance". To develop the study, two central themes are relevant: i) the sample selection, and ii) the analysis carried out.

3.1.Sample selection

As suggested in some previous reviews, articles were selected according to three criteria: i) keywords, ii) journals, iii) year of publication. Each point is later discussed and the choices made are compared with the insights emerging from previous literature reviews.

Concerning *keywords*, given the focus on hotel performance, these two words were used, in accordance to some previous studies (Phillips and Moutinho, 2014; Sainaghi, 2010a, 2010b; Sainaghi et al., 2013, 2017). Keywords focus only on the hotel segment, while hospitality literature includes other sectors (Pizam and Holcomb, 2008). However, as reported in Table 1, hotels play a pivotal role and are able to attract 1,155 papers, equal to 77% of total papers (1,501), confirming their essential status in the hospitality sector.

Table 1. Different couples of key words

Couple of key words	Hotel & performance		Restaurant & performance		Casino & performance		Total	
	Papers	%	Papers	%	Papers	%	Papers	%
Hotel & performance	**1,155**	**77%**						
Restaurant & performance	1,461	97%	437	91%				
Casino & performance	1,195	80%	481	100%	59	100%		
Total	**1,501**	**100%**	**481**	**100%**	**59**	**100%**	**1,501**	**100%**

Focusing on *journals*, the number of selected papers was broader than in prior reviews, who explicitly focus their attention on hospitality or tourism sector (e.g. Chan and Hsu, 2016; Jang and Park, 2011; Lucas and Deery, 2004; Phillips and Moutinho, 2014; Yoo et al., 2011). However, some recent works such as Sainaghi et al. (2017) clearly demonstrate the relevance of non-tourism and non-hospitality journals. In fact, their sample includes 978 articles with 585 (60%) being "non-tourism" papers, similarly, "non-leading" journals account for 600 papers (61%). Given the relevance of "non-hospitality", "non-tourism" and "non-leading"

journals, the sample will include these outputs. The empirical study was carried out at the beginning of August 2016 and these keywords ("hotels and performance") were researched in abstract, title and keywords in the Scopus database. This approach is widely used in review and bibliometric papers (Gross et al., 2013; Hua, 2016; Sourouklis and Tsagdis, 2013; Tsai et al., 2011). Only journals published in English were included in the sample.
Finally, concerning the *time horizon*, the analysis embraces 20 years, from 1996 to 2015 inclusively. Many papers have adopted the same or quite similar time horizon (Chan and Hsu, 2016; Jang and Park, 2011; Ye et al., 2013; Zhao and Ritchie, 2007). Four time periods were identified in order to map trends: first slice 1996-2000, second slice 2001-2005, third slice 2006-2010 and fourth slice 2011-2015). Overall, these choices assure a wide coverage of the literature. Using these three criteria, the final sample includes 1,155 papers.
All the papers were analysed to verify the relationship with the "hotel performance" research stream. Only articles that explore determinants of results (Sainaghi, 2010a) or, on the otherhand, propose performance measurement systems (Phillips, 1999; Phillips and Louvieris, 2005) were included in the final sample. This choice is consistent with previous studies (i.e. Tsang and Hsu, 2011; Yoo et al., 2011); as reported in Table 2, 268 papers were excluded (23%). It is interesting to note that 90% of these outliers (241) are not-cross cited contributes (or "disconnected papers"). Therefore the proposed methodology (cross-citation) helps researchers to verify the relevance of used keywords. This is reasonably, in fact if some papers are outliers (not relevant for a specific research stream), they are not cited by other studies and therefore they remain "disconnected".
Table 2 reports the sample size. Net sample counts 887 papers, but 153 (17%) are disconnected and therefore not included in the network analysis reported in the findings section, while 734 (83%) are cross-cited articles (cells squared and coloured) and comprise our final net sample.

Table 2. Sample size

Papers	Gross sample		Outliers		Net sample	
	#	%	#	%	#	%
Gross sample	**1,155**	**100%**	**268**	**23%**	**887**	**77%**
Disconnected papers	394	34%	241	90%	153	17%
Connected papers	761	66%	27	10%	**734**	**83%**

3.2. Cross-citation analysis

This section briefly describes the structure of the database used and the analysis carried out. Concerning the database, the research team downloaded 1,155 papers, including all contributes details. In particular, for each paper the full citations were downloaded. The whole sample includes approximately, fifty-five thousand references. This enabled the creation of an ordered database with 1,115 rows (the papers) and some descriptive information in the columns (i.e. authors, title, journal, number of citations, DOI and references). References were checked and when the research team noted problems, such as incomplete information, the full citation were sought in Google Scholar and replaced in the dataset.
In order to analyse the cross-citation, some matrices were created. The use of matrices is popular in the bibliometric field (i.e. Benckendorff, 2009; van der Zee and Vanneste, 2015) and Racherla and Hu (2010) explain how to transform a network into a data matrix. In the present contribute, a first matrix ("paper cross-citation") was created: it consists of 1,155 lines x 1,155 columns, containing all of the sample. Two papers (x and y) are related if the title of paper "x" is cited by paper "y" or the contrary. The link between the two papers is ordered,

and it is possible to distinguish between citing and cited works. This matrix permits analysis for the first research question (most cross-cited papers, journals and time trends).
A second matrix was created with the aim of shifting emphasis from articles (the focus of the "paper cross-citation" matrix) to authors. In fact, for all the papers with more than one author, it is necessary to create additional rows and columns. For this reason, the second matrix is called "author cross-citation" and it counts 2,732 rows and columns. This number (2,732) is the product between the number of papers (1,155) and the average number of co-authors (2.3654). Furthermore, given the presence of many authors that have written more than one article, the final matrix is 1,096 x 1,096. The second matrix will provide the context for the second research question, that is identifying popular authors both in term of cross-citations and published papers.
In order to answer the research question and to use the matrix, network analysis was used. Network analysis is a methodological approach that is appropriate for describing, investigating, and understanding various types of structural and relational aspects. One of the advantages of the network abstraction is that it allows a relatively easy visualization of the main features of the system, that can be validated through well-established metrics (Baggio et al., 2010; Baggio and Sainaghi, 2011, 2016; Newman, 2010), is able to manage the complex structure of the reality under study (Sainaghi and Baggio, 2017), and thus resulting in a deeper unbiased understanding of the system.
The network is built by using the papers as nodes and the citations between them as links. It is a directed network and the degrees (the number of links a node has) represent the citations received (in degree) and those given (out degree) to other nodes.
The analysis is conducted at two levels. First, at a global level we examine the statistical distribution of the links and the Gini coefficient that provide an idea of how uniform or not the links are distributed and signal possible complexities in the structure of the system. In the hospitality literature, Gini index is used in many studies (Fernández-Morales et al., 2016; Lacher and Nepal, 2013; Lau et al., 2017; Martín et al., 2014). The Gini index has some advantages: it is a measure that takes into account the skewness of the distribution and it is less influenced by extreme values than other concentration measures (Cisneros-Martínez and Fernández-Morales, 2015). We also calculate the density, the ratio between the number of links and the total possible number of links that could be present (da Fontoura Costa et al., 2007). This analysis provides a description of the whole set of papers examined looking at the topology of the network. In this way it is possible to analyse the general patterns of the connections and to see the extent to which these connections are formed. Moreover, the scrutiny of the degree distribution provides some indications for the mechanisms that lead to the composition of the network. For example a highly power-law degree distribution is known to be generated mostly by a preferential attachment mechanism. In other words, citations are given more frequently to already highly cited papers than to others less known works (Newman, 2010).
Second, at a microscopic level we examine the position of the most important nodes in terms of in degree and out degree (citations received and given). This allows the identification of the most popular actors in the network, understanding how they are related to the other elements of the system examined.

4. Results and discussion

Results of the study are now explored within the contexts of the two research questions. The first one is analysed in Section 4.1, which focuses on cross-citation papers. This paragraph, based on network analysis, gives an overall perspective of the cross-cited papers, journals and time evolution (trends). The second research question focuses on popular authors. Based on

the author network structure, the most cross-cited and the popular cross-citing authors are identified. The analysis is developed in Section 4.2.

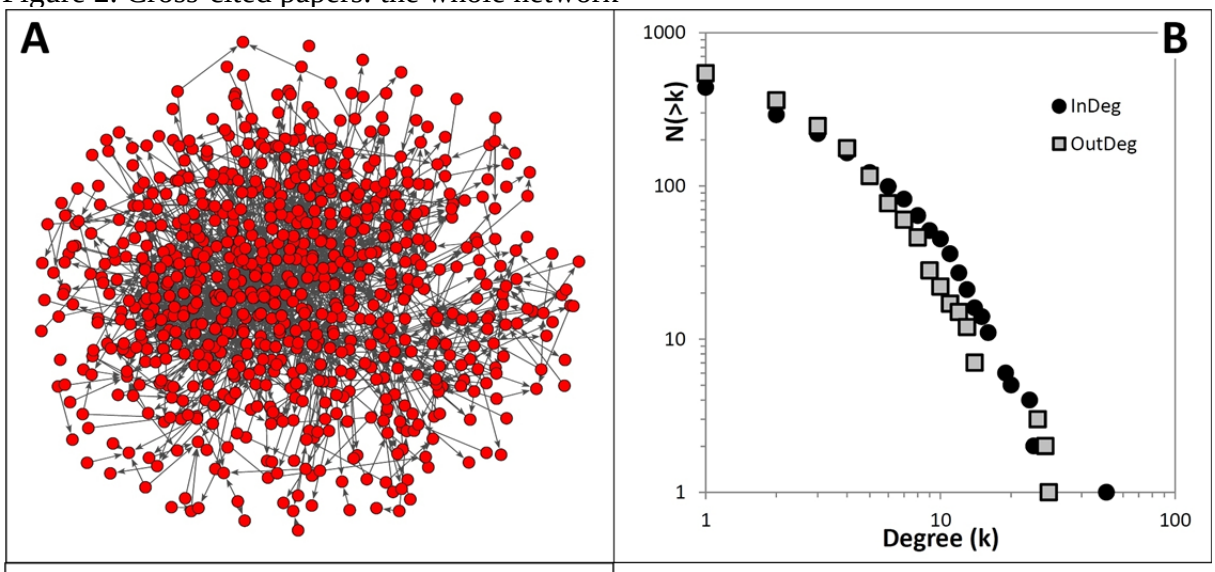
4.1. Research question one: Cross-citations

In order to assess the first research question, the following section consists of four parts. Initially, some basic descriptive results concerning cross-cited papers are presented. This point does not refer to the first research question, but helps readers to understand the structure of the net sample (734 articles); next, the most relevant cross-cited and cross-citing contributes are identified (research question 1.A). Finally, the top-ten journals are shown (research question 1.B) and, fourth, some temporal trends are depicted (research question 1.C).

The whole network

Figure 2 reports the whole network of all the cross-cited papers. Each node in the graph (Panel A) represents an article, while each link is a citation received (in degree, acronym InDeg) or given (out degree or OutDeg). As usual in the network approach, the analysis of exponent degree (Panel B) shows a marked power-low distribution, which signals a complex set of interconnections between the papers. The analysis of the degree distributions shows a marked power-law shape, similar to many other complex networks of natural or artificial origin (Newman, 2010). This, as said above, signals a preferential attachment mechanism for the formation of the network. The similarity between in and out degrees is also interesting as it depicts that the mechanisms for giving and receiving citations are quite similar.

Figure 2. Cross-cited papers: the whole network



C

Network type	directed
Nodes	734
Links	1767
Density	0.003
Modularity	0.627
Gini index of the degrees	
indegrees	0.696
outdegrees	0.580
Degree distributions exponents	
indegrees	3.71± 0.55
outdegrees	3.27± 0.17

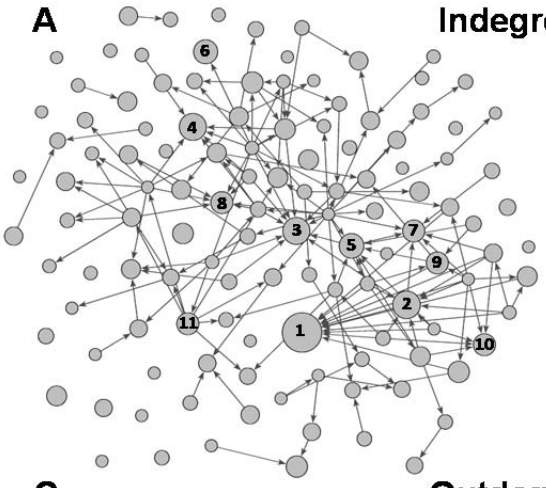
The 734 papers accounts for 1,767 links (Panel C). The density is rather low (0.003), this level indicates that many papers received (or given) few cross-citations, as it appears for many peripheral contributes in network figure (Panel A). It means that the network is populated by an higher percentage of articles with few cross-cited connected and therefore are quite marginal (or peripheral) in the network structure. This is clearly showed in the figure (Panel A). Concerning the Gini index, it is important to remember that this ratio moves from 0 to 1. The higher the value, the higher the inequality distribution and the opposite. Concerning this paper distribution, the Gini index is equal to 0.696 (InDeg) and 0.580 (OutDeg). Generally speaking, both values depict a relatively high concentration, which means that few papers attract (gives) an important percentages of cross-citations. This is coherent with the network figure (Panel A), where, in the centre, papers are more highly connected. Focusing on the indicators, cited papers (in degree) show a higher level of inequality distribution than citing papers (out degree). What does it mean in the field of hotel performance literature? A possible explanation is the following. More or less all the contributes pertaining to this research stream should position themselves and therefore their literature section depicting some citations (out degree) from other papers. Of course, in our matrix, the number of in degree and out degree is always the same, but the Gini index suggests that out degree is more homogeneous (less concentrated). It means that a relatively higher percentage of studies provide some cross-citations (0.580). By contrast, these citations are directed to a more smaller group of papers, that attract cross-citations. Therefore the Gini index of in degree is higher (0.696), which means the inequality distribution (concentration) is higher. Finally, it is important to note that the distance between the two Gini indexes is not very large.

A visual inspection of the network (Panel A) reveals a more densely connected area (the centre) with a less densely peripheral populated layer. This configuration is even evident when examining the network formed by the journals (later analysed), supporting the division between different journals (top or leading versus non-top and non-leading).

Most cross-cited papers (research question 1.A)
Figure 3 represents the network of the most cross-cited papers and distinguishes between cited (in degree) and citing (out degree) contributions.

Figure 3. Most cross-cited papers

A Indegree



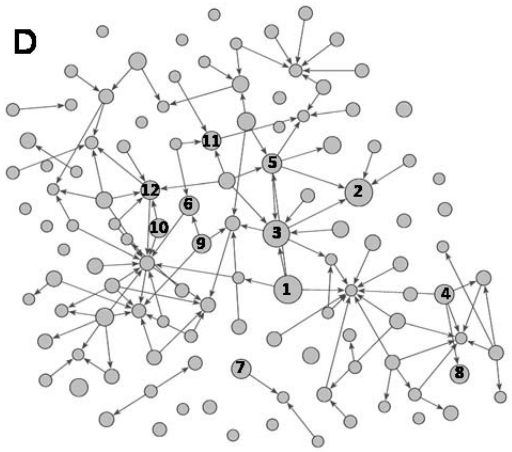
B

Rank	Authors	Slice	Journal	Indegree (#)	Indegree (%)
1	Hwang and Chang (2003)	2nd	TM	51	2.9%
2	Barros and Mascarenhas (2005)	2nd	IJHM	25	1.4%
3	Kalnins and Chung (2001)	2nd	ASM	24	1.3%
4	Álvarez Gil *et al.* (2001)	2nd	Omega	24	1.3%
5	Barros (2004)	2nd	TE	20	1.1%
6	Pine and Phillips (2005)	2nd	IJHM	19	1.1%
7	Phillips (1999)	1st	IJHM	17	1.0%
8	Israeli (2002)	2nd	IJHM	16	0.9%
9	Wang *et al.* (2006)	3rd	IJHM	16	0.9%
10	Botti *et al.* (2009)	3rd	Omega	16	0.9%
11	Wang et al. (2012)	4th	IJHM	16	0.9%
	Total			244	13.7%

C Outdegree

Rank	Authors	Slice	Journal	Outdegree (#)	Outdegree (%)
1	Peng *et al.* (2015)	4th	IJHM	32	1.8%
2	Sainaghi (2011)	4th	IJCHM	28	1.5%
3	Sainaghi *et al.* (2013)	4th	IJHM	26	1.4%
4	Parte-Esteban and Alberca-Oliver (2015a)	4th	IJCHM	14	0.8%
5	Sainaghi and Baggio (2014)	4th	IJHM	14	0.8%
6	McManus (2013)	4th	IJHM	14	0.8%
7	Gross *et al.* (2013)	4th	TMP	14	0.8%
8	Parte-Esteban and Alberca-Oliver (2015b)	4th	CIT	13	0.7%
9	Lai and Choi (2015)	4th	JHLSTE	13	0.7%
10	Espino-Rodríguez and Gil-Padilla (2015)	4th	THR	13	0.7%
11	Kim *et al.* (2015)	4th	IJHM	13	0.7%
12	Grissemann *et al.* (2013)	4th	IJHM	13	0.7%
	Total			207	11.4%

D



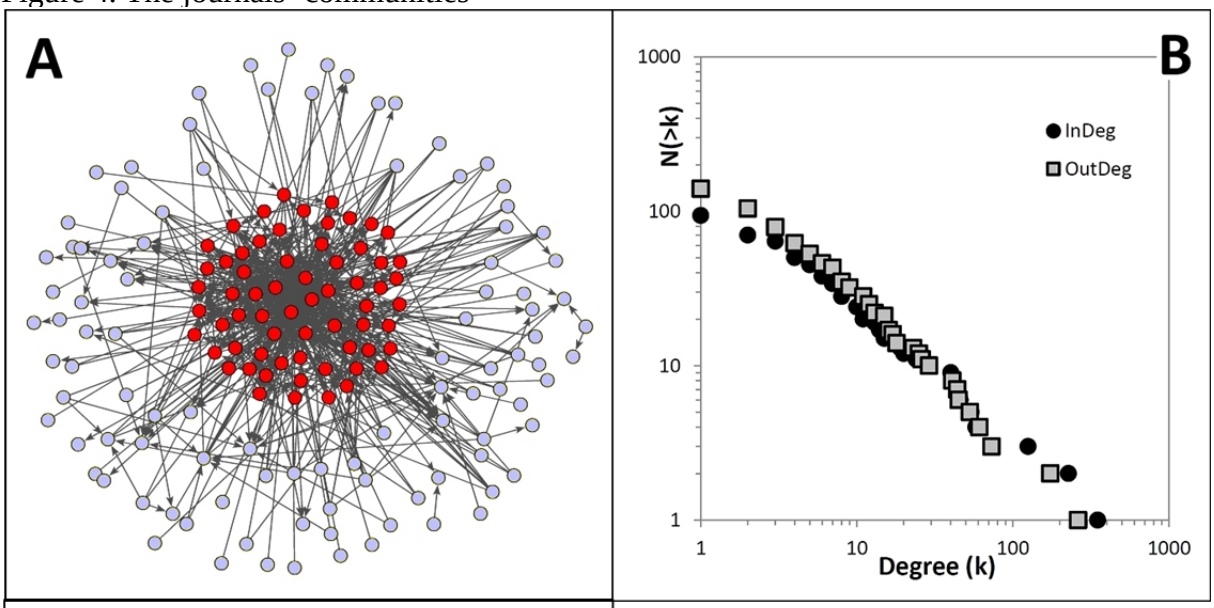
Legend: TM = Tourism Management; IJHM = International Journal of Hospitality Management; ASM = Advances in Strategic Management; TE = Tourism Economics; IJCHM = International Journal of Contemporary Hospitality Management; TMP = Tourism Management Perspectives; CIT = Current Issues in Tourism; JHLSTE = Journal of Hospitality, Leisure, Sport and Tourism Education; THR = Tourism and Hospitality Research

Focusing on *cited articles (in degree)*, in order to increase the readability, only studies that accounts for at least five connections (i.e. five cross-citations) are represented in the graph (Panel A). For this reason some contributes appear disconnected. In fact, while the net sample includes 734 papers, Panel A accounts 122 studies, therefore some articles, despite receiving citations, have no arrows because the citing papers are not included in the graph. Inside the network, the most cited papers are numbered. The table (Panel B) reports some information. The most cited contributes are reported in the bibliography of this paper. It is interesting to note that the majority of these studies (7 out of 11) belong to the second slice (2001-2005). It appears reasonable for two motives. First, as usual in the literature, older papers receive more citations than recent one, given the time length of knowledge diffusion; second, this research stream is rapidly increasing (as later depicted in the "time trends" section) and therefore very

old papers (first slice) do not represent the pillars. In term of journals, hospitality journals published the majority of contributes and IJHM accounts for more than six papers (over 11). The most-cited studies collectively attract 244 cross-citations, representing 13.7% of the total.
The *citing contributes (out degree)* present a very different time profile. In fact, they are recent papers (all pertain to the fourth slice) and six (out of 12) belong to the last year included in the analysis (2015). This evidence is coherent. In fact, on one side, as previously described, recent articles account for more references, when compared to older outputs, on the otherhand, more recent studies can cite older papers but not the opposite. Said differently, the citing direction is necessarily past oriented. Focusing on authors, some researchers appear in more than one contribute (i.e. Sainaghi three times; Parte-Esteban and Alberca-Oliver two times). Hospitality journals play a crucial role and IJHM published six papers, followed by IJCHM (two articles). The twelve more citing studies account 207 cross-citations, representing 11.4% of the total.

Top journals (research question 1.B)
Following the structure of §4.1 and the network modularity emerging in the previous paragraph, the journals are now analysed in order: i) to identify the existence of sub-community and ii) to describe some possible trends (time evolution).
In the same way as for the papers, we build the network of cross-citations between the *journals* in which the papers considered (734) were published (Figure 4). The network has 164 nodes (journals) and 658 links with a density equal to 0.025, quite low as well. The degree distributions are, as can be easily imagined, a power-law shape (Panel B) with exponents: in degree = 1.82± 0.10 and out degree = 1.94± 0.12.
In this case the interesting feature to be noted is that: the network has a clear core-periphery structure (Panel A) with a central area of strongly connected nodes and a periphery of nodes that link (or are linked) the centre with practically no connections between them. The core is formed by élite journals, that incidentally are mostly leading or top journals, that interlink by citing each other.
The network metrics (Panel C) depict a density ratio very similar with those previously described focusing on the whole network, while the modularity index shows a strong reduction, given that this analysis focuses on journals and therefore some of them account many papers – International Journal of Hospitality Management (IJHM) has published 142 papers, International Journal of Contemporary Hospitality Management (IJCHM) 79, Tourism Management (TM) 43. By contrast, these different roles played by single journals explain the high value of the Gini index for both in degree (0.861) and out degree (0.757) cross-citations.
The role played by the *top ten journals* (Panel D) is crucial: they have published 56% of cross-cited papers, attract 72% of total cross-citations (in degree) and give 60% of out degrees (evidences not reported in Figure 4). These figures suggest their centrality in the knowledge diffusion inside the hotel performance stream. IJHM is ranked first in Panel D, followed by IJCHM; TM is the first non 100% hospitality oriented journal. The table suggests that top journals are mainly hospitality oriented (IJHM, IJCHM, CHQ, JHTR, JHMM) or tourism oriented (TM, TE, APJTR). Only two journals are outside of hospitality and tourism field: Service Industries Journal (fourth) and Omega (eighth).

Figure 4. The journals' communities



C

Network type	Directed
Nodes	164
Links	658
Density	0.025
Modularity	0.212
Gini index of the degrees	
indegrees	0.861
outdegrees	0.757
Degree distributions exponents	
indegrees	1.82±0.10
outdegrees	1.94±0.12

D

Rank	Authors	Papers #	Papers %
1	International Journal of Hospitality Management (IJHM)	142	19%
2	International Journal of Contemporary Hospitality Management (IJCHM)	79	11%
3	Tourism Management ™	43	6%
4	Cornell Hospitality Quarterly (CQ)	32	4%
5	Service Industries Journal (SIJ)	32	4%
6	Journal of Hospitality and Tourism Research (JHTR)	31	4%
7	Tourism Economics (TE)	22	3%
8	Omega	4	1%
9	Journal of Hospitality Marketing and Management (JHMM)	11	1%
10	Asia Pacific Journal of Tourism Research (APJTR)	13	2%
	Total	**409**	**56%**

Time trends (research question 1.C)

Regarding the evolution, *time* is analysed, based on four slices, each composed by 5 years. Given the high number of isolated papers, especially in the first two slices, as later described, the analysis is not supported by the four networks representation but some key measures are reported (Table 3). In fact, the figure of network 1996-2000 is composed by 32 nodes (papers) but only four of them are connected by 2 links and 28 (88%) are disconnected. A similar situation characterizes the second slice (2001-2005), where the percentage of isolated papers is 71%.

Having clarified why a network representation is not reported, Table 3 depicts time evolution. A first remark concerns the impressive increase in the number of papers (nodes). As reported in the third column from left (percentage of nodes), the first slice accounts 4% of the total number of cross-connected papers (734), the second 10%, while the last 56%.

Moving from nodes to links, a similar strong increase is depicted in the fourth column from left. The percentage accounted by the last slice (2011-2015) is more than three-quarters (76%). The increasing number of links reduces (as reasonably) the number of isolated papers, as reported in the third column from right. If we focus the attention on percentages (penultimate column), they show a rapid reduction during the years, moving from 88% (1996-2000) to 35% (2011-2015). The explanation of this dynamic is quite simple: recent papers tend to cite previous (older) studies, increasing the number of connected papers. Therefore considering more years (new slices) decrease the percentage of isolated studies. Said differently, the higher the number of articles, the higher the probability that some papers are

cited, as confirmed by Table 3. The decreasing number of isolated papers is also favoured by the increasing number of averaging citations per article. In fact, this figure moves from 36 references in the first slice to 63 in the last (the evidence not reported in Table 3).
Finally, the last column reports the density measures. As previously clarified, this index refers to the ratio between the number of links and the total possible number of connections that could be present. Therefore, a low density means a paucity of relationships among articles. This is coherent with the number of links depicted in Table 3, that represents a small amount. In fact, considering the 734 papers, the highest amount of connections is equal to 354 (fourth slice). Interestingly, the density measure remains more or less the same during the four periods. This confirms that the real connections (links) are a small amount of all possible relationships and it confirms the central role played by top journals: a few amount attracts a disproportionate percentage of cross-citations, while non-top journals are relatively disconnected.

Table 3. Time evolution (based on number of papers)

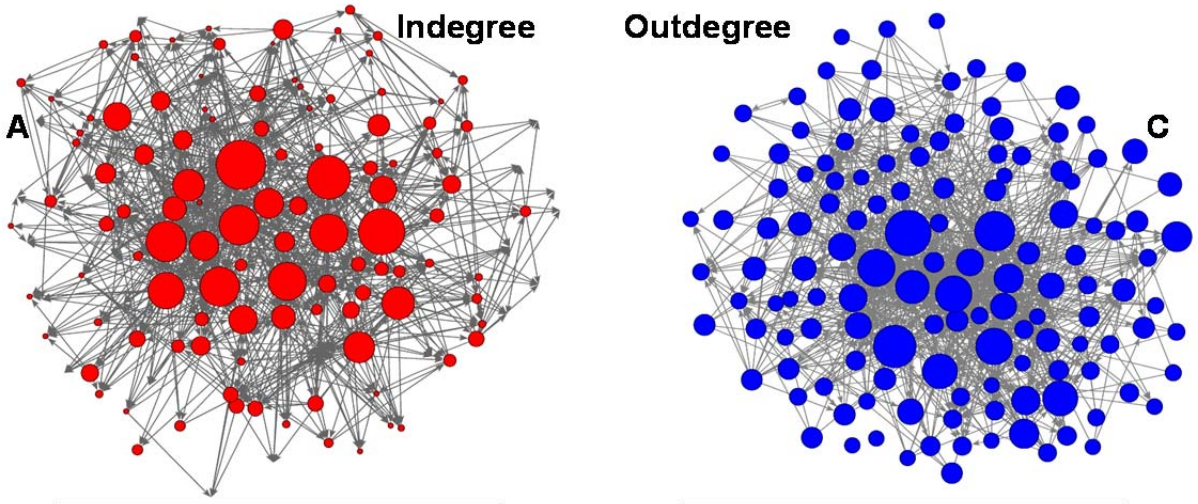
Subnetwork (year)	# Nodes (papers)	Percentage of nodes	Number of links	Percentage of links	Number of isolates	Percentage of isolates	Density
1996-2000	32	4%	2	0%	28	88%	0.002
2001-2005	72	10%	16	3%	51	71%	0.003
2006-2010	221	30%	95	20%	109	49%	0.002
2011-2015	409	56%	354	76%	145	35%	0.002

4.2.Research question two: Popular authors

The second research question focuses on popular authors. Figure 5 reports the main findings distinguishing between leading cited and citing scholars.
Concerning *popular cited authors (in degree)*, Panel A reports a selected group of researchers accounting for the highest values of cross-citations. The network includes 142 scholars and the figure clearly shows a contraposition between a relatively small group of central popular authors (the bigger circles) and a second group composed by many peripheral researchers (the smaller circles). The Panel B reports the top ten cited authors. The names present some similarity to the most cited papers (i.e. Barros, Chang, Hwang, and Phillips); furthermore, in many cases popular scholars have written papers together, as the case of Claver-Cortés, Pereira-Moliner, Molina-Azorín and Tarí (all from Spain), on onehand, and Chang and Hwang (both working in Taiwan), on the other. In term of topics, they show a strong focus on some issues, as hospitality strategy and performance for Claver-Cortés, Pereira-Moliner, Molina-Azorín and Tarí; human resource management for Karatepe; performance measurement systems for Phillips and Lee; efficiency for Barros, Chang, Hwang; marketing and online review for Law.
With the exception of Chang and Hwang (they are co-authors and both account for a single contribute), all the other popular authors have published many studies, with the pick of Karatepe (35 contributes). These popular scholars represent, collectively, 18% (131 articles) of the sample.
The *citing popular authors (out degree)* present a similar network structure, with a relatively few central researchers and many peripheral points (Panel C). This analysis includes the 133 most citing scholars. The table (Panel D) reports the names and all the lines account at least 5 papers. Sainaghi is the leading citing author, with five papers (two of them are reviews and therefore account an higher number of references) (Sainaghi and Baggio, 2014; Sainaghi et

al., 2013; Sainaghi and Canali, 2011; Sainaghi, 2010c, 2011), followed by Karatepe and Mattila.

Figure 5. Popular authors



B

Rank	Author	Papers (#)	Papers (%)
1	Claver-Cortés E.	15	2%
2	Karatepe O.M.	35	5%
3	Pereira-Moliner J.	16	2%
4	Phillips P.A.	9	1%
5	Molina-Azorín J.F.	12	2%
6	Chang T.-Y.	1	0%
	Hwang S.-N.	1	0%
7	Law R.	15	2%
8	Lee S.	15	2%
9	Barros C.P.	4	1%
10	Tarí J.J.	8	1%
	Total	**131**	**18%**

E

Rank	Author	Papers (#)	Papers (%)
1	Sainaghi R.	5	1%
2	Karatepe O.M.	35	5%
3	Mattila A.S.	11	1%
4	Claver-Cortés E.	15	2%
5	Zhao X.	5	1%
6	Pereira-Moliner J.	16	2%
7	Cvelbar L.K.	10	1%
8	Assaf A.G.	12	2%
9	Molina-Azorín J.F.	12	2%
10	Wu J.	8	1%
	Total	**131**	**18%**

D

Finally, it is interesting to note some relationships between cited and citing authors (Panel E, arrows). This can suggest a positive circle between citing and be cited, on one side, and given the high number of published papers of these authors (at least 12), the possibility to generate an important flow of self-citations (equals to 31% of total cross-cited citations in the case of Karatepe).

5. Conclusions, limitations and future research

The proliferation of hospitality and tourism research and its sub-fields make it timely to consider hotel performance. The influential nature of these outputs are of interest to a variety of constituents. Established and emerging scholars need to know where the influential papers are located across the domain. This will allow the identification of salient works by non-specialists too. The longitudinal approach of two decades provides valuable insights into the development.

Conclusions are structured at two levels, in accordance with the two research questions. In both cases, theoretical and empirical (when possible) implications are stated. Focusing on the first research question, findings are structured in four points: i) the whole network, ii) the most cross-cited and citing papers, and iii) journals, and iv) the temporal trends.

The *whole network* shows a low density, which includes many less cross-connected articles, accounting for an higher value of the Gini index, which suggests the existence of some internal communities. Based on these results, at theoretical level is possible to affirm that

there is a small group of studies around which the network rotates. The ability to identify these articles help understanding the heart of this research stream. These findings confirm the validity of the first research question. For managers, this central corpus of studies help understanding where researchers' energies were invested and to evaluate the fit existing between practitioners problems (practice) and theoretical contributes (rigor).

The most *cross-cited papers (in degree)* are mainly older (64% belong to the second slice), they represent 1% of sample but account 14% of cross-citations, the tourism and hospitality journals published 73% of these contributes and IJHM 55%. The implications for both theory and practice are the following. The majority of most-cited papers refer to the past and they represent the pillars for researchers, but are probably less relevant for practitioners, given the age of publication. Hospitality and tourism journals are more able to attract higher levels of cited papers. For researchers, it is important to publish in these journals, because they can assure high visibility and attract citations. The most *cross-citing papers (out degree)* are recent (100% belong to the fourth slice, 50% to 2015, the last year considered in the sample selection), 12 papers represents 1.6% of the sample but account 11.4% of cross-citing citations. All the papers are published in hospitality and tourism journals, while IJHM published 50% of these studies.

The 734 papers are published in 164 journals, but they show a clear core-periphery structure. Central area is populated by strong connected journals, while peripherals show no (or few) connections between isolated journals, but have more relationships with the centre. *Top journals* (ten) attract 56% of papers, 72% of cross-citations (in degree) and 60% of out degree. Some clear implications for researchers are the following: i) there is a wide and increasing number of journals interested in hotel performance, ii) top journals assure high visibility, attract a considerably amount of papers (56%) and mainly attract (in degree) a disproportionate percentage (72%) of cross-citations.

The *time trends* show an increasing (booming) number of published papers (first slice 4%, fourth slice 56%). During the years, the percentage of isolated articles move from 88% (first slice) to 35% (fourth slice), given the parallel increase in cross-citations (links). At a theoretical level, this research stream is an emerging area of enquiry. The high volume of recent papers is establishing many links with previous studies, creating the hotel performance network. At the empirical level, researchers are devouting time to measure and analyse results. Practitioners can find many ueful insights and papers can support the continuous adaptation of real performance measurement systems.

Finally, the second research question focuses on *popular cited and citing authors*. Given the similarity of findings, the discussion is not articulated by distinguishing between citing and cited popular authors. The network graphs display relatively few core researchers and many peripherals. Leading scholars usually have published many papers, some of them are co-authors and illustrate a geographical proximity. They focus on some recurrent topics such as strategy and performance, performance measurement systems, human resource management, efficiency, marketing and online reviews. There is some overlap between cited and citing popular authors with a positive circle between cited and citing authors.

5.1.Limitations and future research

This work presents some limitations that are primarily identified to suggest a future research agenda, for authors and other researchers. First, the study uses the Scopus database which despite being authoritative will result in some research outputs not being accessible because of their unavailability at the time of the research. The Scopus database is not exhaustive of all the possible publications relating to performance measurement, and we do not include textbooks in our sample.

Second, the chosen keywords (hotel and performance) favoured a focus on the hotels, reducing the generalizability of present results to other hospitality sectors. However, as reported in Table 1, lodging plays a pivotal role inside the whole industry, assuring a wide paper saturation (77%).
Third, the two research questions have favoured a more descriptive approach, focused on general trends of the topic (hotel performance), and on most cross-cited and citing papers, journals and authors. Thus the study has not explored analytical sub-fields in-depth. This limitation can be overcome with future studies that explore the salient clusters of papers sharing similar topics across networks.
The collection of the articles on the topic of hotel performance shows many multi-authored papers. In line with Ye, Song, and Li (2012), a further research development can be represented by the study of cross-institutional networks of co-authorship, in order to highlight research collaboration between institutions.
Finally, this study covers 20 years from 1996 to 2015. During this period some journals have altered their focus and currently do not publish hotel operation and performance measurement studies. As an example, this study includes journals such as Asia Pacific Journal of Tourism Research, which are no longer active in publishing articles relating to hotel performance.

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