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Investigating Tourists' Destination Choices – An Application of Network Analysis

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Abstract

A better understanding of the complex destination choice process is highly relevant, both for academia and practice. Tourism research tends to focus either on actually executed or hypothetical destination choices. However, a discrepancy exists between these two types of destination choices which has hardly been investigated. Moreover, past research often studies tourists and their attitudes, needs or perceptions of destinations but not how destinations' attributes affect destination choices. To approach these two research gaps, this study concentrates not only on actual but also on hypothetical destination choices to better understand differences in the evaluation of alternative destinations. This study furthermore examines the role of the destination itself to discover the influence of destination characteristics on destination choices. Therefore, network analysis and set theory are combined in a new research approach which allows to analyse destination choices with varying closeness to reality whilst preserving destination information. The analysis is based on a quantitative survey of German tourists' travel decision-making behaviour. The results reveal changes in destination choices from multidimensional hypothetical choices to unidimensional actual and past choices. Furthermore, only few destinations have a consistent position whilst most destinations are either more relevant for hypothetical or actual destination choices.

***Keywords*:** destination choice, travel decision-making, network analysis, set theory, Germany

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Introduction

Travel decisions are multilayered decisions with interdependent elements (e.g. destination, type of accommodation) that "evolve in a decision process over time" (Dellaert, Ettema, and Lindh 1998, 313). A type of travel decision that receives special attention in tourism research is the choice of a destination, probably due to the high importance for tourists compared to other elements of the travel decision (Fesenmaier and Jeng 2000; Oppewal, Huybers, and Crouch 2015). Choosing a destination is a complex process where only the result is visible in the form of tourist flows from a source market to a destination. Until a destination is finally chosen by a tourist it has to successfully complete

several stages of the destination choice (DC) process. The reasons it is preferred to other alternative destinations during these steps are manifold, interrelated and depend on external as well as internal factors (Um and Crompton 1990).

Tourism research tends to focus either on actually executed or hypothetical DCs which covers up an existing discrepancy between these two types of DC. A research gap exists in the understanding of DC as the discrepancy between actual and hypothetical DCs has rarely been investigated. For example, reasons why tourists decide to travel to some destinations while others remain hypothetical "dream" destinations are not clearly identified. Actual behaviour and imagination of travelling cannot be seen as equal (Decrop 2010; Karl, Reintinger, and Schmude 2015). This implies that actual and hypothetical DC do not proceed under the same premises and that there are differences in the way tourists evaluate alternative destinations for actually planned or executed and hypothetical future holidays. However, knowledge about the discrepancy and how to overcome this discrepancy can be highly relevant for the tourism industry.

DC is furthermore a negotiation process between tourists' needs and what destinations offer (Ankomah, Crompton, and Baker 1996). While many past studies focus on tourists and their attitudes, needs or perceptions of destinations, information on the destinations such as the geographic location is rarely captured. There are exceptions in the form of case studies which give important insights into a specific destination (e.g. Botha, Crompton, and Kim 1999) but not into the DC process in a more comprehensive way. The lack of consideration of the destination itself pushes one of the most important aspects of DC into the background: The destination and its distinct characteristics are important determinants of DC (Karl et al. 2015).

To approach these two research gaps (i.e. discrepancy between actual and hypothetical DCs; consideration of destination characteristics), this study investigates DC sections that vary in their closeness to reality. The focus is not only on the outcome of DC (actual DCs) but also on dreams and imaginations of travelling occurring before the decision to travel has been initiated (hypothetical DCs). The purpose of the paper is to better understand differences in the evaluation of alternative destinations concerning actual and hypothetical DCs. This study furthermore aims to analyse the relevance and role of the destination itself at different DC sections in order to emphasise the importance of destination characteristics in the DC process.

A reason why destinations have not been paid more attention in research on DC, in particular in quantitative studies, may be the methodological challenge to capture the multiplicity of destinations that are considered during the DC process. This study therefore applies network analysis as it allows to identify structures in the evaluation of alternative destinations whilst preserving destination information. Based on a quantitative survey on DC behaviour, alternative destinations of different DC sections and their relations as competitors are analysed using network analysis. This allows to capture the role of destinations on the basis of their position in the network. The results demonstrate that only few destinations have a consistent position in all DC sections whilst most destinations are either more relevant in the hypothetical or actual DC sections. Exemplary destinations are chosen to illustrate how destination characteristics determine the role of a destination in the DC sections. The exemplary destinations furthermore allow to further look into interlinkages and relations between actual and hypothetical DCs. The research approach and results of this study offer a wide range of application opportunities for practitioners which are discussed in the conclusion of this article.

Literature review and research questions

Various theories, approaches and methods have been applied to investigate DC from output oriented microeconomic models (e.g. Seddighi and Theocharous 2002) to behaviouristic models focusing on tourists' behaviours rather than the actual final choices (e.g. Choi, Lehto, Morrison, and Jang 2012). Two approaches dominate in tourism research to analyse DCs: 1) focus on actually executed choices for example by the observation of DCs (e.g. Botha et al.

1999) or output-oriented models to predict DCs (e.g. Papatheodorou 2001; Seddighi and Theocharous 2002); 2) focus on hypothetical choices with methodologies such as choice experiments (e.g. Ferns and Walls 2012; Sarman, Scagnolari, and Maggi 2016; Sharifpour, Walters, and Ritchie 2014). However, a discrepancy often exists between actual and hypothetical DC caused by constraints that prevent tourists from implementing their hypothetical dreams (Decrop 2010; Karl et al. 2015).

This study is therefore embedded in set theory as encompassing concept since set theory embraces the idea of different kinds of choices with varying closeness to reality. Another advantage of set theory is that it allows to investigate all destinations that are considered during the DC process instead of only focusing on the final decision. This helps to identify reasons for the rejection of destinations before the final choice and provides important input, both for the theoretical understanding of DC and the practical knowledge for tourism management and marketing.

Set theory is an approach which has first been introduced in consumer behaviour research to investigate choice opportunities and has been adapted to tourism research to explain DC processes in quantitative as well as qualitative studies (e.g. Crompton 1992; Decrop 2010; Jang, Lee, Lee, and Hong 2007; Prentice 2006; Um and Crompton 1990). According to set theory, DC can be described as a multistage, sequential, and funnel-like process with multiple alternatives (Crompton 1992; Sirakaya and Woodside 2005; Um and Crompton 1990). The complexity of the DC is simplified by distributing all destinations among hierarchically structured sets (Crompton 1992). The final decision is then made between a few destinations from a smaller subset (Crompton 1992). More detailed information on set theory can be found in a former study by Decrop (2010). Past set theory studies underline the complexity of a DC process which changes from the first initial idea to the final choice of one destination (e.g. Decrop 2010; Um and Crompton 1992). A longitudinal study from Decrop (2010) implies that travel decision-making and DC processes are becoming more realistic towards the end. This means that the type of destination changes, resulting in a discrepancy between initial travel dreams and actual travel behaviour (Karl et al. 2015). The discrepancy could be attributed to changes in the decision criteria that determine the different stages of the DC process. While facilitators dominate at the beginning of the process, inhibitors or travel constraints play a more important role towards the end (Um and Crompton 1992). Although past research agrees that the DC process changes and that different types of destinations are more or less relevant depending on the stage of the DC process, the differences in the comparison and evaluation of alternative destinations between actual and hypothetical DCs are not yet clear.

Another challenge in the investigation of DC, which has rarely been faced in past studies, in particular in quantitative surveys, is the integration of the actual destinations. However, it is the combination of tourist and destination attributes that forms the DC (e.g. Bekk, Spörle, and Kruse 2016; Karl et al. 2015): A destination will only be chosen as a final destination in case that the destination's characteristics and the tourist's preferences match. Bekk, Spörle and Kruse (2016) introduce tourist-destination personality similarity, a concept taken from person-environment fit theory, which is based on tourists' individual perceptions and destination attributes. Their results suggest that the level of similarity between these perceptions influences how satisfied tourists are with the destination and how likely they would recommend the destination to others. Another example are facilitators or inhibitors that lead to the selection or rejection of a destination. These factors are linked to the destination as well as to the tourist (e.g. risk-avoiding personality – preference of safe destination) and can only be fully understood through the integration of destination details in the research methodology (Karl 2016). There are few studies that consider destination attributes to a limited extent: Work on the investigation of inhibitors or travel constraints that influence the narrowing-down process of alternative destinations tend to concentrate on the choice of a particular destination but not on alternative destinations (e.g. Botha et al. 1999). Input-output DC models that include attributes of the entirety of final destinations (e.g. Marcussen 2011), neglect

alternative destinations that did not pass the whole DC process. Set theory provides a possibility to analyse destinations and their relevance at different stages of the DC process. However, most past studies on DC using set theory concentrate on the choice sets itself. In particular, the size and type of choice sets are investigated rather than the actual destinations and their characteristics (e.g. Crompton and Ankomah 1993; Woodside and Lysonski 1989; Um and Crompton 1990). Consequently, specific features of destinations, which are in some cases crucial determinants of DC, are not taken into account and tourists' DC set structures are only partly explained.

This paper aims to address two research gaps that have been identified in the literature review: 1) recognition of a discrepancy between actual and hypothetical DC; 2) consideration of the destination in DC research. Therefore, DC is not investigated in its entirety as a process, instead the focus is on certain sections of the DC that are distinguished by their closeness to reality and represent actual and hypothetical DCs. The study moreover includes specific information on the alternative destinations to better explain differences of actual and hypothetical DCs.

This study proceeds on the assumption that differences exist between hypothetical and realistic DCs which are reflected in the evaluation structure and relevance of alternative destinations in each DC section. Destinations that are perceived as more realistic should be more relevant in the realistic actual choices while destinations associated with stronger travel constraints should be less relevant at the same time. Based on this assumption, two research questions lead this study:

✓ Research question 1: What are the differences in the comparison of alternative destinations at different DC sections with varying closeness to reality?
✓ Research question 2: Which relevance or role do destinations have in different DC sections with varying closeness to reality?

Methods

Network Analysis

DC sets are comprised of a multitude of destinations. Consequently, a high amount of different destinations is mentioned in quantitative surveys. This impedes statistical analyses (e.g. combinations of destinations; links between destinations) and demands for alternative approaches. In order to avoid the concealment of destination information through clustering or typing methods, this study applies network analysis as a tool to investigate DC. This allows the analysis of hypothetical future, actually planned and executed past choices whilst preserving information on the destinations. This approach helps to better understand how alternative destinations are evaluated during the DC. Network analysis does not only permit the inclusion of destination information but also information on linkages between competing destinations to identify clusters of competing or compatible destinations in different sections of the DC.

> "Network analysis, derived from graph theory, attempts to describe the structure of relations (displayed by links) between given entities (displayed by nodes), and applies quantitative techniques to produce relevant indicators and results for studying the characteristics of a whole network and the position of individuals [actors] in the network structure" (Shih 2006, 1031).

Network science was introduced in social science to investigate relationships between stakeholders of various kinds. In tourism research, network analysis is applied for example to investigate stakeholder relationships in destinations (e.g. Baggio, Scott, and Cooper 2010; Pforr 2006; Scott, Cooper, and Baggio 2008), interrelations between destinations (e.g. Baggio 2007; Shih 2006) or tourist attractions within a destination (e.g. Stienmetz and Fesenmaier 2015). Further information on network science with a specific focus on the application in tourism research can be found in Baggio et al. (2010). In contrast to former research, our study is not based on relationships of stakeholders in a particular destination or competing destinations and attraction points but on specific sections of DC and relations between alternative destinations in these sections.

Data Collection

This study is part of a survey on the structure and determinants of tourists' DC processes.

Data were collected in Munich, Germany 2013 using a standardised questionnaire in personal interviews (*n* = 835). Trained interviewers approached the respondents in 18 public spaces where people tend to spend time instead of just passing. To avoid bias due to personal preferences, every second or third passers-by was approached depending on the passenger frequency. To ensure that only potential travellers were integrated in the survey, participants were asked a screening question at the beginning of the survey (i.e. "Are you planning to conduct a main holiday (at least four overnight stays) within the next twelve months?"). Only potential tourists at the age of 14 years or older were accepted since, in most cases, younger tourists influence but are not actively involved in DC (Decrop 2006).

The questionnaire was completed in personal interviews in an average time of 15 minutes. Only the sections that focus on DC and sociodemographic variables are included in this article. In the questionnaire set theory is applied to analyse DC behaviour at more hypothetical and realistic stages of the DC. Theoretical models of DC using set theory (e.g. Crompton 1992), describe rather complex, differentiated and detailed DC set structures. However, in quantitative surveys it is difficult to cover such complex structures. Therefore, the focus of this study is on three sections of DC representing hypothetical future, realistic planned and executed behaviour: the future consideration set, the relevant set and past DC.

Destinations in the future consideration set are alternative destinations for a future holiday which the respondent has not visited yet but wishes to visit in the future. The future consideration set illustrates the range of destinations that a respondent would be interested in and is drawn to visit in the future. It represents the hypothetical section of DC. The restriction to destinations which have not been visited before excludes own experience or images based on own experiences, both strong influencing factors of DC and image formation (Litvin, Goldsmith, and Pan 2008). It is similar to Crompton's (1992, 422) initial set which consists of "all the locations that might be considered as potential destinations for a vacation before any decision process about a trip has been activated". In our study the future consideration set has been operationalised as follows: "Please name up to six other destinations which you have not visited yet but would like to visit in the future."

The relevant set and past DC depict a more realistic picture of the DC towards the end of the DC process without destinations which cannot be visited (easily) due to constraints. The relevant set has a crucial position in the DC process. This set comprises all alternative destinations which tourists are considering for the next planned holiday and the final destination is taken from this set (Crompton 1992). In this study, the relevant set represents the realistic section of DC that is happening at present. The relevant set is based on Ankomah's et al. (1996) as well as Crompton's (1992) late consideration set with a limited time between DC and commencement of a journey (in our study: twelve months). "Which destinations are you considering for your next main holiday (i.e. at least four overnight stays)?" Past DCs represent actual choices in contrast to planned choices (relevant set) or hypothetical choices (future consideration set): "Where have you spent your main holidays in the last three years?". It signifies a realistic section of DC in the past with actually executed holiday trips where respondents were able to overcome travel constraints.

Respondents were not restricted to a specific geographical scale concerning the destinations in the questionnaire. An explanation for this approach can be taken from Fyall's (2013) statement on destinations:

> "Destinations come in all shapes and sizes and can be found in a variety of geographical settings such as in urban, rural and coastal environments. Destinations can be countries or a collection of countries, a distinct state, country or province, or in fact represent a local city, town or resort, national park, area of outstanding national beauty or coastline" (Fyall 2013, 118).

After elimination of invalid questionnaires, a final sample size of 835 questionnaires is used for the network analysis. Table 1 displays the socio-demographic profile of the respondents. The age

Table 1. *Profile of respondents (n = 835).*

	n	Percent
Gender		
female	418	51.2
male	399	48.8
Age		
14 – 19 years	64	7.7
20 – 29 years	242	29.0
30 – 39 years	123	14.7
40 – 49 years	100	12.0
50 – 59 years	132	15.8
60 – 69 years	92	11.0
> 69 years	72	8.6
Highest level of education achieved		
Apprenticeship	28	3.4
Junior high school	57	6.9
Secondary school	123	14.9
High school	267	32.4
University or college	320	38.8
Other	30	3.6
Occupation		
Retired	109	15.5
House wife/husband	18	2.6
Student	223	31.8
Workman	24	3.4
Employee	243	34.6
Civil servant	60	8.5
Unemployed	7	1.0
Other	18	2.6
Household income per month		
< 750 €	131	15.7
750 – 1,499 €	79	9.5
1,500 – 1,999 €	71	8.5
2,000 – 2,499 €	53	6.3
2,500 – 2,999 €	73	8.7
3,000 – 3,499 €	61	7.3
3,500 – 3,999 €	42	5.0
4,000 – 4,499 €	41	4.9
4,500 – 4,999 €	45	5.4
5,000 – 7,499 €	57	6.8
> 7,499 €	49	5.9
n/s	133	15.9
Household size		
1	227	27.6
2	306	37.2
3	131	15.9
4	108	13.1
> 4	51	6.2

group 20 to 29 years is particularly dominant since the survey took place in a city with a high amount of students. However, specific characteristics of the location of data collection (e.g. high proportion of young professionals) are considered throughout the data analysis and interpretation of the results. Moreover, this study is an explorative study that aims at developing and testing a new methodology to investigate DC. The goal was not to depict a representative picture of German tourists' DC. Nevertheless, a comparison with a representative survey of

German tourists travel behaviour (FUR 2016) shows a high consensus regarding the realistic DC sections.

Data Analysis

The wide range of destinations named in the survey created a dataset with information that was too differentiated for the quantitative network analysis. An aggregation of all destinations on the national level was necessary to detect patterns and structures of alternative evaluations. Information on the original geographical scale was used to better interpret the results of the network analyses.

Different software tools are used to analyse network data: R version 3.0.2 (R Core Team 2013) for the transformation of original survey into network data; UCInet version 6.507 (Borgatti, Everett, and Freeman 2002) for the analysis of the structures and properties in the networks; NetDraw version 2.138 (Borgatti 2002) to visualise network data; and SPSS version 21.0 (IBM 2012) for statistical analyses of the original survey data.

The transformation of the original survey data on destinations into network data results in an undirected and symmetric network. All destinations named in one DC section form a specific network. Nodes which are seen as the "elements of a system" (Fortunato, Latora, and Marchiori 2004, 1) represent destinations mentioned in a particular section. Links in the networks show that two destinations are named by the same respondent in the same section. The weight of a link corresponds to the number of times where two destinations are named together by respondents in the same DC section. The network analysis includes weighted as well as dichotomised data (i.e. distinction only between ties being absent or present; Hanneman and Riddle 2005) to investigate both the strength and variety of links between destinations in order to reveal dominance as well as diversity of destinations in the DC sections.

Social network analysis provides a multitude of tools, metrics and algorithms. Since this study does not examine social relationships but DCs and competing alternative destinations, only certain metrics are applicable here. Several metrics were considered that allow examining the way that nodes are connected, the distances between nodes and the kinds of structures that characterise the networks. However, some of these metrics were not applicable with the available data set or did not provide further insight into DCs than the chosen metrics. In the end, network density, degree centrality, network centralisation and cutpoints were chosen to investigate DC network structures in this study. The chosen metrics are unambiguous measurements and indicators for different aspects that are relevant for the analysis of DCs. Table 2 provides an overview of the chosen network metrics, measurement levels and indicative meanings in this study.

Network Density Δ

Network density "describes the general level of linkage" among the nodes in a network (Scott 2013, 69). In this study, network density indicates the degree of connectedness between destinations. It is measured using both

Table 2. *Dimensions of network analysis.*

Network metrics	Measurement of	Indicator of/for
Network Density Δ	structure of evaluation	degree of connectedness between destinations
dichotomised		cross-linking between destinations
weighted		strength of connections between destinations
Degree Centrality C_D	role of destination	degree of compatibility and uniqueness of a destination
Network Centralisation C_A	structure of evaluation	degree of hierarchical order of destinations
Cutpoint	structure of evaluation	degree of stability and connectivity between destinations
	role of destination	degree of bonding force of a destination

dichotomised and weighted data. In a binary network, dichotomised network density (i.e. ratio of links present to all possible links; see formula 1, Wasserman and Faust 2009) implies whether a network consists of a high number of marginally connected (i.e. low dichotomised network density) or strongly interwoven (i.e. high dichotomised network density) destinations. In a valued network, weighted network density (i.e. sum of links divided by all possible links; see formula 2, Wasserman and Faust 2009) incorporates the strength of a link or how often destinations are mentioned together in a DC section. The inclusion of the weighted network density factors in destinations that are strongly connected and build a cluster of highly relevant central destinations with specific roles in a DC section. In particular, the comparison of dichotomised and weighted network densities allows to draw conclusions about the diversity of destinations at a certain DC section. For example, a high weighted network density, compared to the dichotomised network density, is evidence for strong ties between few destinations.

Binary network with dichotomised data

$$\Delta_D = \frac{L}{g(g-1)/2} = \frac{2L}{g(g-1)} \qquad (1)$$

Valued network with weighted data

$$\Delta_W = \frac{2\sum v_k}{g(g-1)} \qquad (2)$$

v_k *value of line* l_k
L *number of links*
l_k *line between node* i *and* j
g *number of nodes in the network*

Degree Centrality C_D

Algorithms to measure centrality in a network generally aim to identify the most important, central or prominent actors within a network and are "a measure for an actor's level of involvement or activity in the network" (Prell 2012, 97). Various centrality measures are generally applied in network analysis such as closeness centrality, betweenness centrality or degree centrality. While closeness and betweenness centrality also incorporate non-direct adjacent neighbours to calculate the centrality of a node, degree centrality focuses only on directly adjacent neighbours (Wasserman and Faust 2009). However, non-direct links are difficult to interpret in a context that is not based on human or corporate networks. Therefore, degree centrality (i.e. amount of direct links to adjacent neighbouring actors; Wasserman and Faust 2009) is applied in this study to identify the role of individual destinations within the network. Since degree centrality indirectly depends on the size of a network, it is calculated in our study in a normalised way which is independent of the size of the network (see formula 4, Freeman 1978-1979; Wasserman and Faust 2009). Degree centralities are calculated with dichotomised data as, in this study, the focus is on the variety of destinations that are connected by a particular destination to understand how compatible a destination is with other destinations. Degree centrality is, moreover, able to demonstrate whether a destination is the main destination for tourists (i.e. low degree centrality) or mostly part of a group of competing destinations (i.e. high degree centrality).

$$C_D(n_i) = d(n_i) = \sum_j x_{ij} = \sum_j x_{ji} \qquad (3)$$

$$C'_D(n_i) = \frac{d(n_i)}{g-1} \qquad (4)$$

$d(n_i)$ *number of directly adjacent nodes*
x_{ij} *value of the link between i and j*
g number of nodes in the network
$0 \leq C'_D \leq 1$

Network Centralisation C_A

Network centralisation describes the structure of a network based on differences in the level of degree centralities (see formula 5, Wasserman and Faust 2009). It is able to show to which extent "cohesion is organised around particular focal points" (Scott 2013, 90). While the analysis of degree centralities helps to reveal the role and relevance of certain destinations during the DC, network centralisation allows to understand the balance or imbalance in a network. In this study, network centralisation is used to identify the hierarchical order of destinations within one DC section. A high level of network centralisation

implies that few destinations with high degree centralities dominate the DC section while a low level suggests a balanced structure without strongly dominating destinations.

$$C_A = \frac{\sum_{i=1}^{g}[C_A(n^*) - C_A(n_i)]}{\max \sum_{i=1}^{g}[C_A(n^*) - C_A(n_i)]} \quad (5)$$

$C_A(n^*)$ *maximal degree centrality of a node*
g number of nodes in the network
$0 \leq C_A \leq 1$

Cutpoints

A measurement for the analysis of the internal structure and connectivity of networks are cutpoints that bind the network. The removal of a cutpoint leads to a drop out of further nodes which are only attached to the network by this particular node. The network would consequently be divided into several sub-networks (Scott 2013). Hannemann and Riddle (2005) state that "cutpoints may be particularly important actors – who may act as brokers among otherwise disconnected groups". In our study, cutpoints are used to reveal destinations which bind other destinations or groups of destinations together and connect them to the network. The assumption is that tourists who prefer or travel to different kinds of destinations can agree on this cutpoint destination. This means that a cutpoint destination is an alternative for tourists whose preferences do not overlap otherwise.

Results

The analysis of the three DC sections (i.e. future consideration set, relevant set, past DC) focuses firstly on the general structure of each DC network and secondly on destinations with particular roles in the network. The first part concentrates on the. entirety of destinations and links between destinations in one DC section to investigate the structure of alternative destination evaluations, relevance of destinations and differences between the investigated sections of DC. The second part focuses on particular destinations and their embedding in a network of competing destinations to examine and illustrate the DC network structures of certain types of destinations. Table 3 displays the results of the DC network analysis.

The DC networks, shown in figure 1 to 3, illustrate the results and discussion sections of this article. All network figures are created in NetDraw using spring embedding technique, a "simple heuristic for laying out arbitrary networks" (Scott et al. 2008, 174). Nodes are positioned in a way that minimises distances between linked nodes. Hence, the most frequently linked destinations are situated at the smallest distance. The size of the nodes represents a destination's level of degree

Table 3. *Results of the DC network analysis.*

	Future consideration set		Relevant set		Past DC	
N	2,097		1,362		2,273	
No. of nodes	139		97		109	
No. of links	2,584		743		1,892	
Δ_w / Δ_D	0.27 / 0.12		0.16 / 0.08		0.32 / 0.11	
C'_D	USA	0.62	Italy	0.46	Italy	0.57
	Australia	0.50	USA	0.45	Spain	0.46
	Thailand	0.46	Spain	0.37	USA	0.44
	Canada	0.46	France	0.28	Germany	0.41
	New Zealand	0.44	Austria	0.25	Austria	0.41
C_A	0.50		0.39		0.47	
Cutpoints	Argentina, Asia, Caribbean, Mongolia, Lithuania, Russia, Sweden		Austria, Baltic States, Bulgaria Egypt, Greece, Italy, Madagascar, New Zealand, South Africa, South America, Southeast Asia, Spain, Portugal, United Arab Emirates, United Kingdom, USA		Egypt, Germany, Turkey, USA	

centrality while the strength of links between nodes refers to the number of times that destinations are named simultaneously.

Network densities and network centralisation provide information on the structure of DC sections according to the linkage of alternative destinations and are chosen to answer the first research question. In all DC sections, weighted and dichotomised network densities are between 0.16 and 0.32 or 0.08 and 0.12, respectively. These low values can partly be ascribed to the size of the networks since rather large networks are generally associated with lower network densities (Scott 2013). Both in regard to weighted and dichotomised network

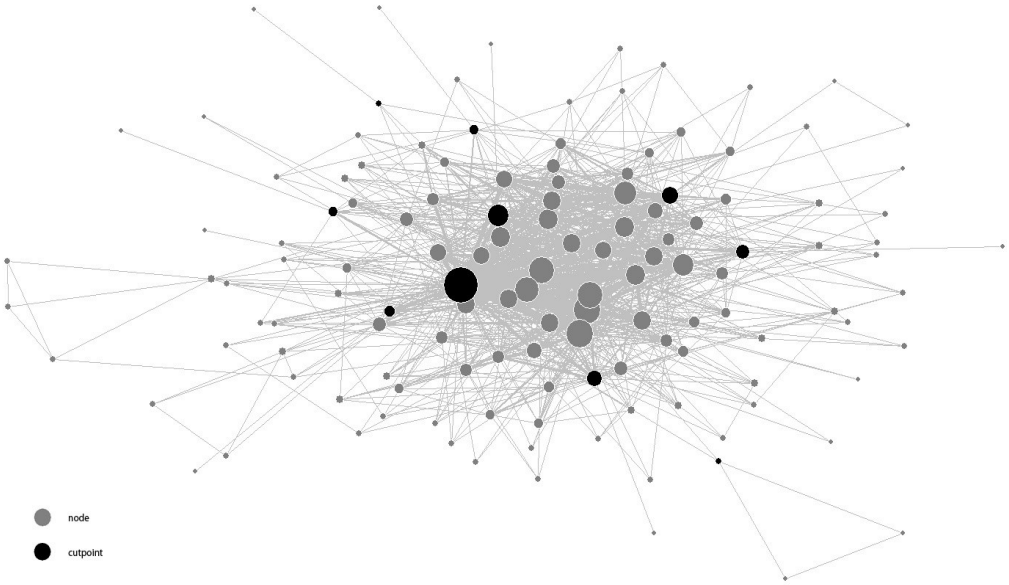

Figure 1. *Network of the future consideration set with degree centralities and cutpoints.*

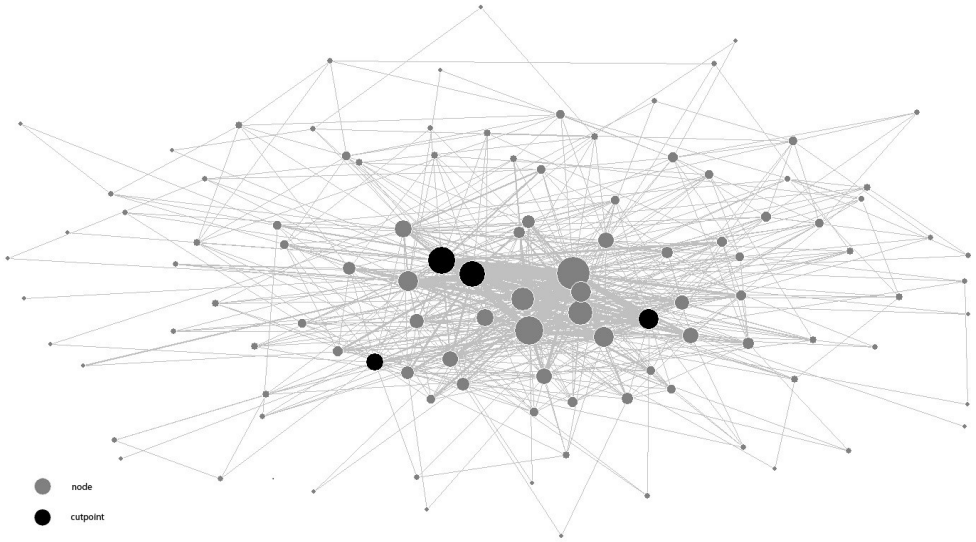

Figure 2. *Network of the relevant set with degree centralities and cutpoints.*

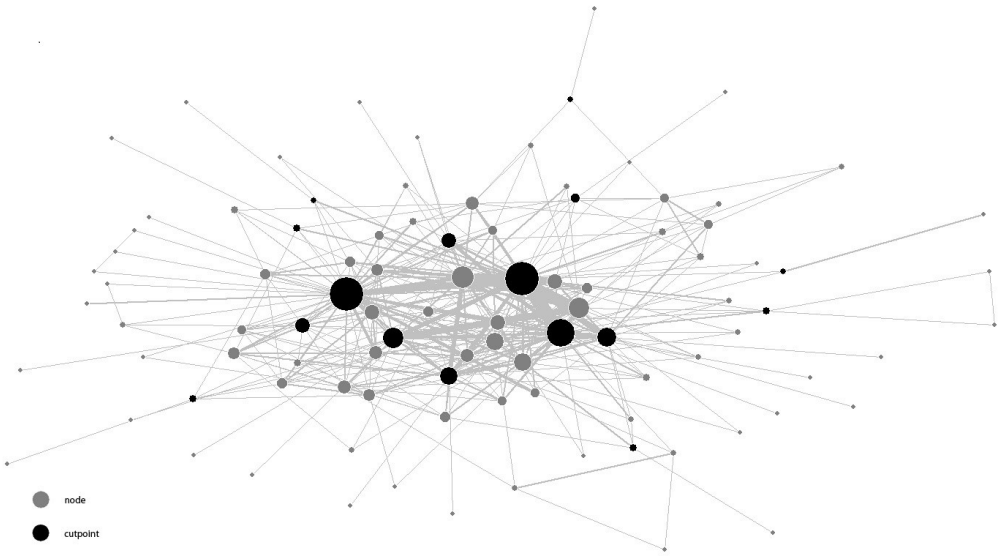

Figure 3. *Network of the past destination choice with degree centralities and cutpoints.*

densities, the relevant network has the lowest values while the future consideration and past DC networks have slightly higher values (see table 3). The level of network centralisation lies between 0.39 and 0.50 in the three networks. The future consideration and past DC networks show the highest network centralisation and consequently the highest variability of degree centralities. Here, few destinations with high degree centralities dominate the centre of the network structure and a large amount of destinations with low degree centralities constitute the peripheral areas of the network. In the relevant set, a weaker cluster of dominating destinations and less peripheral destinations result in a comparatively low level of network centralisation.

The metrics degree centrality and cutpoint are used to investigate destinations and their relevance or roles within DC sections (see research question 2). It has to be noted that the number of responses influences degree centralities: Frequently mentioned destinations have more chances to be linked to other destinations, resulting in a higher degree centrality than destinations which are mentioned only by a few respondents. In all networks, destinations with the lowest degree centralities are destinations with rather low tourism intensities (i.e. tourist arrivals per 1,000 inhabitants; UNWTO 2013). Destinations with the highest degree centralities in the future consideration network are long-haul non-European destinations, which do not necessarily occupy important positions in the other sections and do not reflect actual travel patterns of German tourists (UNWTO 2013). This is in contrast to the relevant or past DC network where destinations with high degree centralities are predominantly European destinations at a short or medium distance to Germany with high tourism intensities and strong tourist flows from Germany (UNWTO 2013). Two kinds of cutpoints have been detected in the DC networks: cutpoints with high degree centralities that connect destinations with high and low degree centralities which vary regarding touristic indicators, geographic locations or development statuses (UNDP 2014); cutpoints with low degree centralities that connect destinations with low degree centralities which are rather uncommon for the German outbound market (UNWTO 2013).

Discussion

The results demonstrate that the DC sections differ concerning the structures (i.e. network density, network centralisation) and relevance of alternative destinations (i.e. degree centrality, cutpoint) in the DC sections (see research question 1 and 2).

The future consideration network is characterised by a relatively high weighted network density despite a large amount of peripheral destinations and a high level of network centralisation. This indicates that a cluster of highly interwoven destinations exists despite a broad variety of destinations. Hence, a limited number of destinations is mentioned simultaneously by many respondents. The future consideration network is, moreover, a network with few cutpoints which is a proxy for a stable network. These results imply that hypothetical future travel plans of German tourists are rather multidimensional but nevertheless concentrated on some specific destinations. The multidimensionality can be ascribed to the absence of travel constraints at this hypothetical stage of DC. This is in line with Um and Crompton (1992) who state that inhibitors of travelling such as travel constraints strongly influence DC towards the end of the process when it comes to actual DC. The beginning of the process, which can be compared to the hypothetical DC in this study, however, is dominated by positive attributes and facilitators of travelling. Consequently, tourists include destinations in the future consideration set without taking factors into account that would deter them from travelling to destinations which substantially extends the range of different destinations.

In contrast to the hypothetical future consideration set, the relevant network is shaped by low network densities (dichotomised and weighted), a high proportion of destinations with low degree centralities and a large number of cutpoints. This means that the network itself is rather fragile with loosely connected destinations and would dissolve into several subnetworks in the absence of the cutpoint destinations. This implies a unidimensionality or uniformity in German tourists' actual travel plans for a particular holiday: Only a limited amount of destinations is considered for one particular trip. Moreover, the comparatively low but still significant level of network centralisation indicates that this network has a strong centre with few interconnected dominating destinations. This result is confirmed by a former study of Karl et al. (2015) where the level of homogeneity is calculated for several DC sets. Their study shows that the relevant set is very homogeneous since it mainly consists of rather similar destinations.

The high level of network centralisation in the past DC network is a proxy for a network with a strong centre of highly interwoven dominating destinations. This suggests that German tourists choose similarly when it comes to the final DC. Studies on first-time and repeat visitors, such as Chi's (2012) investigation of destination loyalty, confirm the stable destination preference. However, the higher network densities (dichotomised and weighted) and lower number of cutpoints, compared to the relevant set, are a sign of a strong integration of peripheral destinations into the network. The strong linkage of peripheral destinations to the cluster of central destinations indicates that the same respondents travelled to uncommon as well as conventional destinations. In the last decades, tourists have evolved into hybrid or multi-faceted tourists who do not travel to the same kind of destination or even the same destination in each holiday (Dellaert et al. 1998; Lohmann and Aderhold 2009). A study by Boztug, Babakhani, Laesser, and Dolnicar (2015, 190) shows that nowadays hybrid tourists "are the norm, rather than the exception" in regard to motivation and travel expenses. It is therefore likely that tourists also act in a hybrid manner in terms of DC.

A comparison of the results for each DC section demonstrates that the structure and relevance of alternative destinations varies which reflects the changes in the DC process. The structure of the future consideration network is characterised by a broad variety of potential destinations for tourists' future holidays. This variety is narrowed down in the relevant set and past DCs when tourists have to make actual decisions concerning their holidays. This refers to findings of previous studies on DC which found that DC follows a funnel-like process where travel constraints successively reduce alternative destinations (e.g. Crompton and Ankomah 1993; Woodside and Lysonski 1989). Consequently, alternative destinations become more homogeneous at the end of the DC process. Karl et al. (2015) for example show that while most tourists consider a greater variety of destinations at an early stage of the DC process, their relevant sets for a specific trip consist of a very limited amount of destinations of a similar

type. A closer investigation of the destinations that form clusters in the centre of each DC section confirms that not only the evaluation structure of alternative destinations changes but also the relevance of particular destinations (see research question 2) and the strongest competitors: Central destinations in the hypothetical DC section are mainly long-haul non-European destinations while central destinations in the realistic DC sections are mainly popular destinations for German tourists. Reasons for the changes are for example temporal situational or permanent structural travel constraints (Decrop 2010) which lead to a domination of destinations in the relevant set and past DC that can be realised more easily. These destinations are mainly located within Europe and probably associated with less transport costs which might reduce financial constraints. In the hypothetical future consideration set, however, respondents do not actively consider alternatives. Therefore, constraints do not yet apply and do not influence this section of the DC. This is in line with past research on DC such as Decrop (2010, 110-111) who states that the DC process becomes more realistic: "Vacationers may move from a preference/ideal value level (dreamed but not necessarily available destinations) to an expectation level (realistically available destinations) and finally to a tolerance level (surrogate destinations that represent an acceptable minimum) as far as plans evolve".

Changes between the DC sections moreover manifest in the geographical scale of the named destinations (i.e. regional, national, subcontinental or continental). Subcontinents and continents are in particular mentioned in the future consideration set where the imagination of an actual destination is (still) sometimes rather vague. Tourists probably do not have in-depth knowledge about a destination (yet). A reason may be that they do not actively consider alternative destinations, for example through information search, until the end of the DC process (Crompton 1992). In the relevant set, where respondents are closer to the actual choice for a holiday, imaginations of the destination are clearer and the destinations named in the survey are narrowed down to smaller geographical areas (i.e. countries or regions). The same applies for past DCs with destinations on the national or regional level.

The network analysis shows that the DC sections differ in the variety of destinations and that different destinations play a key role in actual and hypothetical DC sections. A comparison of destinations' degree centralities in the three DC networks furthermore reveals that most destinations do not have a consistent relevance or position in all DC sections. In fact, most destinations vary in their relevance and positions in the DC sections and loose or gain in importance from hypothetical to actual DCs. Three types of destinations in regard to their position in the DC sections are identified: core destination (i.e. high relevance in all DC sections); surrogate destination (i.e. higher relevance in actual than hypothetical DC sections); and intentional destination (i.e. lower relevance in actual than hypothetical DC sections). The following exemplary destinations represent the three types of destinations. These exemplary destinations allow to illustrate and explain what kind of characteristics a destination should incorporate in order to classify as core, surrogate or intentional destination.

Core destinations are destinations with high degree centralities in all DC networks. The high degree centralities signify a large amount of competing destinations and a high combinability with various other destinations. Therefore, core destinations could be seen as destinations on which travel companions with different destinations in their minds can easily agree. Consequently, core destinations can help to facilitate DCs since tourists normally decide together with their travel partners in mutual decisions (Jang et al. 2007; van Raaij and Francken 1984). USA can be defined as a core destination since it has high degree centralities in all DC networks, being the first, second and third most central destination in the future consideration, relevant and past DC network (C'_D = 0.62/0.45/0.44). The role of this destination in the three DC sections indicates that USA as a core destination can be combined with various kinds of destinations. The diversified touristic potential of the USA allows tourists to realise various types of holidays from city tourism in New York to sun-and-sea tourism in Florida. With its different climate zones, it is

moreover a year-round destination. A holiday in the USA (and other core destinations) is an alternative which is acceptable for a broad variety of tourists with various travel preferences and DC structures.

Surrogate destinations are destinations with comparatively low degree centralities in the future consideration network but high degree centralities in the realistic sections of the DC (i.e. relevant set, past DC). According to Decrop (2010), surrogate destinations replace ideal destinations when it comes to the final DC (Decrop 2010). Many tourists plan to travel to these destinations on their next holiday or have already realised a holiday there but do not dream about visiting them in the future. The assumption is that tourists who travel to different destinations are able to agree on surrogate destinations as an alternative to their other travel preferences. The destination Italy represents an example for a surrogate destination as it has an outstanding position (i.e. very high degree centralities, cutpoint) in the relevant and past DC networks (C'_D = 0.46/0.57) but a weaker position in the future consideration network (C'_D = 0.39). The high degree centralities in the actual DC sections imply that Italy is a destination that is an adequate alternative for many tourists when it comes to the actual DC. Due to the diverse touristic potential of Italy, tourists with varying travel motives are able to fulfil their needs at the same destination from sun-and-sea to culture or nature oriented holidays. Moreover, with about ten million arrivals from Germany every year and a market share of about 20 percent (UNWTO 2013), Germany is an important source market for Italy. The high number of German tourists implies that many German tourists are familiar with Italy due to prior visit and/or information from friends or relatives who have visited the destination. Both, own experience and word-of-mouth information are rated as strong persuasive factors in DC (Litvin et al. 2008). The short distance to Germany, the free movement of persons within the Schengen area and the usage of the same currency further facilitate travelling between the two countries. All these aspects point towards the fact that Italy can easily replace other destinations which were initially considered as alternatives but may be not be realisable for various reasons.

The last type of destinations are intentional destinations with low degree centralities in the DC sections which represent actual travel behaviour (i.e. relevant set, past DC) where they are located at the periphery of the networks and relatively high degree centralities in the future consideration network. The discrepancy between realistic and hypothetical travel behaviour is the distinctive feature of these destinations. Intentional destinations are rather uncommon destinations for the German outbound market with weak tourist flows from Germany. Russia's role as a connector in the future consideration network (i.e. cutpoint with relatively high degree centrality, C'_D = 0.33) together with the peripheral position in the actual DC networks (i.e. relevant set, C'_D = 0.05; past DC, C'_D = 0.18) classify Russia as an intentional destination. An intentional destination, like Russia is most central at the hypothetical stage and becomes peripheral when it comes to actual choices because of a substitution by a surrogate destination, probably due to travel barriers. Travel barriers concerning Russia are presumably visa requirements which complicate travel arrangements for trips from Germany to Russia. Studies on visa regulations agree that there is a significant influence of changes in visa regulations on tourist arrivals or economic effects of tourism (e.g. Beenstock, Felsenstein, and Rubin 2015; Neumayer 2010). Another travel constraint may be the language barrier which might hamper travelling in and to Russia: Tapachai and Waryszak (2000), who analyse destination image in DC, demonstrate that the absence of language barriers between the host and source country is perceived as a beneficial factor in DC.

Conclusion

Choosing a holiday destination is a complex process where only the result is visible in the form of tourist flows from one country to another. Until a destination is finally chosen it has to successfully complete several stages of the DC process where it is compared to its alternatives. The evaluation structures and the alternative destinations themselves are not the same in all stages of the DC process, in particular comparing realistic and hypothetical sections. Our study contributes to the understanding of DC, both for tourism research and management. It sheds light on the competing destinations and

their relation in different DC sections and identifies types of destinations with specific, varying relevance in these sections.

Theoretical Contribution

This empirical study combines network analysis, a methodological instrument for the investigation of "*relationships* among [...] entities, and [...] the patterns and implications of these relationships" (Wasserman and Faust 2009, 3), and set theory, a theoretical model with hierarchically ordered subsets of alternative destinations, to investigate DCs. Metrics from social network analysis are transferred to examine the position, combinability or interchangeability of destinations at certain DC sections. This approach adds new insight into the understanding of DC and enhances the DC research methodology. An advantage of the application of network analysis is that all destination information is retained during the analysis. The analysis and interpretation of the results can consequently be conducted with specific information on the destinations, adding a geographic perspective to DC literature. Moreover, set theory is able to address another gap in past research - the discrepancy between actual and hypothetical DCs. Hence, some limitations of quantitative and qualitative research approaches can be reduced through this study's approach: Quantitative outcome-oriented research, such as Marcussen (2011), includes a range of destinations to predict the final destination. However, the DC process and different sections of DC are not captured. Qualitative process-oriented research, such as Decrop (2010), focuses on different steps of the DC process but is not able to embrace the variety of destinations that are part of the DC process.

Extending former research by Decrop (2010), our study shows that the structure of DC networks differs considerably between the selected DC sections from multidimensional hypothetical future choices to unidimensional actual and past choices. A significant finding to emerge from this study is that every DC section is characterised by destinations which are located at the centre or periphery of the network and consequently more or less relevant alternatives. Few dominating destinations play an important role in all sections of the DC while the majority of destinations are more or less relevant in either hypothetical or actual DC sections.

In contrast to many past studies on DC using set theory, our study investigates DC from the perspective of the destination rather than of the tourist. This approach helps to understand how alternative destinations operate in different DC sections. The concretisation of set theory through the integration of actual destinations in the theoretical construct of DC sets furthermore deepens the knowledge of DC behaviour. For example, reasons for shifts in the DC sets or why destinations lose relevance in certain DC sections can be examined more thoroughly with information on the actual destination and its characteristics. This is particularly important since the characteristics of destinations have a decisive impact on the decision in favour or against a destination (Ankomah et al. 1996). A combination of set theory and network analysis offers new possibilities to study travel constraints from the tourist and destination perspective for a better understanding of changes in the DC process caused by internal and external factors.

Managerial Contribution

The combination of network analysis and set theory provides a useful tool for a destination's management and marketing for several reasons. This approach is applicable on various geographical scales, global but also regional or local. It enables tourism stakeholders to identify competitors and possible cooperation partners, both, on a global level and at close proximity. Network analysis, in combination with set theory, allows to determine in which DC section a destination is represented mostly and with which alternative destinations it has to compete in order to succeed in the DC process. DMOs are then able to identify competitors at different sections of the DC process and optimise their marketing strategies accordingly. For example, the core destination USA is mainly competing with Australia and Canada in the hypothetical DC section and Italy, France and Spain in the realistic DC sections. While competitors in the hypothetical DC are rather similar to USA (e.g. long distance, highly developed, politically stable and safe, nature-oriented marketing), competitors in the realistic DC are more diverse regarding for example the distance to the source

market, touristic offer or climate conditions. Explanations for these difference are the hybrid choice behaviour of tourists and the high combinability of the destination USA with various kinds of destinations. This is a challenge of DMOs which could be faced by more individualised marketing strategies.

Another factor that is important in this context is the interchangeability of destinations. Is a destination a destination with a high amount of competitors or a unique destination with few or no direct competitors and therefore hardly interchangeable with alternatives? Our study emphasises that some sun-and-sea destinations in the Mediterranean can easily be exchanged (i.e. strong links between the destinations) probably because the main attractive features (e.g. beach, sea, climate) are available in all alternative destinations. For example, Italy, a sun-and-sea destination, has destinations with a similar offer (i.e. Spain, France, Greece, Turkey and Croatia) as strongest competitors in the relevant set. Other destinations with a more unique touristic potential are harder to substitute which is reflected in the network structure (i.e. destinations with a high number of mentions but low degree centralities such as China). This knowledge enables DMOs to target unique characteristics that distinguish a destination from its competitors to reduce interchangeability.

This study furthermore demonstrates that some destinations with rather important positions in the future consideration network are not realised when it comes to actually choosing a destination for the next holiday. Information about competitors and travel constraints that lead to the rejection of a destination is necessary as it supports a destination's shift from more hypothetical sections to actual DCs. More specifically, DMOs can look at similarities between competing destinations in regard to supply, image or marketing strategies but also restraining or decisive factors that distinguish successful destinations from its competitors in more or less realistic DC sections. An analysis of situational and structural constraints can help to develop marketing strategies which specifically address those constraints to positively influence tourists' perceptions of a destination.

Limitations and Further Research

Network analysis provides many instruments to investigate different aspects and areas of networks. Since this study does not examine social networks but networks of destinations in tourists' minds, only certain metrics are applicable. The focus on only a few instruments in this study can be explained by the aims of this study: a better understanding of DCs and specific roles of destinations in different DC sections with varying closeness to reality; a straightforward interpretation of the instruments to facilitate the application in other geographic regions for research and practice purposes. However, some network analysis tools could offer further and deeper comprehension of DCs, in particular in regard to the structure of DC networks. A possibility to analyse network structures is core-periphery analysis. Core-periphery analysis helps to detect structures of densely connected, cohesive cores and loosely connected peripheries of a network (Borgatti and Everett 1999). In regard to DC, core-periphery analysis would be able to reveal strong competitors in the initial consideration set or relevant set and compatible destinations in the past DCs. For the subsequent and further investigation of DC structures, modularity analysis might be useful since it is able to detect possible divisions of a network and to measure the strength of division (Newman 2006). Both approaches are particularly interesting if destinations are categorised according to specific aspects such as dominating market segments, safety and security aspects or distance to the source market. This strategy could help to identify how similar strongly or weakly linked destinations are in regard to decisive influencing factors of DC. A deeper analysis of densely connected destinations in the DC sets enables to detect patterns, for example, in regard to the interchangeability. This would allow the extraction of clusters with competing, interchangeable destinations from the network for in-depth analysis. Further research questions could focus on the identification of destination types and similarities between destinations in strongly linked clusters using modularity analysis.

A limitation of this exploratory study is that the results highly depend on the area in which the investigation takes place. While the general structure of the DC sections and, in particular, the research methodology is transferable to other research areas, the results, in particular the destination-related results, are strongly related to the geographic location of the study. The results should be interpreted in the light of the national (e.g. importance of international destinations due to the strong German outbound travel market; Lohmann and Aderhold 2009) and regional context (e.g. importance of the destination Italy due to the close proximity between Southern Germany and Italy in the realistic DC sections). It could be useful to conduct cross-cultural studies in other countries to investigate similarities and differences in DC network structures.

Several research questions concerning DC networks, especially in regard to the role of the tourist, remain unanswered at present. Ankomah et al. (1996) state that factors related to the tourist as well as factors related to the destination shape the DC process. A former study by Karl et al. (2015) highlights this interrelation showing that the interaction of personal and destination characteristics results in diverse DC patterns. Other aspects concerning the tourist like travel experience, travel preferences or travel motives should be investigated in relation to destination characteristics to gain a deeper understanding of DC. An investigation of DC using the methodology of our study can therefore enhance DC tourist typologies like Plog's (1974) or Decrop and Zidda's (2006) that focus primarily on tourist characteristics as explanatory variables. The calculation of clustering coefficients (i.e. extent of clustering; Hanneman and Riddle 2005) for the DC networks could be a first step to reveal whether tourists primarily choose between several destinations while other tourists select a destination from a different group of destinations. A further possibility would be the identification of clusters of closely connected destinations, for example by means of modularity analysis. The final step would be an investigation of differences between tourists (e.g. travel behaviour, sociodemography) who choose from each cluster of densely connected destinations. This procedure would allow to incorporate tourist and destination characteristics in the investigation of DC choices. The integration of DC tourist types and DC networks would better capture the interdependency between tourist and destination in order to understand the complexity of DC.

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