



International Journal of Contemporary Hospitality Management

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Article information:

To cite this document:

Deborah Edwards Mingming Cheng IpKin Anthony Wong Jian Zhang Qiang Wu , (2017), " Ambassadors of knowledge sharing: co-produced travel information through tourist-local social media exchange ", International Journal of Contemporary Hospitality Management, Vol. 29 Iss 2 pp. -

Permanent link to this document:

<http://dx.doi.org/10.1108/IJCHM-10-2015-0607>

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Ambassadors of Knowledge Sharing: Co-produced Travel Information Through Tourist-Local Social Media Exchange

Introduction

The establishment and proliferation of Web 2.0 and social media as a new medium of communication has transformed the world by allowing people to form far-reaching networks, and virtual communities sharing their everyday life issues and interests (Qualman, 2013). In the context of tourism, tourists are especially interested in searching, organizing, and annotating their travel experience as well as building their online travel communities for sharing travel information and knowledge (Xiang & Gretzel, 2010). Similarly, destination management organisations (DMOs), and tourism operators are responding to these changes by extending their social media accounts to reach, persuade, and attract potential tourists, and to mediate and shape tourists' experiences (Hays, Page, & Buhalis, 2013; Leung, Law, van Hoof, & Buhalis, 2013).

In particular, research on user generated content (UGC) in social media to-date has proven a valuable asset to many stakeholders, as it has fundamentally changed the knowledge and marketing structure of the contemporary business world. Consumers increasingly rely on UGC to make their decisions (Leung et al., 2013; Ye, Law, Gu, & Chen, 2011). As such, the marketing power of DMOs and tourism operators are shifting towards UGC, as consumers perceive UGC to be more authentic and genuine (Költringer & Dickinger, 2015). However the UGC of travel forums with their interactive, collaborative and informative exchanges have largely been overlooked in the tourism literature. To address this gap this research uses the world's largest travel forum – TripAdvisor – to generate both theoretical and practical insights by examining its vast data to identify the knowledge sharing structure created by those engaging in UGC. The study provides a visual representation of the social media

mediated travel knowledge co-production process of the TripAdvisor travel forum, extends online knowledge management theory (Yiu & Law, 2014) and contributes to extant methodological literature on the analysis of big data by introducing a novel visual analytics approach. Practical implications are provided for DMOs, tour operators, and social media sites.

The paper is structured as follows. It starts with a literature review of four related areas - knowledge sharing, UGC and its challenges, co-production of value and visual analytics. Then the research design is presented covering data source selection, in conjunction with an explanation of the key steps taken by using a novel visual analytics approach. After that, findings are presented via a series of visualised figures. The paper concludes with considerations of both theoretical and methodological implications and insights that go beyond the study.

Theoretical Background

The tourism literature largely reports positive impacts of tourist demand and tourism development on a destination. These impacts include job creation, economic gains, destination development, socio-cultural benefits, and knowledge exchange (Ap & Crompton, 1998; Liu & Var, 1986; Stylidis, Biran, Sit, & Szivas, 2014). As benefits from tourism development can trickle down to the hosting community, community stakeholders are often involved in the process of tourism development in attracting and serving tourists (Aas, Ladkin, & Fletcher, 2005; Byrd, Bosley, & Dronberger, 2009). In fact, community stakeholders play a key role in transmitting tourism services and encouraging tourists to learn and to acquire various tourism products (Wong, 2014). Community stakeholders' involvement could be explained by multiple theoretical underpinnings including agency

theory in which actors are more likely to engage in activities that promote personal interests (Ross, 1973).

Although these prior studies have laid the necessary theoretical foundation, research on stakeholders and tourism development primarily focuses on identifiable stakeholders, such as government, local businesses and service providers, but largely ignore community stakeholders who act as travel experts, immersing themselves into social media to assist tourists in answering travel related questions and planning their trips. Through computer mediated channels, such as online travel forums, these actors serve as knowledge surrogates of a destination who disseminate destination-specific information and co-produce trip-specific knowledge for potential tourists. Although prior studies have documented UGC and its roles in affecting tourists (Hvass & Munar, 2012), the current study goes beyond UGC to disclose a new phenomenon – travel knowledge co-production – in which the tourists knowledge of a destination and information acquired for their trips are co-produced with destination community stakeholders who literally serve as destination ambassadors by providing one-to-one information inquiry services about specific destinations. Given the distinctive phenomenon discerned in this study, we review the literature germane to knowledge sharing, UGC, co-production of value and visual analytics as follows.

Knowledge Sharing

Knowledge sharing as a research topic has received growing popularity, particularly in organizational settings, as it helps organizations generate innovative ideas, create solutions, innovate best practices and ultimately enhance the long term performance of an organization (Adamic, Zhang, Bakshy, & Ackerman, 2008). Shared knowledge can be approached as a spectrum, which ranges from completely tacit to totally explicit (Haldin-Herrgard, 2000).

Tacit knowledge is hidden knowledge acquired during a period of time and is perceived to be

difficult to convey and transfer, as it is the personal knowledge in individuals' minds through the forms of experience, personal belief and insight (Groff & Jones, 2012) that another user is needed to communicate or use the knowledge (Ipe, 2003). Examples include everyday discussion, and face-to-face meetings. In contrast, explicit knowledge is articulated by formal practices that are more directly observed, captured, transferred and communicated to others (Kim, 2011). Examples are all forms of written and visual materials.

To better explore the relationship between these two types of knowledge, Nonaka (1994) creates the SECI model which represents four dimensions of knowledge creation and transfer: socialization, externalization, combination, and internalization. These dimensions have been widely adopted in the knowledge management literature. Socialization refers to a process by which tacit knowledge is created and then transferred from one to another through practice, guidance, imitation, or observation. The socialization process is particularly relevant to the Web 2.0 context, as social media facilitates and ultimately creates a new platform of tacit knowledge sharing, through a "virtual" interactive and collaborative manner (Ma & Chan, 2014; Panahi, Watson, & Partridge, 2012). Examples include online forums that are designed for knowledge sharing from mundane questions to complex ones. While researchers are increasingly interested in social media, there is still a lack of studies to examine the relationship between knowledge sharing and social media (Panahi et al., 2012; Razmerita, Kirchner, & Nabeth, 2014). One of the significant features of social media is the powerful nature of UGC, where users are no longer readers but rather they are contributors in creating, editing, commenting, annotating, evaluating and distributing their tacit knowledge (Kaplan & Haenlein, 2010; Lerman, 2007). It ultimately contributes to "harnessing collective intelligence" in Web 2.0 (O'Reilly, 2007).

In the tourism literature, studies of knowledge creation and sharing on Web 2.0 are relatively modest. A recent review of knowledge sharing (Yiu & Law, 2013) reveals that

studies thus far still concentrate on organizational settings, such as hotels. Nezakati et al. (2015) reinforce this need for further studies of knowledge creation suggesting that the integration of tacit knowledge sharing during pre-travelling decision making can be powerful, as it may significantly influence tourists' decision making process. Additionally they argue that understanding the knowledge sharing structure in online forums could ultimately improve the effectiveness of the process that contributes to the sustainable management of a destination.

User Generated Content (UGC) and Its Challenges

UGC is a repository of content generated by users. It contains a large volume of naturalistic and spontaneous data, which create valuable research possibilities. Research to date on UGC in social media has largely focused on hotel review comments (Zhang, Ye, Law, & Li, 2010), travel blogs (Law & Cheung, 2010), Facebook and twitter data (Sotiriadis & van Zyl, 2013). One type of UGC that has been overlooked is the travel forum. A travel forum is different from other social media spaces, as it usually contains short questions and answers that help tourists solve a particular travel issue at the micro level (i.e., users posting a question and waiting for answers on a particular social media site). Issues raised by tourists in a travel forum are growing dramatically, as tourists seek extra information to support their information search process (Zhang & Watts, 2008). It would seem that tourists' dominant functional needs are unmet. Hence, during their information acquisition process, searching for information through social media assists tourists to reduce their uncertainty level prior to making their decisions (Hwang, Jani, & Jeong, 2013).

Hence, a travel forum is driven largely by problem solving initiatives through a series of interaction with other participants. The distinctive structure of questions and answers (QAs) in a travel forum provides many valuable insights and reflects the dynamics of

knowledge sharing practices (Wang, Wang, Li, & Fan, 2014) creating collective intelligence for and from different stakeholders such as tourists, community stakeholders, and local tourism authorities (Adamic et al., 2008; Zhang & Watts, 2008). In particular, TripAdvisor deliberately created a strategy in which residents or frequent visitors, who are friendly, offer good advice and respond to many different topics on a regular basis are accorded 'destination expert' status (TripAdvisor, 2014). Such has been the success of this strategy the TripAdvisor forum is considered to exemplify the best of travel forums in giving helpful, friendly advice.

While acknowledging the usefulness of UGC data, research to date in the tourism space faces a number of issues that are in most cases unsolved. Existing analysis of social media data in tourism rely on a limited sample size and sometimes, the selection of data are towards "outliers" that do not necessarily reflect the representation of the underlying phenomenon (Crampton et al., 2013). More importantly, UGC data in the social media space is updated in a dramatic speed. Hence, much research faces a major limitation by only including a small sample of data from a particular source and claim it to be representative of underlying tourism problems (Lu & Stepchenkova, 2015). For example, the selection of blogs often falls into this trap. This raises questions in terms of the traditional research process and creation of knowledge, suggesting a need for re-evaluating our approach to social media data (Lu & Stepchenkova, 2015).

As such, the use of big data allows for a more compressive and representative account that will generate valuable insights for many large unstructured fields (Chen, Chiang, & Storey, 2012; Kitchin, 2013). However, large volumes of data which contain more than just text or numbers are impossible for human manual processing. Methodological challenges arise in collecting, organizing, and analysing this data in a quantifiable and time-efficient manner (Boyd & Crawford, 2012; Mayer-Schönberger & Cukier, 2013). Hence, careful data

mining techniques are required that involve an initial understanding of the data structure and content, a cautious data cleaning process, a multidisciplinary approach beyond simple text and statistical analysis, and a clear and visual representation of the data.

Co-production of Value

Value is defined as benefits a person receives during a market exchange and now understood as being co-produced by consumers (Etgar, 2008; Fisher & Smith, 2011). Central to the value co-production concept are theoretical underpinnings of service-dominant logic (Merz, Yi, & Vargo, 2009; Vargo & Lusch, 2004) and third-place community (Rosenbaum, 2006, 2009) in that customer involvement in the value creation process is perceived as a central part of the service delivery process, and in which value is intangible and relies on user engagement (Gangi & Michael, 2010, p. 8).

Value co-production is defined as the mutual benefits gained by the organization and users (Gangi & Michael, 2010, p. 6). Then by its very definition, value co-production encompasses customer-driven activities, such as sharing information and knowledge, to assist a firm to create value for customers. That said, it requires the customer to perceive that their role is personally important and relevant and that they are fulfilling their needs, and interests. Such active customer participation is classified into four major components including preparation of service (i.e., seeking referrals); building a relationship with the provider; providing information to clarify service expectations; and providing feedback, problem diagnosis, and solutions (Kellogg, Youngdahl, & Bowen, 1997). Indeed, a central point of value co-production rests on customers' operand and operant resources, such as knowledge, skills, and experiences, to participate in the co-production process (Jacob & Rettinger, 2011; Merz et al., 2009). Hence, residents or visitors, who possess travel expertise of a specific destination, are well situated to participate in co-producing value with tourists not only by

providing destination specific information but also by interacting with them and sharing tacit knowledge through QA dialogs. Figure 1 provides an exemplar of the value co-production process in TripAdvisor.

*** Insert Figure 1 here***

In turn, given the high level of involvement and interactions mediated through social media, we define co-production of knowledge as a value proposition created through participation of community stakeholders (residents, locals, or frequent visitors) who contribute their operand and operant resources (i.e., travel expertise). It is clear that co-production of knowledge goes beyond the current understanding of UGC as it defines a process by which users not only generate content online, but this content is constructed with the goal of creating better valued solutions (i.e., a travel itinerary, a specific piece of advice, and a snapshot of the trip experience). Such solutions could be used to fulfill tourist needs on a one-to-one basis with consultation-like QA trip-specific dialog aided by locals who camouflage as travel experts. That is, UGC generated in the TripAdvisor forum, for example, is also a type of knowledge co-production that is goal oriented, created by community residents of a destination who act as ambassadors of the destination, with an attempt to improve tourist knowledge about the place and to assist tourists in maximizing their decisions.

In order for the co-production of value to occur successfully, all users must capture benefits (Payne, Storbacka, & Frow, 2008). In this regard TripAdvisor is exemplary as a UGC platform as it facilitates positive user experiences through the encouragement of individual expression that focuses on a user's needs and interests, access to social resources,

an open and transparent business model, and the ability for users to perceive the risks associated with engaging in the UGC website (Füller, 2010; Gangi & Michael, 2010).

Visual Analytics

As discussed, the methodological issues embedded in dealing with big data, require new methods of analysis to enable the examination of such complex data. Visual analytics is considered an appropriate approach in this study, as it allows the researcher to process and synthesize large and complex data sets by combining analytical techniques with interactive visualizations to support complex analytic discourse and decision-making (Keim et al., 2008). Visual analytics has gained prominence in many scientific areas (Sacha et al., 2014) but tourism and hospitality has not taken full advantage of its application, despite the increasing complexity of the data generated through activities associated with tourism and hospitality.

Visual analytics, is a multi-disciplinary approach, that integrates the strengths of a number of scientific and technical disciplines from computer science, information visualization, knowledge management, cognitive and perceptual sciences and social sciences (Sacha et al., 2014). Different from information visualization, the visual analytical approach treats visualization as an analytic process that enables the researcher to continuously reflect on data through the interplay between the strengths of human understanding and machine lead data reduction (Keim et al., 2008). Fundamentally, it facilitates highly interactive and iterative data exploration and transformation, data analysis and visual representation to foster effective collaboration between researcher and machine that enables “detection of the expected and discovery of the unexpected within massive, dynamically changing information

spaces” (Wong & Thomas, 2004, p. 20). Recent examples using this approach are Cheng and Edwards (2015) investigating reposting behaviour of Sina Weibo users in China and Viégas and Wattenberg (2010) exploring the temporal dynamics of Wikipedia. The data analytical process requires a number of interactive and iterative stages, which are detailed in the data analysis section.

In summary, anecdotal evidence consistently points to the need to understand the tacit knowledge sharing structure of an online travel forum through customer value co-production. One way to begin this intensive research agenda lies in careful examination of a travel forum by using a robust methodological approach. This study accomplishes this objective through TripAdvisor’s online forum using a visual analytics approach.

Research Design

Data Sources

TripAdvisor’s travel forum was selected for this study, as it is the world’s largest travel online forum that is organized by destination. Sydney travel forum was chosen, as it is the main gateway city in Australia and the most visited destination in Australia (Tourism Australia, 2014). In particular, it contains large volumes of data concerning people’s travel planning for New South Wales in Australia.

The travel forum threads (115,847 treads with 8,346 conversations) were collected from TripAdvisor Sydney travel forum between 2010 to 2014. We selected data from multiple years in order to eliminate time specific fluctuation for UGC. Marketing content according to TripAdvisor travel forum policy was automatically excluded. Key information

was recorded including conversation index, conversation url, conversation topic, author identifier, posting time, word length, and the content of particular QAs threads.

Data Analysis

In the first stage (loop 1), because of the unstructured features of the raw data, we commenced data preparation with a careful examination of different QAs sets, their inner structure, and the requirements of our analysis system. *Open-Refine* (an open source tool for working with messy data, which deals with data clean-up and transformation) was then used to clean the data to ensure the data were clearly identical (e.g. a uniform structure). Afterwards, we developed a series of algorithms through *Python* (a widely used general-purpose, high-level programming language) that would extract the key information that could be used to make sense of the data. For example, we developed the algorithm to auto-code the date that the tourists planned to visit a certain place so that we could compare it with the time they posted questions. This helped us identify the appropriate length of tourists' planning time. Another example is re-organizing the data into network analysis that helps identify key contributors to the knowledge creation process.

At the second loop, following data preparation, Gephi and Leximancer were chosen to visually map the data and enabled us to interact with the visualization. The open source network visualization software *Gephi* performed the network analysis. Compared to other network visualization software at present (e.g. pajek), Gephi offers a high level of interactive and responsive visualization that is suitable for various types of networks, complex systems, and dynamic and hierarchical graphs (Bastian, Heymann, & Jacomy, 2009). *Leximancer* was used for text mining to identify the main themes underlying the QAs and how different themes and concepts are connected to each other. Bayesian statistical theory underpins Leximancer, which allows the user to envisage the whole documents in a holistic manner by

integrating fragmented pieces of evidence in the text (Watson, Smith, & Watter, 2005). Essentially, the power of Leximancer lies in its transformation of “lexical co-occurrence information from natural language into semantic patterns in an unsupervised manner” by using “two stages of extraction – semantic and relational” (Smith & Humphreys, 2006, p. 262). It solves the problems of expectation biases that can result from manual text analysis techniques or expert based reviews by demonstrating a high level of reproducibility and reliability of concept extractions and thematic clustering (Smith & Humphreys, 2006), even with large chunks of text (Angus, Rintel, & Wiles, 2013).

The results of Leximancer appear on a hot map of which the brightness of a concept label and circle is a reflection of the importance of themes, while the bubble size is an indication of the quantity of concepts, enabling the researcher to make visual sense of the data (Angus et al., 2013). In addition, the concepts that have strong semantic meanings, are mapped in a close distance (Campbell, Pitt, Parent, & Berthon, 2011; Rooney, 2005).

In the third stage, we repeated the first two steps in an iterative manner to answer our research questions and refine our data after the initial analysis through a high level of analytic reasoning. Also, a series of statistical analyses were performed at this stage through SPSS identifying the relationship between key information (loop 3). When final decisions were reached, the results were presented in a series of interactive visual presentations with effective narrative (Information Knowledge) (loop 4). In summary, the analytical procedure adopted in the study went through multiple steps in an interactive and iterative process between human perception and computers (Keim et al., 2008) in which the data is investigated for patterns and relationships through interactive visualization by integrating different models and tools to gain a deep understanding of the data and subsequently generate insights. It is important to note the integration of human reasoning through the whole process

to explore, verify and generate knowledge. The process in visual analytics is demonstrated in Figure 2.

Insert Figure 2 here

Findings

Basic Information of the Data

For the whole data set, there are an average of 7.8 threads per conversation (SD= 6.06). There are 8,346 questions with an average 6.8 replies (SD=8.3), indicating a reasonably active forum. By tracing contributors' profiles 76.4% of the askers (those asking questions) are first time visitors to Australia. The analysis of the contributors' registered profiles shows that 81.2% of the contributors have more than 100 records of either reviews or comments in the past five years. It appears that most of the askers are not novices in terms of their travel experience and are fairly skilled in their information search process. This indicates a greater need for more information that can fulfil the functional needs of these tourists (Hwang et al., 2013). At the time of the research, the researchers found that information concerning regional areas (through DMO's websites) was so broad as to lack the detail required to meet the micro enquiries of tourists. Additionally, a zero-order bivariate correlation analysis indicates a strong positive correlation between the number of reviews and posts written by the respondents ($r = 0.95$, $p < .001$).

Figure 3 presents the number of questions posted monthly during the data collection period. The first quarter and October present as the most popular time for asking questions, while May and December are less popular.

Insert Figure 3 here

The comparison between travellers' posting time and their actual/planned travel is around 3.6 months, while tourists from different places of origin show greater variations. Figure 4 indicates that tourists from North America spent close to 7 months planning their trips to Australia while Asian tourists spent between 2-3 months. This might be the distance effect on their planning. During the planning period, 65.4% of askers had not yet booked their hotels, attractions and destinations to visit, presenting opportunities for marketing efforts and offerings to influence tourist choices prior to arrival.

Insert Figure 4 here

Degree of Distribution

In order to present the connection between contributors in a more detailed and rich manner, network analysis proximity scores were visualized to generate a network graph. In the network graph visualized by Gephi, the size of the bubble presents the normalised connections received by the contributors and the size of the thickness of the lines represents the strength of connections ties. Based on the network structure, a grouping algorithm was used to cluster relevant contributors by colour (Blondel, Guillaume, Lambiotte, & Lefebvre,

2008), as this helps to identify the common features within a particular community (Figure 5).

Insert Figure 5 here

In our network analysis, the respondent who raises the question is *in degree* and those who answer the questions are *out degree*. Our analysis shows that the TripAdvisor Sydney forum has a broad out degree of distribution, which is an indication of highly active repliers who constantly give help to others with their travel problems, but do not necessarily seek help (Figure 5). The visualized network of many outlier points indicates that the askers do not often answer questions, which suggests the active roles and importance of repliers in crafting the knowledge creation process.

Analysis of ego networks was performed to differentiate an “answer” person to “discussion” person in TripAdvisor forum. Each ego network is made up of the user and ties to other users, with whom the person has a direct interaction. The analysis shows that the most active users are “answer people” because most of their neighbours, the people they are helping, are not connected. However, further analysis indicates the major contributions to the Sydney travel forum are from a network of major repliers that are considered “local experts” (Figure 6). An analysis of their profiles clearly shows that all of them are current residents in Sydney, Australia and contribute extensively ranging from 8,559 to 25,724 posts. These local experts usually have follow-up discussions with “askers” in voicing different solutions. Indeed they activate the network and subsequently build collective intelligence. In this data set, the major repliers we identified were all categorised as destination experts by TripAdvisor except lien who no longer contributes to TripAdvisor forum after 2013. The title ‘destination expert’ is based on the fact that they are “regular contributors who exemplify the

best of our forums, giving helpful, friendly advice and welcoming new members. They are passionate about the destinations they represent and have up-to-date knowledge of what's going on in their destinations” (TripAdvisor, 2014). As such, based on their contributions, enthusiasm to provide advice and their current residency, we refer to them as “local experts”.

Insert Figure 6 here

To understand the expertise required of local experts, text mining is performed via Leximancer. Five themes were identified including *Sydney* and Australia in general, *transport*, *sites to see*, *food* and *hotels* (Figure 7).

Insert Figure 7 here

The first theme *Sydney* is grouped with travelling with kids, estimate days of visit, night activities, best time to visit, and options to regional areas. The second theme *transport* remains a constant question raised by the tourists. Our analysis shows that it not only concerns Sydney as a city but also its connection with other cities, particularly regional areas, as Sydney usually serves as a gateway city to other regional destinations. The main concerns are with different forms of transportation, time plan and ticketing. The third theme *Site* is about specific sites to visit, price and the connection of transport between them. The fourth theme is *food*, where tourists sought information on different types of food and restaurants, particularly near The Rocks area (an historic tourist location near the harbour). The last theme concerns *hotels* with different views, booking channels, and price. At the time that tourists posted their questions; nearly 89% of them had undertaken some prior information search and 65.6% had planned part of their itinerary. However, our conceptual map shows

that the elements that were not planned were usually hotel accommodation, transportation within destinations, attractions to visit and activities for a particular period. This provides opportunities for tour operators and DMOs to be engaged in helping tourists in a critical part of the travel planning process.

By looking closely at the answers provided by “local experts”, knowledge sharing is specific and tacit leading to a community of practice. Indeed, it shows that community residents camouflaged as local experts spend considerable efforts in engaging tourists by answering questions and co-producing knowledge. A further analysis of answers by these local experts shows that they specialise in different areas. Figure 7 (names in red) indicates that *Mia* and *Kve* contribute significantly to hotel advice, while *Elle* offers suggestions for food and hotels. Meanwhile, *lien* and *Guru* focus on general aspects of Sydney, *emel* concentrates on transport and *dougo* offers advice for sites to see and shopping.

Discussion and Conclusion

Social media is recognized as being part of the everyday life for many people. Xiang and Gretzel (2010) view social media as playing a substantial role in shaping modern tourists’ decision making process, while Shao, Rodriguez, and Gretzel (2012) argue that social media plays an equally strong role in redefining DMOs and tour operators’ marketing landscapes. As such, understanding the knowledge sharing practice via the lens of on-line travel forum can assist in gaining insights into contemporary tourist decision making process. This study offers new insights in respect to theory, methodology, and practice. They are detailed below.

Theoretical Implications

This study contributes to the literature in several ways. First, unlike prior research on knowledge sharing which often assumes that knowledge is created by individual actors, this study assumes and finds that the knowledge sharing structure is goal oriented with locals forming a network of travel information surrogates covering a specific area of domain expertise such as hotel accommodations, food, pricing, airport, activities, and transportation. These locals who camouflage as travel experts serve as ambassadors of a destination and provide collective intelligence to form a knowledge repertoire with information covering various travel domain areas. These results, extend the online knowledge management theory (Yiu & Law, 2014) by delineating that knowledge sharing may be better conceptualized and operated as a network with distributed expertise. Such a knowledge network with grassroots contributions by answering tourist micro queries supplements the broad information found on DMO websites.

In line with the above contribution, the findings also reveal a new social phenomenon – consumer camouflaging – in that community stakeholders immerse themselves as local travel experts and develop relationships with potential inbound tourists in an effort to fulfil tourists information needs and assist them to plan their itinerary. Camouflaging as travel experts has advantages over traditional communication means as social media users perceive the dialog and information more credible and trustworthy (Cox, Burgess, Sellitto, & Buultjens, 2009). Hence, it enhances the persuasiveness of the UGC as well as improving the image of a destination (Jani & Hwang, 2011). In light of the above discussion, this study extends to current understanding of UGC by presenting an alternative perspective of it; that is, UGC from camouflaged local residents.

Another contribution of the study lies in social media's mediated knowledge sharing process, which highlights the important role of value co-production in the knowledge creation process. By serving as ambassadors of a destination and tirelessly sharing tactic knowledge,

locals as camouflaged local experts help destinations, tourism authorities, and service providers (e.g., hotels and restaurants) to create tremendous customer values that would otherwise not be visible and accessible to potential tourists. Through computer mediated channels such as an online travel forum, these stakeholders are able to utilize their operand and operant to serve as travel experts to co-produce knowledge, and in turn value, on behalf of both tourists and destinations. To the best of our knowledge, this study is the first attempt in the tourism and hospitality literature in describing such as social phenomenon, opening a new research area of computer mediated value co-production.

Methodological Implications

The methodological contribution of our study is to empirically apply a novel visual analytic approach to analyse a large set of tourism related data. It highlights the importance of using a multi-disciplinary approach to tackle the challenges presented by big data in tourism and provides a continued discussion of big data through a visual analytics approach. The use of Leximancer, Gephi, programming knowledge, and statistical modelling provides an integrated approach by presenting clear steps to effectively address the complex issues that are embedded in big data. More specifically, the approach helps address the bias associated with manually processing social media data (Lu & Stepchenkova, 2015) and uses visualization as an analytical process rather than a representational tool (Cheng & Edwards, 2015). Our study opens a new way of thinking and novel methodological approach in tourism in making sense of big data and its applications to industry practitioners by investigating distinctive online social media platforms.

Practical Implications

From a practical perspective, our study reveals that by allowing users to post any information TripAdvisor literally moves the online social structures for knowledge management into an

online community of practice for knowledge creation. A travel forum was not intended or designed to build or support sustainable relationships among participants (Zhang and Watts, 2008). The results of our network analysis demonstrate that knowledge co-creation and community of practice are indeed facilitated by locals who camouflage as travel experts and constantly contribute to knowledge creation through active iteration in their respective expertise. Thus, to remain competitive, online forum providers, such as TripAdvisor may need to provide further infrastructure to sustain the process (Wenger & Snyder, 2000).

At a technical level, this could be achieved by supporting message archiving (i.e. with a search engine or organized storage) or visual representation of communication and activities. But more importantly, as demonstrated earlier and also suggested by the literature (Zhang & Watts, 2008), on-going organizational support of the active involvement of local experts is crucial to sustain the travel forum. By knowing who the “local experts” are and what they contribute, TripAdvisor and other travel operators can better understand these destination experts. What is not well understood are locals’ motivations for camouflaging as travel experts. Bock and Kim (2001) report that people participating in blogs expected no direct rewards and according to Hsu and Lin (2008), attitudes towards knowledge sharing were not affected by rewards. What is known however is that satisfaction in helping others is significantly connected with knowledge sharing intentions and attitudes (Lin, Morais, Kerstetter, & Hou, 2007) and reciprocal benefits and relationships may play a role in effecting the motivation to share (Quigley, Tesluk, Locke, & Bartol, 2007). Hereto lays an area for research.

This study also provides critical support for practitioners to understand different aspects of knowledge creation and how such knowledge can be used to better position themselves at both holistic and micro levels. It highlights an opportunity for DMOs to rethink their customer service delivery. This may be in the form of a platform (website) through

which users (tourists and locals) can create and contribute content, provoking a co-created experience between users and the DMOs. Whilst this may not seem too different to what already occurs on TripAdvisor, DMOs having their own platforms enable them to access beneficial data that can be leveraged for business objectives such as marketing insights, positively influencing tourist expectations and experiences, improving brand awareness and customer relationships, and idea generation (Wallace & Garcia, 2011).

For tour operators, by aggregating tourists' interests, negative experiences and expert suggestions from UGC, improved offers can be created. Similarly, improved understanding of the time lag between when tourists post enquiries and actual travel, more timely and effective marketing campaigns can be planned. Equally, understanding the needs and wants, and the length of planning time of different demographics will assist DMOs to identify region specific strategies for marketing campaigns. For example, North American tourists generally plan three or four months earlier than Asian tourists and they are interested in different aspects of Sydney and broadly Australia.

Research Limitations and Future Research Directions

Our study is not without limitation. The researchers through this study are very cautious of the generalization of the TripAdvisor sources to be representative of all tourists, as such, we call for future studies to utilize different sources of data including government data sources to mitigate the outlier problem of social media (Crampton et al., 2013) and provide a more comprehensive understanding of the phenomena. Longitudinal studies of questions posted would also offer additional insights informing relevant and effective managerial decisions. Additionally, another opportunity to enhance the current research lies in understanding the motivations of repliers who reply less frequently. A closer examination of these repliers indicates that they have been residents in Sydney before or reside in regions near Sydney, or

very occasionally tourists from other countries. As pointed out by one reviewer, this finding presents another interesting area for future research. As understanding the reasons why they contributed on a voluntary basis even when they are away could offer additional insights regarding tourists' attachment and loyalty to both theory and practice.

Acknowledgement

The authors of this paper would like to thank Darren Lee from UTS Data Arena, Jared Berghold from Intersect and the eResearch team at UTS for their technical support of this paper.

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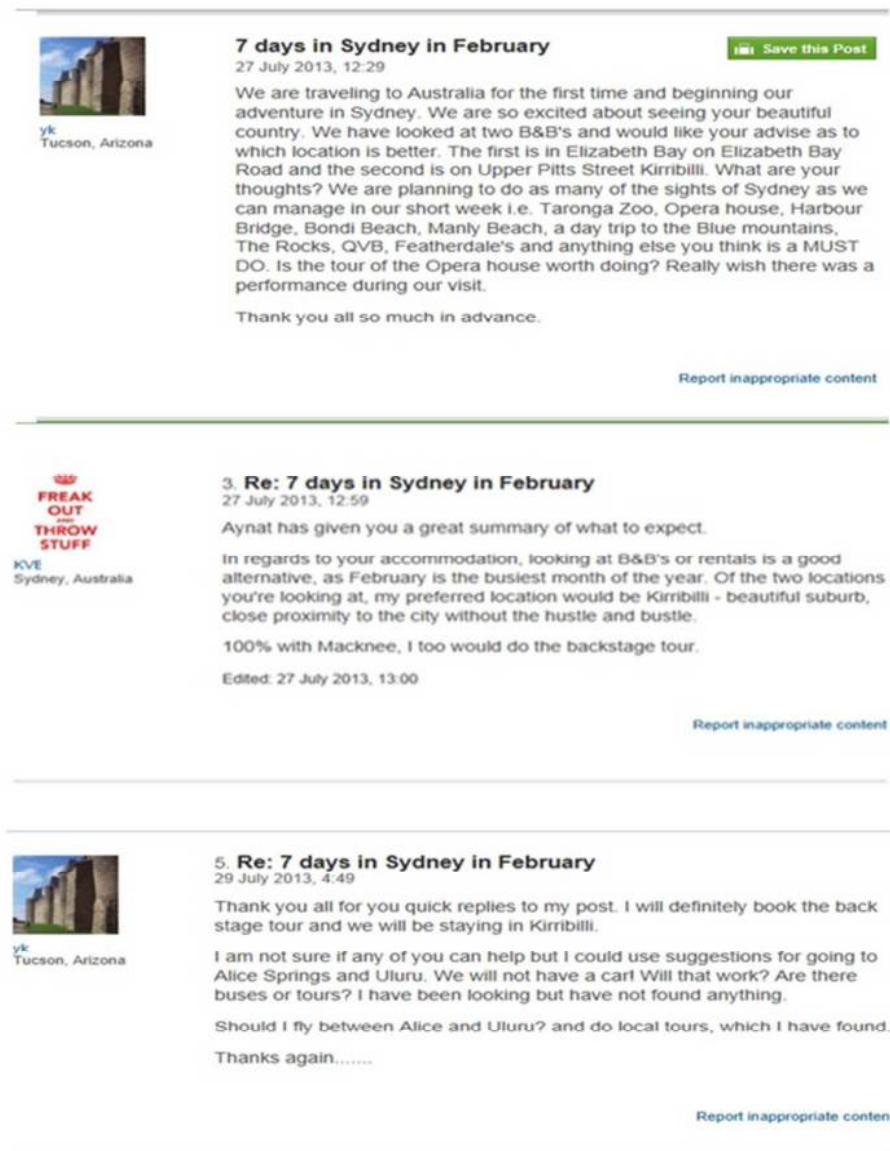


Figure 1: Example of co-production on the TripAdvisor travel forum

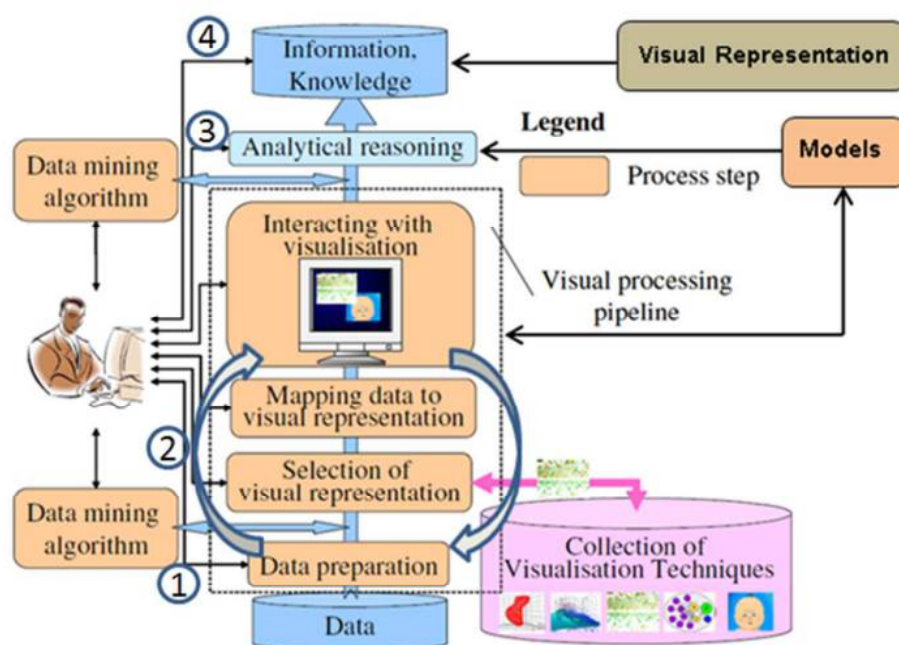


Figure 2: Visual Analytics Process (adopted from Simoff et al., 2008, Keim et al., 2008 and Cheng & Edwards, 2015)

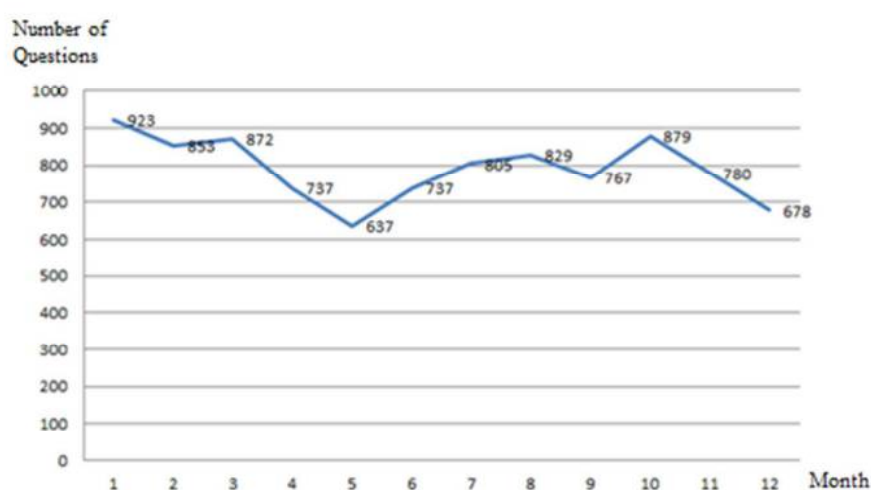


Figure 3: Number of Questions per month

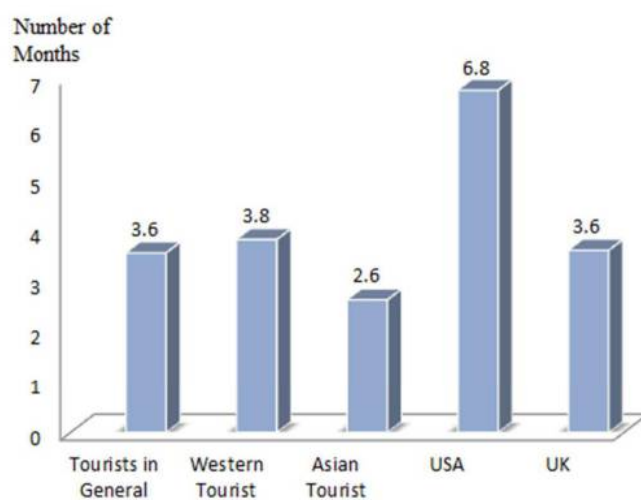


Figure 4: Length of planning time

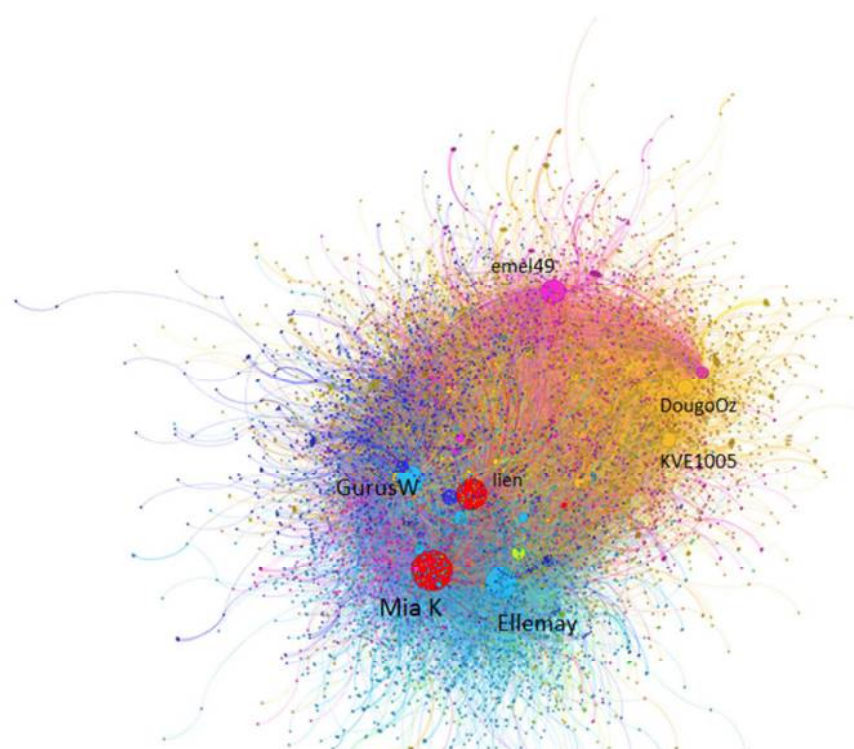


Figure 5: Visualized network of all contributors

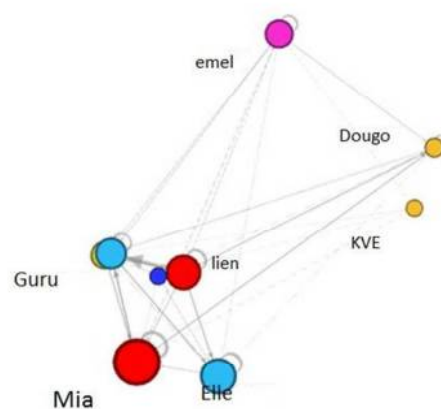


Figure 6: visualized network of the major contributors

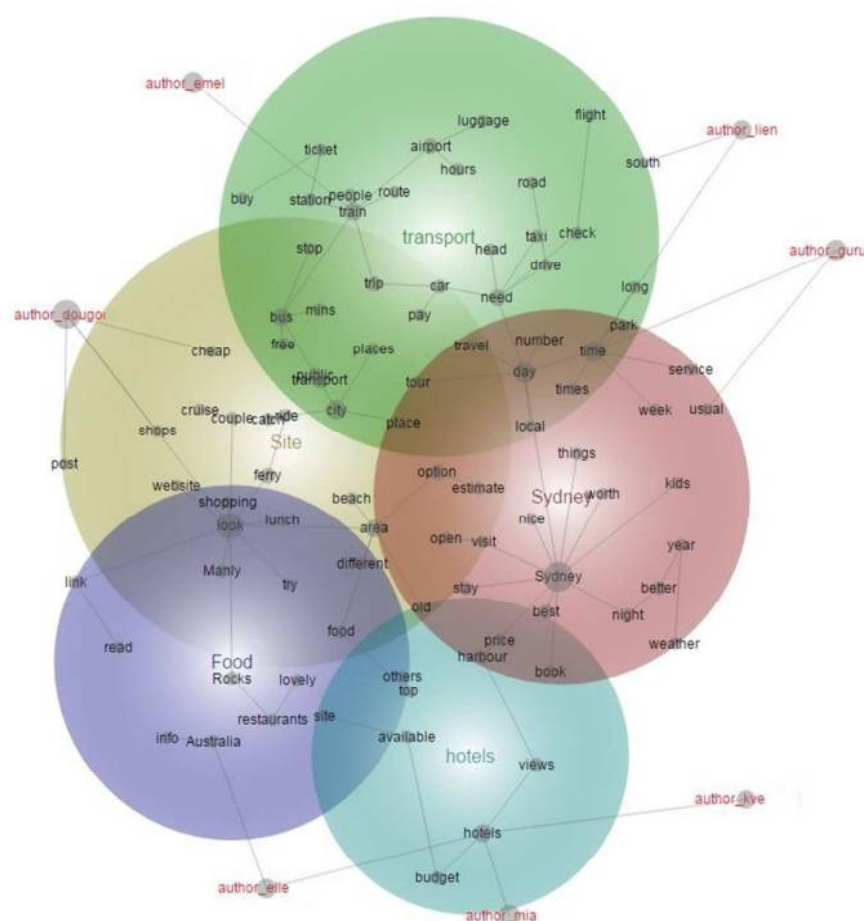


Figure 7: Conceptual Map of different major contributors