Technology Enabled Information Services Use in Tourism: An Ethnographic Study of Chinese Backpackers

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Abstract

The purpose of this paper is to investigate the previously unexplored theoretical relationship between technology enabled information services (TEIS) and the value created by the use of such services. This paper presents a mixed virtual and multi-sited ethnography to provide a thick description of Chinese backpackers (CBs) use of TEIS. Participant observations and interviews of CBs in three different journeys within Europe were undertaken. Our findings illustrate that additional usage values occur when TEIS are used in a tourism context. Social influences and technical infrastructure play a stronger role than previous research presented. The study contributes to the literature by 1) providing a theoretical understanding of tourists' TEIS use; 2) documenting a study of a complete package of technologies used by CBs, and 3) proposing a research model which can be used for studying different TEIS use behaviour/patterns, and also in the design of TEIS for specific contexts.

Keywords: Ethnography, Qualitative, Chinese Backpacker, Technology, IT Service

Introduction

Technology enabled information services (TEIS) are becoming increasingly important in tourism (Tanti and Buhalis, 2016; Zhang et al., 2017). Tuunanen et al. (2010) define TEIS as systems that enable consumer value co-creation through the development and implementation of information technology (IT) enabled processes that integrate system value propositions with customer value drivers. The spill over of IT into vacation contexts (MacKay and Vogt, 2012) has transformed tourist experiences (Neuhofer et al., 2015). Tourists are increasingly likely to use TEIS on their smartphones during travel (Lamsfus et al., 2015; Wang et al., 2016), or online services for trip planning (Ferrer-Rosell et al., 2017; Xiang et al., 2015), where tourists have the option of using multiple devices, e.g. laptop, smartphone, or tablet to find information or make bookings (Murphy et al., 2016). Although much research attention has been given to the use of IT by tourism service providers, more research is needed regarding the integration of IT in tourism from the consumer perspective (Neuhofer et al., 2014). Hence, we want to understand how users create value when using various TEIS, and how these perceptions co-create their experiences (Neuhofer, 2016; Zhang et al., 2017).

The use of smartphones has altered the time and place constraints on human interaction in the travel domain (Dickinson et al., 2014). Yet there remains little research on how tourists engage with IT such as smartphones during longer duration trips (Tan, 2017), or the use of destination online platforms (Molinillo et al., 2018; Zhang et al., 2017), or how TEIS can play a role in tourist decision making processes (Lou et al., 2017). Neuhofer (2016) emphasises the significant role of IT in the value creation for tourists, and calls for further research in understanding the utility and value created through TEIS tourist experiences. This study is motivated by the potential for technology use in tourism, and the increasing desire to understand IT use in tourism from a consumer perspective (Molinillo et al., 2018; Neuhofer et al., 2014), along with the more active role that tourists are playing in value creation through TEIS (Zhang et al., 2017).

One growing consumer group is the Chinese outbound tourism market (UNWTO, 2017). Chinese outbound tourists reached 145 million in 2017 (CNTA, 2017), and online activity from Chinese travel companies' is expected to reach $105.06 billion by 2019 (Huang et al., 2017). Among this mass group of tourists is an emerging group of Chinese Backpackers (CB) which is experiencing unprecedented growth with the confidence of travelling independently and the development of virtual platforms. It is noticeable that the independent travel phenomenon is becoming increasingly important in China domestically and internationally (Ong and du Cros, 2012; Reuters, 2007). Backpacker sociality is a networking sociality, which is created through intersecting movements between physical and virtual space (Castells, 2002). Interweaving with physical sociality, CBs highly rely on technologies and are active in the virtual world (Lim, 2009; Wu and Pearce, 2014). Comparing with other nationals, Chinese tourists are also more likely to use IT for decision making (Liu et al., 2017) in an emotional manner (Yang et al., 2012). Furthermore, there are known differences in how Chinese adopt mobile technology (Raffaele et al., 2017; Song et al., 2015), and make mobile payments while travelling (Law et al., 2018); however, there remains sparse research on how Chinese consumers use IT when they travel. CBs with embedded cultural influences (Chen, 2002; Lin, 2011), are characterized as tech-savvy (Ong and du Cros, 2012), and have strong motivations of learning and self-development (Chen et al., 2014a; Chen et al., 2014b), which makes them a very interesting research domain for our ethnographic study. We are therefore motivated to understand the behaviour of CBs as they engage with IT during their travels (Neuhofer et al., 2014).

In order to investigate CB's perceptions, practice and preferences of TEIS in an intercultural context, as well as responding to recent call for research in value creation of IT in the tourism context (Neuhofer, 2016; Zhang et al., 2017), our research question is: *how do [Chinese] consumers create value by using TEIS within a tourism context?* Therefore, our unit of analysis is the consumer, rather than the business context. We explore this through an ethnographic study of CBs travel through Europe. Ethnographic studies enable the researcher to develop deep insights about an information systems' usage through participant observations (Myers, 1999). We also analyse our data through the a theory of consumer information services which is useful for exploring how consumers' derive value from the information services they use (McKenna et al., 2013).

In this paper, we first review literature about technology enhanced tourist experiences. This is followed by the theoretical foundation for our ethnographic study. Then we present the research methodology, the analysis and results of our field study. Finally, we present our research model and discuss the findings and conclusions.

Technology Enhanced Tourist Experiences

Recent research on IT in the tourist experience covers a wide range of areas. The technology enhanced tourist experience is a complex construct (Neuhofer et al., 2014), hence a key research focus in tourism is the service encounter, which is increasingly mediated by IT (Sinarta and Buhalis, 2018; Zhang et al., 2017). IT can offer a range of travel information both before and after travel, and can help consumers to book hotels, restaurants and other services (Williams et al., 2017) and help tourists to decide where to visit (Molinillo et al., 2018). Zhang et al. (2017) argue that online platforms enable consumers to develop more realistic travel expectations due to the

co-creation of their experiences. Lou et al. (2017) investigated QR code payments and found that they influence tourists' transaction and travel satisfaction. Sylejmani et al. (2017) found that IT can better obtain personalized travel itineraries for group tourists. Social media also plays an important role in travelers' planning and decision making (Amaro and Duarte, 2017; Liu et al., 2017) or sharing of information (Munar and Jacobsen, 2014).

One important use of the Internet for tourists is to plan and book holidays, which influences overall travel satisfaction (Ferrer-Rosell et al., 2017), and has important implications for hotel marketers and travel agents (Huang et al., 2017). Jalilvand and Heidari (2017) suggest that electronic word of mouth has powerful effects on travel intentions, attitudes, and destination image, when compared with face to face word of mouth. Mobile technologies are increasingly becoming more influential in the formation, facilitation and co-creation of tourist experiences (Neuhofer et al., 2014). Tourists value the functional purposes provided by smartphones, but depending on travel motivations may experience the joint physical and virtual space differently (Tan, 2017). Furthermore, Zhang et al. (2017) argues that the tourist experience is going through a paradigm shift, with the co-creation of tourist experiences through technology where users are no longer passive receivers, but rather play an active role in value creation through TEIS. It therefore becomes necessary to explore further the use of IT use in tourism from a TEIS perspective.

Adoption and Use of TEIS

To understand tourist behaviours and develop our consumer focused approach, we have chosen to use a theory of consumer information services by McKenna et al. (2013). We chose to use this theory for two reasons. Firstly, it enables us to explore how consumers can perceive and adopt information services. Second, it can be used

to determine how consumers' derive value from the information services they use (McKenna et al., 2013). This theory was developed based on two theories, namely the Theory of Organizational Information Services (TOIS) and the Unified Theory of Acceptance and Use of Technology (UTAUT). McKenna et al. (2013) integrated these theories together to study mobile service use. We provide the reasons why McKenna et al. (2013) chose to combine these theories below, followed by our analysis of the limitations of the model, which we aim to address in this paper.

One of the key reasons for McKenna et al. (2013) combining these two theories together was to move TOIS (developed for organizational service use) into a consumer perspective (using UTAUT). TOIS was originally developed, because of the dramatic changes occurring regarding the use of IT in organisations. The change was characterised by a shift from a systems perspective to a service perspective and to further understand, and design information services for organisational contexts (Mathiassen and Sørensen, 2008). TOIS contains four TEIS types: computational, adaptive, networking, and collaborative services, based on the *equivocality* and *uncertainty* of information. Uncertainty is related to the reliability and availability of the information required to execute a task (Galbraith, 1973). Equivocality relates to the multiple and potentially conflicting interpretations which means that information cannot be processed in a standardised and straightforward manner. High equivocality creates confusion and actors do not have shared understandings, for example medical professionals sharing opinions on an x-ray (Daft and Lengel, 1986; Mathiassen and Sørensen, 2008).

Mathiassen and Sørensen (2008) developed TOIS as four distinct TEIS types defined by their high or low levels of uncertainty and equivocality for organisational users (based on empirical evidence from a police control room). McKenna et al. (2013) later used these definitions, and adapted their application to consumer usage. Therefore, the TOIS definitions adopted in this paper are as follows:

- *Computational* TEIS components support consumers in transforming available and formalized information into stimuli by following standardized and repeatable patterns of information processing.
- *Adaptive* TEIS components support consumers to interpret and transform available and emergent information into stimuli by adapting patterns of information processing to specific contexts.
- *Networking* TEIS components aid consumers in producing information on phenomena in an environment by following standardized and repeatable patterns of information processing.
- *Collaborative* TEIS components support consumers in producing information about phenomena in an environment through interpretation of the specific context (Mathiassen and Sørensen, 2008; McKenna et al., 2013).

McKenna et al. (2013) derived a model (cf. Figure 1), which combines TOIS (Mathiassen and Sørensen, 2008) with UTAUT (Venkatesh et al., 2003), through a number of propositions. The propositions which tie together the TOIS service types, and UTAUT constructs were developed based on a literature review. For example, based on the McKenna et al. (2013) propositions, a collaborative TEIS would be tied to social influences (from UTAUT). A summary of the propositions by McKenna et al. (2013) is presented in table 1.

Table 1 - A summary of the McKenna et al. (2013) propositions		
Proposition	**Justifying Literature**	**Confirmation**
1. Computational service and adaptive service components are tied to performance expectancy.	(Davis, 1989; Davis et al., 1989, 1992; Knutsen, 2005; Moore and Benbasat, 1991; Plouffe et al., 2001; Thompson et al., 1991)	Removed from model as *performance expectancy* was non-significant from structural analysis
2. Computational service components are tied to effort expectancy.	(Davis, 1989; Davis et al., 1989; Moore and Benbasat, 1991; Thompson et al., 1991)	Removed from model as *effort expectancy* was non-significant from structural analysis
3. All four service components are tied to anxiety.	(Agarwal et al., 2002; Compeau and Higgins, 1995; Korudonda, 2005; Lee et al., 2004; Pearson and Pearson, 2008)	Removed from model as *anxiety* was non-significant from structural analysis
4. Computational service and adaptive service components are tied to self-efficacy.	(Bitner et al., 2002; Froehle and Roth, 2004; Meuter et al., 2000; Treiblmaier and Dickinger, 2006)	Confirmed and maintained in model from structural analysis
5. Collaboration service components are tied to social influences.	(Dickinger et al., 2006; Hung et al., 2003; Kleijnen et al., 2004; Leung and Wei, 1999; Nysveen et al., 2005; Reid and Reid, 2004)	Confirmed and maintained in model from structural analysis
6. Networking service components are tied to facilitating conditions.	(Bauer et al., 2005; Kaasinen, 2003; Leung and Cheung, 2004)	Confirmed and maintained in model from structural analysis

To develop their model, McKenna et al. (2013) designed a software artefact (a prototype smart phone app) through which the research model was tested through a simulation with participants using the artefact and completing an online questionnaire about their experiences. A more comprehensive model was reduced to what is presented in Figure 1. In the research model, the UTAUT constructs are defined as follows:

- *Self-efficacy*: the judgment of one's ability to use IT to accomplish a particular job or task.
- *Social influence*: the degree to which an individual perceives that important others believe that he or she should use the new system.
- *Facilitating conditions*: the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system (Venkatesh et al., 2003).

Figure 1 – McKenna et al. (2013) model
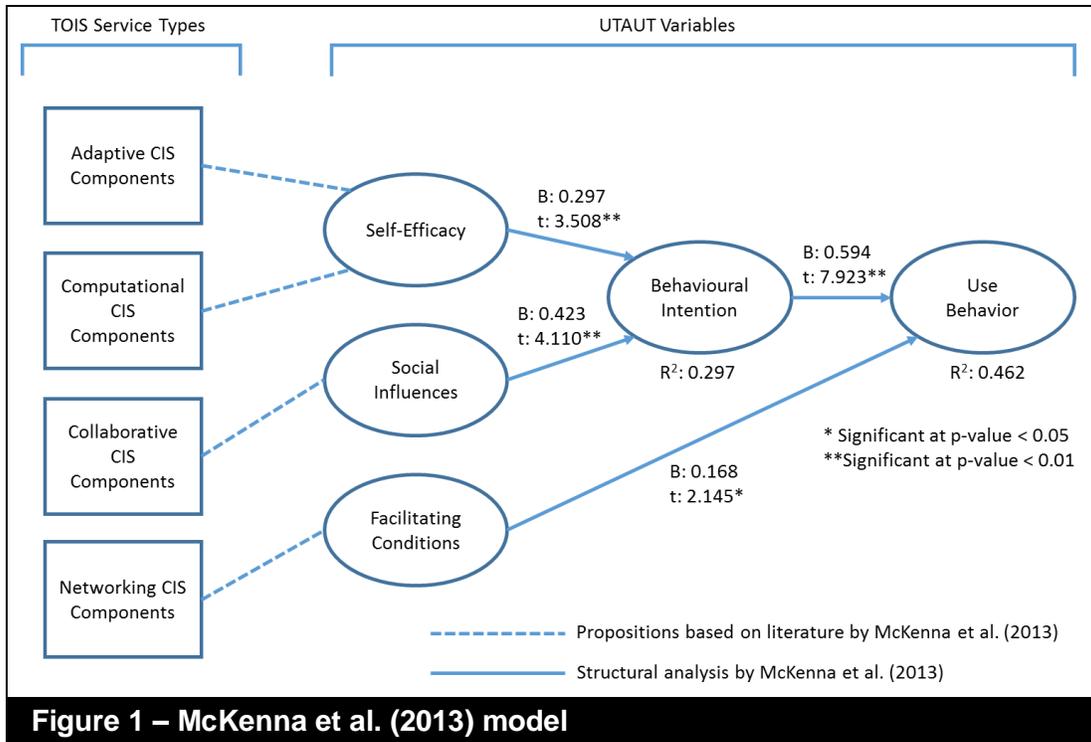
One of the key limitations of the McKenna et al. (2013) model, is that the propositions which tie together the TOIS service types with the UTAUT constructs were developed based on literature alone. Therefore, there are two parts of the model (as indicated in figure 1), the TOIS side on the left, and the UTAUT side on the right. McKenna et al. (2013)'s analysis of the structural UTAUT side of the model was used to determine the significance of the acceptance and use of a mobile application. Data was collected through a survey based developed entirely on the UTAUT constructs. Therefore, there was no empirical data to prove the ties to TOIS service types. The inclusion or exclusion of the McKenna et al. (2013) propositions, was justified by the significance of the structural analysis. For example, in their analysis, the larger UTAUT model contained UTAUT constructs *anxiety, performance expectancy,* and *effort expectancy*. Each of these were proposed (through literature) to be tied to TOIS service

types. After analysis, these three constructs were found to have non-significant influences on behavioural intention, and were removed from the model. Subsequently, this also removed the propositions which tied them to the TOIS service types. Therefore, as no empirical analysis was conducted to support any of the McKenna et al. (2013) propositions (the dashed lines in Figure 1), we aim to use an exploratory study to determine the nature of the propositions which remain in the final McKenna et al. (2013) model, as illustrated in Figure 2.

Additionally, the McKenna et al. (2013) model was developed based on the use of one mobile application. In this study, we explore its usage over a suite of applications used by CBs, as suggested by (Murphy et al., 2016; Neuhofer et al., 2014). Section 5.1, later, will illustrate how the tasks were assigned to the TEIS types in more detail.

Figure 2 – The theoretical focus of this study, based on the remaining propositions of McKenna et al. (2013)
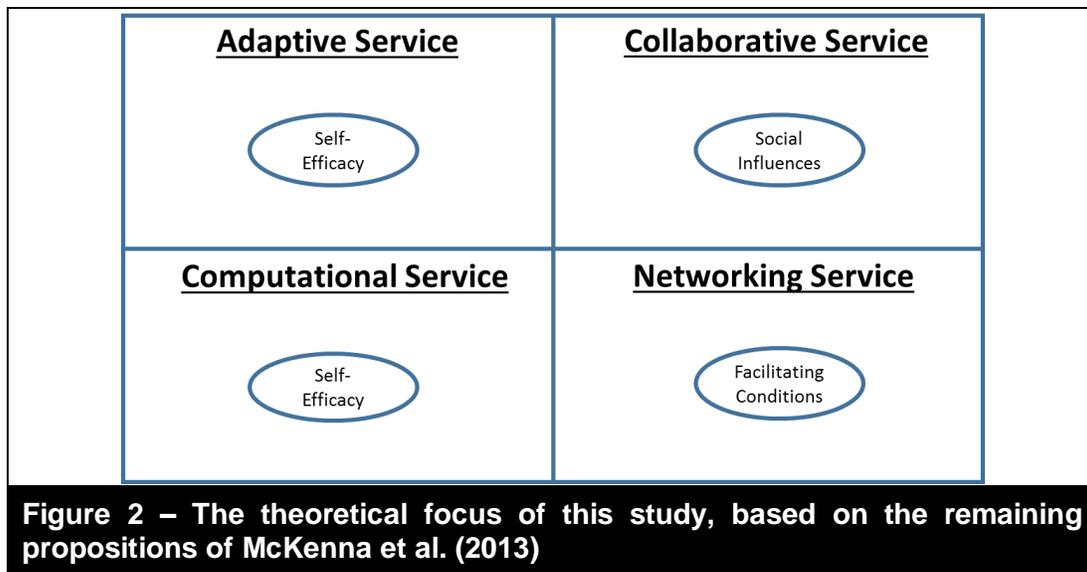
Research Methodology

This study is underpinned by the interpretive paradigm, which sees social science as a complex world and can be understood from those who operate within it (Goodson and Phillimore, 2004). As this study aims to explore how CBs create value by using TEIS, a qualitative approach enables researchers to capture the richness of the world through creating new meanings, narratives, perceptions and interpretations (Berg and Lune, 2011). Exploratory research, which is usually conducted when there is little or no knowledge in a field and its purpose is to better understand its nature (Sekaran, 2000), has been chosen to explore CB's experience of TEIS. To do so, we used virtual and multi-sited ethnography to provide thick descriptions (Geertz, 1994) of CBs to explore McKenna et al. (2013)'s propositions (cf. Figure 1), which show that distinct TEIS components can be tied to specific UTAUT constructs. The McKenna et al. (2013) propositions have never been explored with empirical data. A task level analysis and qualitative analysis will be used to explore how CB receive values while using IT.

Data Collection

To achieve an understanding of CBs perception and practice of TEIS, three mobile ethnographic studies were undertaken between June and December 2014 by following three different groups of CBs in Europe using participant observations and in-depth interviews. The mobile ethnography in this study undertook the 'follow the people' (Marcus, 1995) approach, including netnography (Kozinets, 2010), multi-sited ethnography (Marcus, 1995), and auto-ethnography (Anderson and Austin, 2012) by following CBs' intersecting pattern of movement between the physical world and the virtual world. In addition to travelling with three groups of CBs, virtual data such as online chats, blogs, and social media posts were also collected through China's biggest online travel forum Qyer.com, instant messenger, social networking applications such as WeChat, as well as everyday practice of ITs. These different sources of data were utilised to provide a comprehensive and hybrid understanding of CB's travel experiences through various angles.

The Chinese speaking researcher used this forum to recruit potential CBs to travel with, and thus revealed his identity as a researcher and asked for potential informants' consent before carrying on further studies. Informants who identified themselves as CBs were further selected to meet the criteria of their characteristics

(Chen et al., 2014b; Zhu, 2005, 2009). The researcher then travelled with three groups of CBs and conducted a mobile ethnography by utilising observations and interviews to record CBs' technology usages and their perceptions. The fieldwork ended when reaching saturation. Overall there were 14 informants from three trips (cf. Table 2) who were approached and recruited through one of the leading CB forums, Qyer.com.

The first trip was conducted in August and September 2014 in Spain and Portugal. The second trip was undertaken in September and October 2014 in the UK. The third trip was undertaken in November 2014 in Poland. With informants' consent, online data such as informants' posts on their social media, group chat histories and online travel journals were recorded before, during, and after the trip. Data collected from multi-sited ethnography included semi-structured in-depth interviews for each informant the researcher travelled with, and field notes of conversational interviews and participant observation throughout the three journeys.

In addition, in this reflexive process, the researcher highly valued the role of co-constructing knowledge in the research process, by openly engaging with the collective experience with informants (Goodson and Phillimore, 2004; Jones, 1993), not only as a researcher immersing with informants, but also as a researched backpacker who creates sociality and travel experience with other backpackers. Identifying himself as a CB, the researcher acted as an 'insider ethnographer' (O'Reilly, 2008) in order to immerse with the researched group and interpret responses correctly. Other than minimising the influence, the researcher emphasised the importance of 'human self' (Eisner, 1991; Lather, 1986) and treated himself as one of the researched CBs. Being a reflexive self, the researcher kept reflexive notes throughout the fieldwork to note down his feelings in his dual role of being a researcher and a backpacker. These auto-ethnographic notes are used as part of the data to understand the group dynamic among CBs.

Table 2 – Study Informants' Demographics				
Trip	**Pseudonym**	**Sex**	**Age**	**Occupation**
Spain and Portugal (34 days)	Wayne	M	28	Architect
	Will	M	24	Graduate Student
	Jess	F	24	Fashion Student
	Winnie	F	24	Graduate Student
	Zhang	F	30	Accountant
	Xu	F	33	Teacher
	Wang	M	34	Self-employed
UK (16 Days)	Kitty	F	40	Marketing in a bank
	Aileen	F	42	HR in a bank
	Catherine	F	45	Managing director
Poland (7 days)	Jennifer	F	30	IT
	Jerry	M	29	IT
	Justin	M	35	IT
	Harry	M	24	Graduate Student

We use thick descriptions, triangulation, and informant verification to ensure the credibility of this study. Moments with expansionistic depiction that explicates culturally situated meaning and abundant details were captured by comprehensive field notes to provide the thick descriptions (Geertz, 1994).

In terms of triangulation, different forms of data such as in-depth interviews, conversational interviews, field notes, and reflexive notes were collected by various techniques. For verification, techniques such as confirming understanding by summarising interviewee's ideas, and asking interviewees

to explain specific terms or ambivalent expressions (Healey and Rawlinson, 1994) were undertaken.

All data were collected in Chinese to preserve the originality of the participant's information. As an insider in this ethnography, the Chinese speaking researcher then translated the data into English for the non-Chinese researchers to analyse.
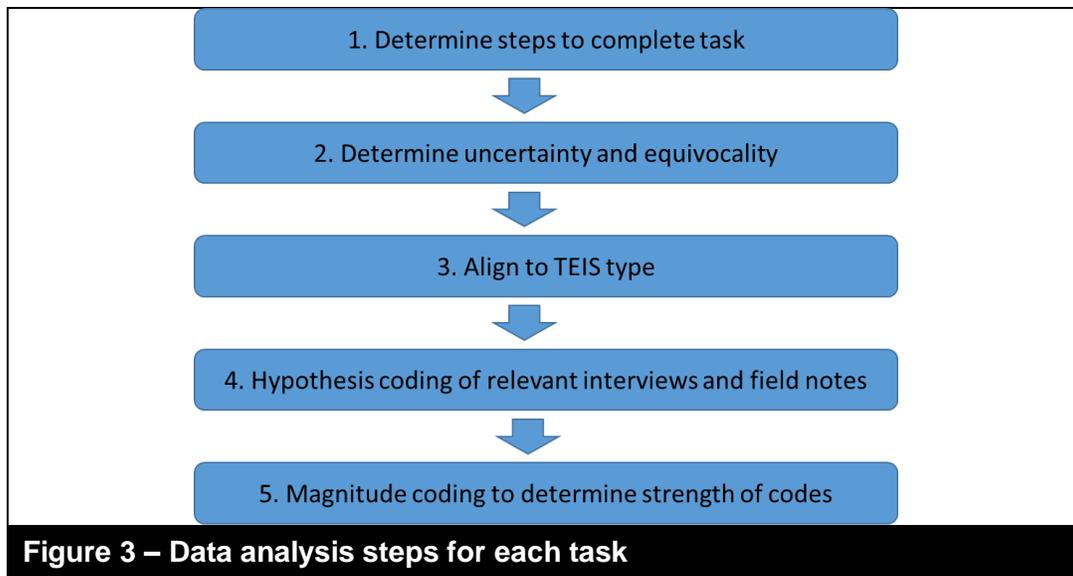
Data Analysis

A multi-step approach was used to explore the McKenna et al. (2013) propositions. Following from McKenna et al. (2013), a task level analysis (cf. Table 3 and section 5.1.) was performed to determine how CB's use different TEIS types and allows for a deep understanding of how the TEIS is used by consumers. A task level analysis examines step by step, the process and IT used by a consumer when using a TEIS to achieve a certain task. For example, the task of going online to look for travel companions. We identified and examined seven of the main technology-related tasks CBs used while planning their travel, or during the trip. These tasks were determined by the researcher, as an inside ethnographer, to be the main IT related activities performed by CBs. Based on the task level analysis, it was then possible to determine the uncertainty and equivocality for each task. The task level analysis also allowed the researchers to identify the relevant text and field notes to be analysed, i.e. when the study participants were talking about a particular task.

Next, we performed a qualitative analysis on the data collected by the researcher during the trips (see section 5.2). This then further enabled us to explore the use and acceptance variables for each TEIS type through qualitative **hypothesis coding** (Bernard, 2006; Saldaña, 2016), which enables the exploration of pre-existing research models (e.g. the McKenna et al. (2013) propositions). Data relating to each task was coded according to the UTAUT variables from the McKenna et al. propositions. To do this we kept the

definitions of UTAUT constructs in mind while reading the text. Where we found the participant was discussing something related to the constructs, it was coded for that construct. For example in Task 1, finding travel companions online (see section 5.1), was determined to be a *collaborative service*, which based on McKenna et al. (2013)'s propositions, is tied to the *social influences* UTAUT variable (Table 2). An analysis of the data collected about this task, enabled the researcher to explore this tie, and to determine if there any connections to other UTAUT variables. In this example, we found that the McKenna et al. proposition was supported, and it was also tied with *facilitating conditions* (i.e. the online forum must already exist, which enables communities of backpackers to meet virtually, and users must have active Internet connections), and *self-efficacy* (i.e. users can arrange their own groups). The analysis consisted of two of the researchers coding the data. Where codes differed between researchers these were discussed to come up with an agreed upon code. This process was performed for all the collected data relating to each of the seven tasks presented in the task level analysis.

Finally, to determine the strength of each of the relationships between service types and use variables, we calculated a percentage for each TEIS type. This was achieved through **magnitude coding,** which is used in qualitative research to add symbolic (e.g. high/low) or numeric (e.g. percentages) to supplement existing codes (Miles et al., 2014; Saldaña, 2016). According to Saldaña (2016), magnitude codes can be added to hypothesis codes. To do this we counted the number of qualitative codes used to determine each of the usage variables for each service type. This number was then divided by the total number of codes from each service type to give a percentage for each relationship. The data analysis process for each task is illustrated in Figure 3. The process was repeated 7 times (once per task). The next section will present these findings in detail.

Figure 3 – Data analysis steps for each task

Boxes in figure:
1. Determine steps to complete task
2. Determine uncertainty and equivocality
3. Align to TEIS type
4. Hypothesis coding of relevant interviews and field notes
5. Magnitude coding to determine strength of codes

Findings

A task level analysis is important for discovering the steps involved, and the uncertainty and equivocality of the task. More information of task analyses can be found in Mathiassen and Sørensen (2008) and McKenna et al. (2013). Table 3 shows seven task level analyses. Note, the TEIS type indicated is already determined from the McKenna et al. propositions, and will be further explored in the qualitative analysis.

Task Level Analysis

The first task involves CBs who look for travel companions online. In this task, CBs either assemble a travel group by making a post on backpacker forums, or look for posts which have similar interests made by potential travel companions. It is suited to a *collaborative* TEIS because the online forum allows users to produce information, and decision making of confirming travel companions, itineraries, budgets and bookings before the trip requires a process of negotiation. This task tends to have high level of uncertainty as CBs do not have an idea who they will be travelling with when looking for travel companions. The high equivocality of this task is attributed to many competing posts available for CBs to choose at a similar period.

The second task involves applying mobile technologies such as a navigator or mobile application such as Google Maps to lead the direction during the trip. By doing so, CBs need to follow standardised and repeatable patterns to navigate. This task is suited to a *computational* TEIS with low uncertainty as the navigator provides step-by-step instructions for backpackers to follow, and low equivocality as information of direction is simple and straight forward, so there is little chance of misinterpretation.

The third task involves CBs going to an online forum to acquire relevant travel information. They can either search by keyword on the website, or go into the section that their destination in to find posts which interest them. This task has a high level of uncertainty because when CBs enter the website, they cannot guarantee that information they need is available. This task has low level of equivocality, as CBs are less likely to have other interpretations of provided information. In this case, this task is suited to a *networking* TEIS as the server produces and transfers one-way information by requests of backpackers.

ID	Task	Uncertainty		Equivocality		TEIS Type	Variables	Application
		Low	High	Low	High			
1	Go to online travel forum to look for travel companion		X		X	Collaborative	Social Influences	Qyer.com
2	Use navigator to lead direction	X		X		Computational	Self-Efficacy	Google Maps, Navigator
3	Go to online travel forum to look for travel information		X	X		Networking	Facilitating Conditions	Qyer.com
4	Use word of mouth applications to check attractions, restaurants, bars nearby	X			X	Adaptive	Self-Efficacy	TripAdvisor, Google Map Rankings
5	Share travel experience on social media		X		X	Collaborative	Social Influences	WeChat
6	Reaching companions		X	X		Networking	Facilitating Conditions	Skype, Mobile Phone
7	Maintain connectedness with friends and families when travelling		X		X	Collaborative	Social Influences	WeChat

Table 3 – Assign Tasks to TEIS Types

The fourth task involves CBs to use word-of-mouth applications on their mobile devices to look up restaurants, bars and attractions nearby. By following steps of these application provided, CBs are able to access to a list of restaurants or attractions that meet their criteria. CBs then make decisions from the list based on the availability and preferences. It is suited to an *adaptive* TEIS, as the number of conflicting restaurants or attractions and diverse availabilities lead to the high equivocality. The uncertainty is low as these word-of-mouth applications can provide comprehensive information of these restaurants.

The fifth task involves CBs sharing their travel experiences on WeChat moment (social-networking functions for WeChat users). These posts normally consist of combinations of pictures and text, some of them are mini-videos. The interactions of their friends and families is an essential part of this task, as the user is highly engaged in replying to comments to extend their travel information sharing. This task is suited to *collaborative* TEIS, as the CB co-produces information with their friends and families on social media through interacting under the post. The high uncertainty is attributed to users having no control over the direction of conversations as it involves multiple actors in the process. High equivocality is because the function of the WeChat moment is similar to other online posts, which involves multiple actors causing different users to interpret the information differently.

The sixth task involves CBs reaching their travel companions by using instant messenger or phone calls during the trip. This task is suited to a *networking* TEIS as users produce information by confirming the location of each other by following certain pattern of IT use. This task has high level of uncertainty as it can be only completed when

facilities enable the connections (e.g. mobile phone reception) and both parties participate. The low equivocality of this task is because the confirmation of location is straight forward and less likely to be incorrectly interpreted.

The seventh task involves CBs to keep in touch with their friends and families back home by using instant messenger or WeChat moment posts. This task is suited to a *collaborative* TEIS as the status of connectedness requires both parties to participate in producing information in an interactive manner. This task has high level of uncertainty because in a hyper mobile setting there are many uncertain variables, as a stable connection is not guaranteed. Having multiple social links active at the same time leads to high equivocality. This can be attributed to the same story being told by CBs in different versions to different audiences. For example, CBs can tell their parents one version of story and tell their friends another.

Qualitative Analysis

This section will present our findings for the ties between the TEIS types to the acceptance and use variables. Through the task level analysis, we found that all the proposed ties between TEIS types and their usage variables were supported. From the qualitative analysis presented next we also found that there are new ties not considered in the McKenna et al. model. The findings will be illustrated with samples of text from our data collection.

Adaptive TEIS

According to McKenna et al. (2013), *adaptive* TEIS are tied to *self-efficacy*. The ethnographic data supports this proposed tie. Informants also showed confidence in using adaptive services, in our example using word of mouth information services such as TripAdvisor, or a combination of applications to receive information.

Jerry (29, Poland Trip): *I use Google Maps and TripAdvisor. Sometimes I use Wikipedia to do some background research for the places you are visiting. For example, some cultural sites, churches, otherwise it is not worth the trip.*

In some instances, informants were more trusting of the information they receive from word of mouth services than face-to-face recommendations, or information from books which don't come with rankings, reviews or alternatives as apps like TripAdvisor provide: *We didn't take recommendations from the host, but looked up from TripAdvisor to find a nice restaurant* (UK Trip, Field notes).

However, we also found that too much *self-efficacy* could produce an over reliance on technology. In the Poland trip, Jennifer (30) showed a strong reliance to her phone: "*I can't travel without this phone. I have to download a local map before I travel.*" On the UK trip, Kitty (40) reflected on this relationship with technology: "*to be honest, I don't really enjoy this kind of reliance. Why is it the authority? Why do we have to live with others' opinions? Or making a decision based on that?*"

We found that *adaptive* TEIS were also tied with *social influences:*

Before Kitty asked, I already started looking for places to eat on TripAdvisor. This has become a daily routine these days. As expected, she came to ask me to look up where to eat later (Field note, UK Trip). Later in the interview, Kitty (40) explained the role of social influences of using adaptive services: "*In this trip, we used Tripadvisor a lot to look up restaurants to eat. This is an era that making decision based on others' opinions.*"

We also found that *adaptive* TEIS were tied with *facilitating conditions*. Facilitating conditions implies that there is information readily available online for users to access the services they need. In our examples, we found that often this information may be misleading, and users may act on this information only to be disappointed. For

example, pictures uploaded may not be realistic, a similar sounding restaurant at a different location could turn out to be the same branch as another one, or reviews might not represent reality.

After a long drive, we finally found the café in Durness, according to TripAdvisor, the café has amazing hot chocolate and a great view, but the experience is actually quite different from what we expected, the view was quite different from the picture on TripAdvisor, although the hot chocolate is delicious. Cath smiled bitterly: "we have to blame the bad weather" (Field note, UK Trip).

Collaborative TEIS

According to McKenna et al. (2013) *collaborative tasks* are tied with *social influences*. The ethnographic material also supports this relationship. For example, in task 5, CBs share travel experiences online with their friends and family, and in particular they use WeChat to "check-in" to notify their parents of their safety during their trips. As one-child policy and collective culture have largely shaped Chinese society (Cameron et al., 2013), which has resulted in 'excessive attention' on the only kids from their families (Fong, 2006). Mobile applications such as WeChat enable CBs to update their safety much easier.

Wayne (28, Spain and Portugal Trip): "*I will do one post every two days to let them know I am still alive (laugh). I tend to do it on WeChat moment rather than instant messenger. I will post some photos and check-in at the location, then all my friends on my social media will know where I am.*"

But it is not only reporting of safety that has some social influences on collaborative services. For some, friends' 'like's and comments on online posts motivate CBs to share more. "*Nowadays, we are living in an era of 'like's. My friends' likes and comments really motivate me to post more of my travel experiences*" (Jess, 24, Spain and Portugal Trip). Catherine (45) from the UK trip however, got more value from comments than likes: "*I realised those core friends will*

interact with you frequently, even if they do not comment, they will give me a like, actually I don't really care how many likes I receive, I care more about how they comment on my posts, that is real interaction. A 'like' for me is just mean they have read it."

In addition, the feeling of 'being left behind others' was also a motivating factor for one informant to learn new features of WeChat, such as sending a 'sight' (a 6 second video).

Aileen (42) started to research how to use the new function of 'sight', then she started to practice in our group chat in the evening. She said she cannot be left behind. She likes to try new things (Field note, UK Trip).

Furthermore, we found that *collaborative* tasks which were also tied with the usage variables of *facilitating conditions* and *self-efficacy*. For *facilitating conditions*, when CBs go online to find travel companions (task 1), technical infrastructure such as an Internet connection, and organizational infrastructure such as pre-existing discussion forums is required to enable users to connect with other users. When recalling her experience of finding travel companions during the trip when there were no mobile data connections, Jennifer (30, Poland Trip) said: "*in the evening I have no choice to go to an Internet café to make a post on Ctrip to look for travel companions.*"

Also in task 5 there were also technical requirements or limitations when *collaborative* TEIS are used, such as requiring GPS or Wi-Fi to connect to services such as checking-in at a location or sharing information. Justin (35, Poland Trip): "*I don't spend money on local SIM cards, so I have to rely on Wi-Fi in the restaurant or in public. I always make good use of the time when we are in the restaurant, to make some posts and check-in at the location, so all my friends on WeChat know where I am.*" WeChat also has a limitation in the number of photos which can be uploaded in a post, which means that CBs must carefully select the photos they wish to share in a post. "*I don't want to do multiple posts for a day, that will annoy my friends on WeChat. Since I can*

only upload up to nine photos, I will carefully select the best nine photos to post" (Jennifer, 30, Poland Trip).

There were differing opinions on the purchasing of a local mobile SIM card during their travels. For some it was important for safety: "*I feel 9/10 safe with a local SIM card, the feeling of safety drops to 4/10 without one. Without a sim card I will worry about getting lost, and have to do extra work, such as download offline maps beforehand*" (Wayne, 28, Spain and Portugal Trip); but for others it created an environment of isolation as they had no connection to the outside word when outside a Wi-Fi zone: "*Personally I quite enjoy this moment of isolation…in everyday lives, it tends to be more stable and routine, so I will rely more on social media*" (Winnie, Spain and Portugal Trip).

We also found that *self-efficacy* is tied to *collaborative* TEIS.

In terms of looking for travel companions, I went straight to the most popular one - Qyer.com. Hundreds of people looking for travel companions there every day. I believe I can find my travel companions and potential informants there (Reflexive notes).

Computational TEIS

According to McKenna et al. (2013) *computational* TEIS are tied to *self-efficacy*. From our ethnographic data we found this to be true. Self-efficacy implies some confidence in using a service. In task 2, CBs felt confidence in using navigational services such as an in-car navigator or Google Maps.

We got on the bus, although we did research last night, as this bus will not terminate at the salt mine, which means we have to get off at some point, it is a local bus and we don't understand Polish; however, with Google Map in hands, we are quite relaxed and don't need to worry about getting off the wrong stop (Field note, Poland).

Our informants also illustrated confidence in using TEIS over traditional printed maps or asking locals for directions. *Wayne suggested to visit the local market*

recommended by the accommodation host. *Although we had the printed map from the host, we still used Google Maps to lead the way. He folded the map, and put it straight back into the backpack* (Field note, Spain and Portugal Trip).

One participant also suggested we are becoming more reliant on mapping services. Catherine (45, UK Trip): "*Now I know how to use Google Maps, I think I will rely on it a lot. Without it I cannot figure out how to get around. In the past, I will ask around, that was my first choice. I won't choose to look at the actual map; that is too difficult for me.*" (Question from interviewer: Do you think this kind of reliance is getting stronger and stronger?) "*Yes, I believe so, I think it is a good thing, but it also scares me.*"

In addition to supporting the relationship between *computational* TEIS and *self-efficacy* proposed by McKenna et al. (2013), the ethnographic data also suggests that *computational* TEIS are tied with *social influences*. We found that some members in the group were influential in getting others to use certain services. In the Poland trip, the host in Krakow provided us a mobile Wi-Fi device. *Before that, we had to stick to Jennifer's offline map, and she has the power to lead the way. However, with this my phone connected to this mobile Wi-Fi, she seemed to rely on me more* (Reflexive note, Poland Trip).

We also saw that *computational* TEIS can be used across multiple applications, in the examples below, both Google Maps and WeChat were used. Field notes: *I followed the Google Map to see the cathedral, surprisingly the cathedral is still open. I went inside to walk around and use WeChat to tell Wayne this information and send him my current location on WeChat* (Spain and Portugal Trip). Or *Kitty used Google Map to share the location on WeChat, I was amazed Google Map had this function, Kitty laughed at me* (UK Trip).

Additionally, we found an example where both *social influences* and *facilitating conditions* being tied to *computational* TEIS.

One informant saw the researcher using Google Maps, and tried to install it herself, but could not activate it due to her lack of phone signal. Field note: *Aileen (42) saw me use Google Map, also tried to download and sign up an account, however, they need to send a verification code to her mobile phone, she did not have signal, she had to give up* (UK Trip).

We also found that that *computational* TEIS are also tied with *facilitating conditions*. This became clear with problems that informants were having with the in-car navigator. "*When we got in the car, the navigator seemed not to corporate, it kept making mistakes, so it took us a while to get out of the city. When approaching Castle Combe, the navigator couldn't recognize one of the street names, we had to use Google Maps instead to guide us* (Field note, UK Trip). Navigators rely not only on having a good GPS, but also that the mapping services on the navigator have been well designed (i.e. street names and directions). At times when the navigator would not work informants were forced to use other mapping services such as Google Maps. This can provide a set of different functions that may not be available on one service, but is available on another. At times informants also combined the use of both mapping services. Additionally, navigating services may not always lead in the most direct route.

Networking TEIS

McKenna et al. (2013) proposed *networking* TEIS are tied with *facilitating conditions*. The ethnographic data again found this to be true. For example, in task 6, when travelling in an unfamiliar location, and a group gets separated, it is necessary to attempt to reach missing members. As roaming can be expensive, informants often buy local mobile SIM cards to be connected. However, there are often problems with this as mobile providers sometimes 'lock' phones so they will not accept a foreign SIM card, or they require PIN codes to unlock them.

In the evening, we cannot get hold of Will, but only he has the key to the flat. Later he said he bought a sim card, but it got locked when he restarted the phone, and he left the PIN code in the apartment (Field note, Spain and Portugal Trip). Or *as it is not that easy to find me, she has to reach me through her mobile number in China which means making an international call* (Field note, UK Trip).

Another example from task 3 is going online to look for travel information. If there is no information available, it can make a CB anxious as they tend to have a high level of risk avoidance.

Harry (24, Poland Trip): "*Now I am still worried about how to get from the airport to the city centre, in this kind of small place it is rather difficult to find official information, and from other people's experience sharing, there is no one certain conclusion.*"

These problems are also enhanced if there is no phone signal in a specific location. For example, task 6 supports that *self-efficacy* is also tied with *networking* TEIS. The *facilitating conditions* meant that users had no phone signal, and another group member used his ability (self-efficacy) to attempt to make contact through Skype (knowing that the others had a mobile Wi-Fi). This demonstrates that users are aware of conditions inhibiting TEIS, and will attempt other approaches to maintain connections.

I tried to call them, but the problem is the cottage we stayed in the Lake District has very bad reception. I tried to call them from my Skype, but the problem is I am not sure if they have reception on their phones or not. I tried to contact them so many times. Many calls connected for a few seconds then disconnected. I just know they got lost but I don't know if they know the way back or not, and I don't know how far away they are (UK Trip, Field note).

Self-efficacy is also demonstrated with users who know specifically what they are looking for (task 3), it can create a sense of purpose and confidence and a willingness to invest time.

Jess (24, Spain and Portugal Trip): "*In terms of reading Qyer.com posts, normally I just focus on things I am interested in, for instance the book store. I will spend extra time to look into it and find out the history and what it is for.*"

We also found that *networking* TEIS are tied with *social influences*. "*I will go to Qyer.com to read other people's posts, and some friends' recommendations, to see how to design the route. Then I will make a decision to choose some popular destinations*" (Winnie, 24, Spain and Portugal Trip). Informants go online to find information about where to travel, and base their routing decisions on what others have recommended. The use of online forums has strong social influences because in a group situation, some group members will encourage one person to make decisions. This requires research on routes and attractions. As the leader of the group, Wayne (28) took responsibility of planning the route: "*After reading several posts on Qyer.com, I had a general idea of how to plan the tour in Spain and Portugal, we can follow what they did, either clockwise or anticlockwise from Madrid*" (Spain and Portugal Trip). These kind of TEIS also encouraged one informant to travel more. Informant Jennifer (30) had gained confidence with the assistance of online travel forums: "*Yes yes yes, I printed them out, I feel this is so convenient, and so much fun! Since then I travelled much more*" (Poland Trip).

Research Model

Based on our findings, we present a research model which further develops the McKenna et al. (2013) model in terms of providing empirical evidence for the proposed ties between adaptive, collaborative, computational, and networking TEIS and a set of the UTAUT constructs: self-efficacy, social influences, and facilitating conditions. Additionally, we discovered new ties between TEIS components and the UTAUT constructs.

Acknowledging complex relationships between TEIS components and three UTAUT constructs, a simplified model is proposed for better utilisations, using a cut-off point of 20% or less from the magnitude codes. The rationale used for this is that we can observe that the original model is supported with 20% or more strength of the relationships. Consequently, the shaded variables in Figure 4 represent the strongest relationships between TEIS types and use variables as determined by having a percentage greater than 50%. In this model, we propose relationships above 50% as strong ties, and below as weak ties. Finally, the ties proposed by McKenna et al. (2013)'s are supported and depicted with solid lines in this model. The appendix contains a full table of magnitude codes, including those removed from the final research model.

Discussion

This study makes several contributions to towards further understanding TEIS use by exploring the McKenna et al. (2013) propositions. Being the first to explore the propositions using empirical data, we supported these propositions, and discovered new relationships. First, *social influence* has strong ties to three TEIS types: adaptive, collaborative and networking. Previously, this use construct was only proposed within collaborative TEIS (McKenna et al., 2013), which has been supported in this study. Furthermore, this supported relationship is also the strongest of all previously proposed relationships for all other TEIS types, emphasizing that mobile services enable users to express their social and personal identity (Nysveen et al., 2005). For example, sharing travel experiences on social media. We also discovered that *social influences* is an additional use variable connected to adaptive and networking TEIS, and is a stronger relationship than the use variables originally proposed by McKenna et al. (2013). Therefore, we discovered that when uncertainty is high, and users need-to-know-something (Mathiassen and Sørensen,

2008), social influences play an important role.

Figure 4 - Findings and proposed research model
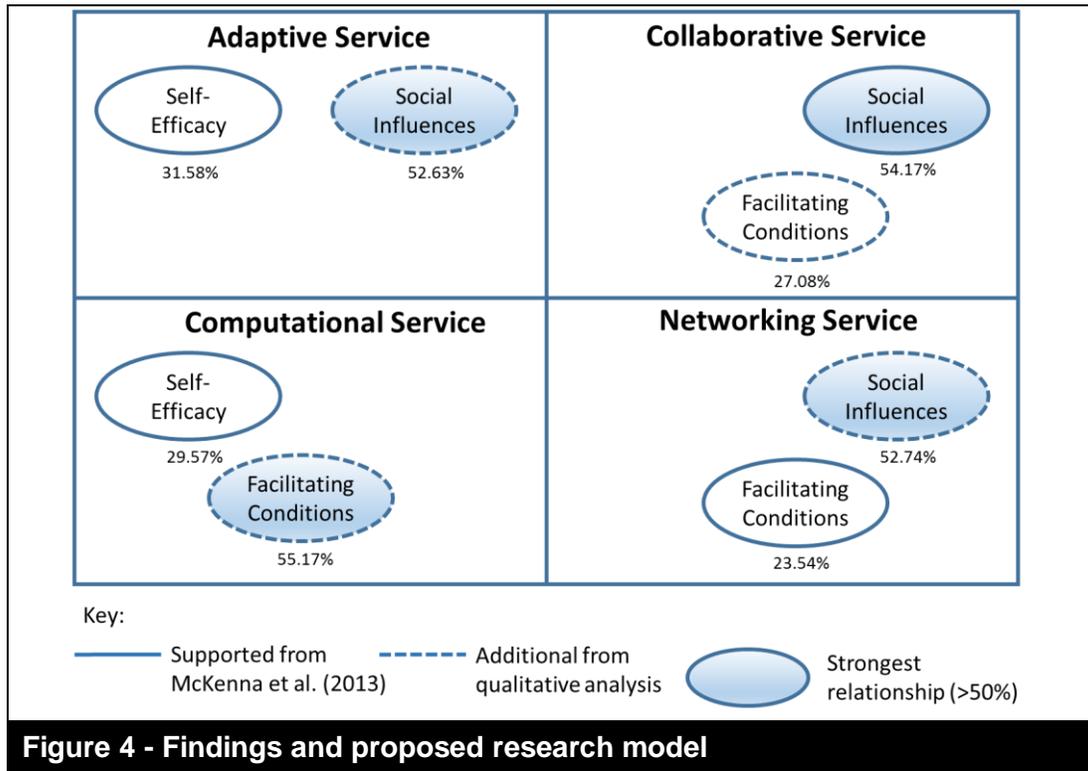
Furthermore, with respect to *social influences* relationship with collaborative and networking TEIS, they are used to produce information (Mathiassen and Sørensen, 2008) in various means throughout the journey. CBs derive more value from social influences when using these TEIS, which aligns with collectivistic and Confucius values of Chinese culture (Reisinger and Turner, 1998). The strong relationship of *social influences* with collaborative and networking TEIS can be explained by the predominant role that embedded cultural values play in terms of IT use. From a collectivistic culture, the relationship between generations is comparatively close; in addition, for the past thirty years, the Chinese one-child policy has had enormous social impacts, such that the new generation has become the core of the family. As a result, 'excessive attention' from parents (Zhu, 2005) leads to concern for their safety when their only child undertakes a long-haul journey. Therefore, CBs often connect to their parents through social media. This reinforces the linkage of travel with everyday life through ITs (Neuhofer, 2016). We can also attribute this to the IT used to produce this service. What's more, both networking and collaborative TEIS require social connections via use of social media, such as Skype or WeChat etc.

Another important issue influencing the increased consideration of *social influences*, is the issue of surveillance through IT (Bennett and Regan, 2002; Germann Molz, 2006) which plays an important role in the context of Chinese outbound backpackers. CBs are expected to have a constant virtual presence to appease their families' worries. Instead of feeling oppressed (Cooper, 2002), CBs feel obligated to maintain connectedness with their families. Beyond simply updating safety statuses, CBs prefer to apply the 'social glue' feature of TEIS (Vertovec, 2004) to mediate and connect space and place in order to maintain this

hybrid sociality. Tourists often have a more memorable and enjoyable trip if they receive emotional support through social media during their travels (Tanti and Buhalis, 2016), and this is more evident for Chinese travellers than other cultures (Yang et al., 2012). Social media allows travellers to maintain connectedness with their everyday social networks (Neuhofer, 2016), and this becomes more evident for Chinese due to the cultural value of *guanxi*, which requires them to be continuously connected. This differs from some travellers who desire to be disconnected or unplugged from IT during travel (Dickinson et al., 2016). For them, sharing travel experiences on social media platforms (Amaro and Duarte, 2017; Munar and Jacobsen, 2014) acts as a multi-functional role to maintain connectedness, and is enabled by collaborative and networking TEIS.

Maintaining connectedness also enables CBs to get access to their mundane lives (Larsen et al., 2007). Although most informants expected to escape their daily lives when backpacking (Paris et al., 2015), they faced challenges of this escapism when the Internet was connected. In this case, CBs, on one hand, enjoy the benefits of TEIS as it allows them to report safety easily and to share travel experiences; on the other hand, CBs are required to show presence in their daily social networks. This also reflects the distinction between home and away, as well as the dichotomy between everyday life and travel experiences are blurring (Neuhofer, 2016; Uriely, 2005; Urry, 2007; White and White, 2007). The Internet and mediated communication enable the expansion of social relations from a compact and community-based format to a wide-spread and networked one (Wittel, 2001). The uncertainty and complexity of travel (Dellaert et al., 2014) determine that information tends to be produced in particular scenarios and cultural contexts rather than in a repeatable manner.

Additionally, we found that *social influences* has a relationship with adaptive TEIS, and it is a stronger relationship (52.63%), than the

proposed McKenna et al. relationship with *self-efficacy* and adaptive TEIS (31.58%). We found that CBs follow and practice world-of-mouth advice from online enclaves in their own settings and that CBs perceive more value from *social influences* when using adaptive TEIS. This strong relationship can be attributed to the strong motivation of 'learning through backpacking' (Chen et al., 2014b; Pearce and Foster, 2007) from both their travel companions and a significant influence from adaptive TEIS such as word of mouth applications (Jalilvand and Heidari, 2017) in terms of decision making, destination information, and planning (Ferrer-Rosell et al., 2017; Sylejmani et al., 2017). We found that social influences were important when advice is both given by others (e.g. online reviews) (Gretzel and Yoo, 2008) and was expected to be given to others when travelling as a group, for example one member of the group checks TripAdvisor.

Computational TEIS, such as using Google Maps for navigation, and adaptive TEIS, such as using word of mouth applications were proposed by McKenna et al. (2013) to be tied with *self-efficacy*, based on the idea that TEIS can be usable without assistance from others (Meuter et al., 2000). The computational TEIS allows CBs to use technologies to assist themselves for travel related activities, emphasising the importance of previous experience in technology use (Treiblmaier and Dickinger, 2006). This relates strongly to general backpacker culture which suggests independence and learning new skills throughout the trip. This, on one hand, is attributed to a Chinese tendency to have higher risk concerns when travelling (Reisinger and Mavondo, 2006); on the other, can trace back to the characteristic of 'self-development learning through backpacking' (Chen et al., 2014a; Fu et al., 2015; Pearce and Foster, 2007; Pearce e al., 2013).

Differing from social influences predominating role in influencing collaborative, networking, and adaptive TEIS usage, computational TEIS derives more

value from *facilitating conditions*, and to a greater extent than self-efficacy as proposed by McKenna et al. (2013). CBs can be characterised as highly digitally active (Ong and du Cros, 2012; Y. Xiang, 2013; Zhu, 2009) and they apply multiple online or mobile tools at different stages of the trip, particularly in decision-making. Computational TEIS allows backpackers to fulfil the trip smoothly and relates to how CBs use technologies to assist themselves for travel related activities (Sinarta and Buhalis, 2018; Tanti and Buhalis, 2016). The role of technological infrastructure is therefore highlighted in standardized information processing. Although facilitating conditions were also an important consideration in both collaborative and networking TEIS, they are considerably more important for computational TEIS. This could be attributed to a more urgent need for using TEIS, such as navigation tools, especially when a traveller is lost (Tuunanen et al., 2011). High levels of technical infrastructure are required for smartphone usage, e.g. hi-speed mobile connections (Dickinson et al., 2016). Technological dead zones can cause major tensions for tourists (Pearce and Gretzel, 2012), especially for Chinese tourists who are more used to making mobile payments (Law et al., 2018). The function of these mobile services and communication channels highly relies on facilitating conditions.

As these ties between TOIS service types and UTAUT variables were generated from the thick description of CB's travel experiences; therefore, some contextual links are identified in terms of the transferability (Decrop, 2004) of this study in order to be further adopted in other contexts. In the contexts of CB, social influences, which to some extent is highly determined by embedded Chinese values, play a crucial role in the practice of utilising TEIS services. As a study designed in a hypermobile and intercultural setting, the role of embedded culture has been enlarged and reconsidered when utilising technologies to serve the purpose of buffering culture shock or assist

intercultural communications. In this case, when applying this model in the daily basis, the role of embedded culture would not be as significant.

Conclusion

This paper has contributed to a better understanding of TEIS use (Neuhofer, 2016; Zhang et al., 2017). Specifically, we conducted a mobile ethnography study to understand how users, in this context, Chinese backpackers, receive value from using different TEIS (Barrett et al., 2015) by examining the relationship between TEIS types and use in a tourism setting. To our understanding, this paper is the first to do this. Our study contributes to the literature by providing an understanding of TEIS use in general, and CB TEIS use specifically. Our study also found that CBs prefer to use mostly collaborative TEIS which gives evidence that Chinese collectivist values can be implemented through IT.

We explored TEIS use from a multi-channel approach because CBs tend to use a suite of IT and applications (Murphy et al., 2016). We analysed IT use against multiple TEIS whereas the McKenna et al. (2013) developed the model through the use of only one mobile application. From a user's perspective, our paper shows a complex picture of blurring boundaries among three use and acceptance variables that a user receives when using different TEIS. We also provide evidence of additional relations between TEIS types with use and acceptance variables, which were not proposed by McKenna et al. (2013). This suggests that for designing different TEIS types, self-efficacy, social influences and facilitating conditions should be all considered.

We recognize that our study has some limitations. First, we only studied the TEIS from the perspective of Chinese users. We acknowledge that CBs have very strong characteristics and cannot fully represent tourists in general (i.e. non-backpacker

tourists). The applied theoretical model also has some limitations. The McKenna et al. (2013) model does not consider other UTAUT variables such as anxiety. We found that some CBs panicked, or were anxious, when TEIS might not work. However, we did not include this in the current study as the anxiety construct was removed from the model by McKenna et al. (2013). Consequently, the use context of TEIS should be further taken into consideration with future research. This concurs with Tuunanen et al. (2010)'s argument that the use context impacts TEIS use.

Future research should further develop the proposed research model through a quantitative analysis. The additional ties discovered through the qualitative analysis also need to be further tested. The model can also be used to compare with other cultures, as others might have different TEIS use behaviour/patterns, or to look at usage and/or design of TEIS for specific contexts based on the TEIS types and their usage variables as presented in this study, i.e. tourism in general, or business-related contexts.

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Appendix

Table A1 - The list of magnitude codes, including those removed from the final research model in italics.	
Adaptive	Social Influences (52.63%) Self-Efficacy (31.58%) *Facilitating Conditions (15.79%)*
Computational	Facilitating Conditions (55.17%) Self-Efficacy (27.59%) *Social Influences (17.24%)*
Collaborative	Social Influences (54.17%) Facilitating Conditions (27.08%) *Self-Efficacy (18.75%)*
Networking	Social Influences (52.74%) Facilitating Conditions (23.55%) *Self-Efficacy (18.75%)*

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