Article

Digital local information services in developing countries: evidence from Colombia

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Abstract

Purpose: This exploratory research identifies and investigates factors that affect the delivery of local information in Colombia. The service provider and 195 local institutions based in Medellin collaborate through an online portal, *Infolocal,* constituting an information landscape. The study implements the local information landscape conceptual framework and highlights deficiencies in traditional local information service (LIS) models.

Design/Methodology/Approach: First, we conducted a Delphi study in order to refine the traditional Unified Theory of Acceptance and Use of Technology model (hereafter, UTAUT) constructs for analysing the *Infolocal* information service. Second, the revised categories (effort expectancy, performance expectancy, social influence, facilitating conditions, organisational support, and affective commitment) were used to form a survey that captured the perceptions of local institutions participating in this LIS. The data were then evaluated using exploratory factor analysis.

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Findings: The study found that theories of technology acceptance were insufficient in explaining disjunctions in the information landscape of this service. This study contributes to closing a gap in understanding the perceptions of LIS practice from the perspective of the institutions that engage directly with citizens' technology acceptance and use behaviour in a multilevel relationship.

Originality/Value: This article captures, compares, and analyses disjunctions between the theoretical frameworks of local information services (LIS) as espoused by LIS experts and the practices of LIS.

Key Words: local information services, local information landscape, information deserts, exploratory factor analysis, Delphi study, Colombia

1.0 Introduction

A local information service (LIS) generates, gathers and redistributes information from affiliated partners often through an online portal. Based in Medellin, Colombia, a private sector organisation formed a collaboration with libraries, small museums, theatres, and community centres (herein, "local institutions") to deliver information about local events to residents in 1991. Beginning as a paper-based, user-focused system, *Infolocal* is one of oldest functioning local information services in Latin America and served as a model for information practice across the continent (van.Klyton and Castaño-Muñoz, 2017). In terms of process, *Infolocal* receives information about an event, verifies it by searching within the channels of the hosting institution, digitalises it, and then disseminates it to a total of 686 institutions in print and on the digital platform (See Appendix A for the list of 34 categories of institutional recipients).The OECD defines local information as digital or print materials generated by professional or non-professional mechanisms deemed *relevant* to local communities. An LIS is often used to disseminate linguistic and cultural events and, when shared, can generate revenue and have a unifying effect on local communities (López et al., 2014).

The Colombian government increased ICT investment and deregulated Internet service provision (Plan Nacional de Desarrollo (2010-2014), 2011), reshaping the local information landscape, particularly for how people access information and even that which was considered "local". This called into question the relevance of local institutions as perceived and lived spaces for local information (López et al., 2014) and stymied the traditional LIS model (Sey et al., 2015). As smartphone technology developed, end users began to access information through smartphones, inadvertently circumventing *Infolocal's* purview and diminishing both the perceived value of *Infolocal,* and, by extension, of the local institutions. This chain of events created "information deserts" within the landscape (Evans, 1994). This case emerges as an example of how technological change can produce information deserts and a fractured information landscape.

Surprisingly, little is known about the perspectives of local institutions that provide information to the portal. As information intermediaries, they are "carriers" of the social process of technological development (Bijker, 1997) and a critical link between the end users and the service provider. They can offer insights into the broader effects of technological change in society. These intermediaries facilitate learning about technology through the provision of a space for constituents, they interpret and develop expectations about the system through their interactions with end users that, in theory, inform *Infolocal* through feedback

mechanisms. Lastly, they are brokers who negotiate with *Infolocal* on behalf of local users and articulate changes in the demand for and usage of technology (Schot et al., 2016). Hence, we begin with the premise that local institutions face a duality of purpose: they have an imperative to fulfil the needs of constituencies to maintain relevance as a community-building source, and they must maintain a collaborative relationship with *Infolocal*. This duality challenges mainstream technology usage and acceptance models (Davis et al., 1989). The institutions' relationship with *Infolocal* then becomes mediated through their *perceptions of the end users' technology usage,* which affects the local information landscape (Lee and Butler, 2019; Lloyd, 2010). In essence, the success of *Infolocal* is contingent on a multilevel, collaborative relationship between the local institutions and the preferences of end-users.

Technological advancements can disrupt existing information landscapes and challenge extant theories of LIS practice and the opinions of "expert practitioners" for understanding actual LIS practice. We test this hypothesis through a two-stage analysis where we invited LIS experts internationally, who make intellectual contributions to the practice of LIS, to participate in a two-round Delphi study. These participants identified and prioritised the factors that they felt enabled effective local information practice. These results were used to augment the traditional technology acceptance model. The revised constructs then formed a survey, which was distributed to 195 institutions in Medellin. The responses were analysed using exploratory factor analysis (EFA). The analysis identified disjunctions between theorised and actual LIS practices and exposed to some extent fragmentation in the information landscape (Lee and Butler, 2019). We use the term disjunction as defined by Lloyd (2017, p.36), such that changes in people's circumstances "cause the disruption of familiar and certain information landscapes". We argue that such disjunctions necessitate the reconceptualisation of information practice and information behaviour, particularly in developing countries. The structure of the article is as follows: the literature review examines the interrelated concepts of information landscapes, information deserts and practices and technology acceptance theories. This is followed by the methodology, findings and the conclusion and recommendations.

2.0 Literature Review

2.1 Local Information Landscapes, Information Deserts and Information Practices

LIS studies (Baron and Gomez, 2012; Bedoya Mazo, 2011; Betancur, 2009; Sabelli, 2008; Saumell i Calaf, 2002; Ospina, 2018) have largely ignored the notion that practices of LIS occur as an interplay between the physical spaces of the institutions, technology, people

and local information itself. This information landscape represents intersubjectively created spaces that result from "human interaction, where information is created and shared and eventually sediments as knowledge" (Lloyd, 2010, p.9). Landscapes are constructed from values systems, contextualised understandings, and practices that generate situated knowledge and reinforce interactions between people (Lloyd 2006, pg. 581). Information landscapes act as an "informational ecology", where information use and creation occurs holistically from "the enterprise level to the personal level" (Skovira, 2004, p.309). The landscape becomes a holistic and multidimensional system (Skovira, 2004), intertwined within the social contexts of the people using the information, producing diverse materialities of information and altering information practices and information seeking behaviours (Lloyd, 2017).

The confluence of sources, pathways, and practices of local information erodes the presumed singularity of purpose of LIS and can result in information deserts and fractured landscapes (Evans, 1994; Lee and Butler, 2019; Lloyd, 2006), bottlenecks that emerge in information sharing, owing to capacity deficits on where to find useful information (Evans, 1994). Information deserts are spaces of information inequality that are social and material in nature and are either a "by-product of organisational strategies or because of the nature of particular information types" (Lee and Butler, 2019, p.10). Deserts also emerge if a user's expectations of a technology are not met (Gibson and Kaplan, 2017) or through ICT development initiatives (Lloyd, 2017, p.36).

Lee and Butler (2019) identified three elements of LIL framework including community characteristics, the local information landscape itself, and community outcomes. This study will focus on two of the seven community outcomes, equality in information access and residents' knowledge about information technology, as there is a direct connection between inequality in information access, residents' knowledge and information deserts, particularly with respect to the network of local institutions that support this LIS. This framework, however, does not explicitly consider power relations. Skovira (2004, p.309) argues that frames of the use of information "bound and structure" a landscape, hence, end users can and do exert power over the landscape. Furthermore, Leonardi (2013, p.69) argues that once the technology has "left the hands of the developers", the interplay of the social and material produce "perceptions of the utility or impediment, and of affordance or constraint." As such, end-user autonomy can create disjunctions between the theorised practice of information management and the actual practice of LIS.

2.2. Technology Acceptance

Practitioners and researchers agree on the importance of technology acceptance for analysing and predicting technology use (Davis et al., 1989; Venkatesh and Davis, 2000; Venkatesh and Bala, 2008). The technology acceptance model (TAM) has two main constructs: perceived usefulness and perceived ease of use. These constructs are also important in understanding how end-users engage with *Infolocal*. This model is underpinned by the determinants of individual differences, system characteristics, social influence, and facilitating conditions (Venkatesh and Bala, 2008, p.275). In addition, we examine both the Theory of Planned Behaviour (Ajzen, 1991) and the Unified Theory of Acceptance and Use of Technology (UTAUT I and II) model to lend support in measuring technology acceptance (Sovacool and Hess, 2017).

2.2.1. Effort expectancy

Effort expectancy (EE) explains the intention to use technology and, indirectly, the actual use of it. It is conceived as the perception of effort needed were an individual to use the technology (Venkatesh et al., 2003). UTAUT I and II (Venkatesh et al., 2003, 2012) propose EE as an equivalent construct to TAM's Perceived Ease of Use; namely, "the degree to which a person believes that using a particular system would be free of effort" (Davis et al., 1989, p.320). The degree of ease related to actual use is crucial for first-time users, but as use habits develop it becomes less significant (Venkatesh et al., 2003). Hence, people who do not have experience in navigating the Internet could build bigger expectancies because using *Infolocal* would constitute a new behaviour.

2.2.2. Performance expectancy

Performance expectancy (PE) can be thought as the degree to which individuals believe that using a technology would help them achieve better outcome over traditional alternatives (Davis et al., 1989; Venkatesh et al., 2003, 2012), which in this case would pertain to how technology could improve the work of local institutions. So, PE would be higher if the institutions perceive that *Infolocal* facilitates the discovery and access information for end-users.

2.2.3. Social influence

Social factors are key for technology acceptance (Ajzen, 1991; Venkatesh and Davis, 2000; Venkatesh et al., 2003; Venkatesh and Bala, 2008; Venkatesh et al., 2012) because the

perceptions of behaviour that other relevant people hold with respect to the user becomes a determinant for developing intention to use technologies (Fishbein and Ajzen, 1975). Social influence shapes the information landscape and alters information behaviour precisely because landscapes are socially-constructed, intersubjective spaces (Lloyd, 2010). By observing actual users in situ as they gather information about the technology and its usage and receive through the portal, the institutions can draw conclusions regarding the impact of social influence on users. This is accompanied by (imagined) rewards and social punishment to reinforce expected behaviours.

The social context is part of an information landscape because if an individual perceives that a relevant social group thinks that an individual should execute an accepted "*Infolocal* use behaviour," then the individual is likely to develop such behaviour. Hence, one might expect social influence to be more prevalent during the earlier days of *Infolocal,* when it was necessary to physically go to the local institution to access information. As users gain experience and hence become more autonomous, social influence as a construct weakens (Venkatesh et al., 2012).

2.2.4. Facilitating conditions

Perceptions about the existence of resources, infrastructure, and opportunities to adopt technology are relevant for intent to use technology (Ajzen, 1991; Venkatesh et al., 2003; Venkatesh and Bala, 2008; Venkatesh et al., 2012; Fishbein and Ajzen, 1975). Even when intent is strong, information deserts can inhibit or impede access to technology and deter acceptance (Evans, 1994). It is crucial that users believe that the technical infrastructure exists, sustaining their perception that their use of technology will be supported (Yang and Forney, 2013). Infrastructure is a non-neutral materiality of technology that carries the artefact itself, information, cultural norms and values, enabling "certain kinds of human and non-human relations" while inhibiting others (Slota and Bowker, 2017, p.530).

2.2.5. Organisational Support

Organisational support is the degree to which employees develop universal "beliefs concerning the extent to which the organisation values their contributions and cares about their well-being" (Eisenberger et al., 1986, p.501). This component was selected as a construct because it informs our understanding of the provisions from senior management at *Infolocal* of sufficient resources that help employees achieve the "organisation's goals." Eisenberger et al. (1986, p.501) argued that an organisation's treatment of its employees has a direct influence

on how employees interpret the organisation's underlying motives. High levels of perceived organisational support would encourage the local institutions to support the "cause" of LIS and cause them to feel like they are an integral part of the organisation, increasing the affective attachment from the institutions and increase organisational identification (Marique et al., 2013).

2.2.6. Affective Commitment

Affective commitment is an emotional attachment to, identification with, and involvement with the organisation (Lin and Hwang, 2014; Meyer and Allen, 1991). It leads to a desire of remaining with the organisation (Magni and Pennarola, 2008) and can affect technology acceptance behaviour (Malhotra and Galletta, 2005). The presence of affective commitment influences the attitudes and behaviours of individuals (Allen & Meyer, 1996). and could also be developed between the provider of technology and its users (Li et al., 2006). We adapted this concept to capture how local institutions perceive end users with regard to the platform. Affective commitment implies that users would adopt attitudes and behaviours for achieving a better relationship with the local institutions (Hwang and Kim, 2007).

Methodology
3.1 The Delphi Study

A two-round Delphi study was conducted with global experts of LIS to enhance construct validity for the survey, which was then distributed to the local institutions. Other studies in library sciences have used this methodology to examine information literacy (Pinto et al., 2017) and the use of volunteers in libraries (Casselden et al., 2014). Following Kerr et al (2016), this present study employed a Knowledge Resource Nomination Worksheet to identify potential panel members with the greatest expertise in LIS. There is no fixed number of respondents, however, ten is suggested as a suitable amount for a homogenous panel (Kelley, 2007; Okoli and Pawlowski, 2004). The study garnered participation from five scholars and five practitioners from Cameroon, Canada, Colombia, Jordan, Mauritius, the Netherlands, the United Kingdom, and the United States. The Delphi method utilises the wisdom of experts to develop a "reliable consensus" on a given issue and can contribute to construct validity for survey instrument development (Okoli and Pawlowski, 2004). Although the Delphi method can be done in several rounds (Sourani and Sohail, 2015), Gallego and Bueno (2014) argue against using more than three rounds because participants may lose interest or time. Furthermore, there is no guarantee of consensus after two rounds.

The first round of the Delphi study should include an item pool that contains two or three times the number of items that will constitute the final scale (Noar, 2003, p.626). Therefore, our starting point was to use the existing constructs from TAM (perceived ease of use, perceived usefulness, social influence) plus constructs derived from theories on access to information (organizational support, facilitating conditions, affective commitment). This produced five dimensions (each comprising of 4-6 questions), yielding an initial scale of 50 items. The items were then sent to the Delphi panel for the first-round considerations. In the first round, the panellists used a 5-point Likert scale to rate the degree to which they felt that the constructs were allocated appropriate definitions: 1 (*strongly disagree*) to 5 (*strongly agree*). They were also asked to give feedback on ratings of less than 4 and to add constructs (and definitions) they felt were not represented. Constructs that averaged a rating of 3 or less were removed.

In the second round of the Delphi study, the panel were sent the five highest rated constructs (including any suggested ones from round one) and the items that best addressed each construct. The experts evaluated item appropriateness, offering feedback for ratings of less than 4. The final list of constructs was finalised with these items, put into survey form and distributed to the institutions. The resulting constructs and items from the Delphi study are shown below:

3.2 Exploratory Factor Analysis

The organization provided the research team with contact details for the 195 participating institutions. The Delphi study-enriched survey instrument was responded to by 89 institutions, a response rate of 49.6%. Exploratory Factor Analysis (EFA) with equamax rotation was used to investigate that the dimension structure for each construct. Equamax rotation is an orthogonal method that optimises the results by distributing variables more uniformly between the extracted factors and spreading variance more equally across them (Hair et al., 2010; Sass and Schmitt, 2010). We proposed a structure of the latent relationships identified through the Delphi study; however, when tested through EFA, the resulting structure proved different. We assert that the resulting disjunctions between the expert opinions and the local institutional perceptions speak to the presence of information deserts and a fractured information landscape that hinder the effective operation of this local information service.

• Perceived usefulness of information: The degree to which the respondent feels that constituents value the information on the platform as relevant, objective and trustworthy.

• Perceived usefulness of the system: The degree to which the system is perceived as flexible and intuitive enough by the user so that it can be extended quickly and easily; including toward disabled users.

• Resources (facilitating conditions): The degree to which all resources (HR, infrastructure, system,

local and state policy) are perceived to be in alignment to achieve the identified objectives of the LIS system.

• Conformity to community values (social influence): The degree to which the respondent feels that the end user feels it is important that others use the service and that this end user is willing to tell others in the community about the service.

• Community's flow and context: The degree to which the respondent feels that the community e/ she serves can build appropriate mechanisms to produce, collect, organize and disseminate information that addresses local needs.

4.0 Findings- Delphi Study

Disparities and similarities emerged between the expert opinions and the literature on LIS practice. For example, the literature uses performance expectancy of technology to refer to the probability of experiencing a better performance by using the technology. However, the experts interpreted performance expectancy as the perceived usefulness of information, i.e., the degree to which the local institutions feel that constituents perceive the information on the platform as relevant, objective, and trustworthy. In addition, the literature refers to effort expectancy (Venkatesh et al., 2003, 2012) and the perceived ease of use (Davis et al., 1989), which we interpreted as users not only seeing the technology as user friendly, but also as extendible to other types of users. The panel experts concurred with this interpretation. The third construct, resources (closely associated with facilitating conditions) is the extent to which all resources (e.g. HR, infrastructure, and systems) are perceived to be in alignment to achieve the identified objectives of LIS. The Delphi study revealed that this was useful for considering state policies, emphasising that it is not only the existence of resources but also the alignment of them with local and state policy that matter.

The experts also derived "conformity to community values" as a fourth construct, referred to in the literature as Social Influence. However, they felt that conformity is not only the influence of other actors but of user's willingness to tell others about the service (e.g., word-of-mouth recommendations). The fifth construct is community's flow and context. The

literature uses organisational support as a proxy to capture the relationship between local institutions and *Infolocal*. However, given that this construct does not consider the end user, it would appear not to fully address the complexities faced by the institutions. The experts did not include organisational support in their appraisal, at least not as a full construct; however, similar items within organisational support were found in the other constructs. Hence, there is a need to reinterpret the theoretical frameworks used for understanding technology acceptance to capture the *actual* implications of using the technology within an LIS context.

Findings- Exploratory Factor Analysis

Using a principal components extraction method, the Kaiser's criterion of eigenvalues of equal or greater than 1.0 was established. The KMO (Kaiser-Meyer-Olkin indicator) and Bartlett's test of sphericity guaranteed sufficient significant correlations between the variables, which is required for correct factor extraction (Norusis, 1985). Thus, adequate values greater than 0.5 for KMO (KMO = 0.838) and a significant test of sphericity (Bartlett's X^2 =1173.13; d.f.=300; p=0.000) were obtained. The Bartlett's test of sphericity showed a high significance (p = 0.000) and Cronbach's alphas were 0.696, 0.786, 0.807, 0.766, 0.816, and 0.811 for factors 1, 2, 3, 4, 5, and 6 respectively, which meet the acceptable threshold of 0.70 (Churchill, 1979; Nunnally and Bernstein, 1994).[1]

Some 25 variables were clustered around 6 factors, with Eigenvalues above 1.0. These factors explained 67.19% of the variance (see Table 3 to observe the initial and rotated information). A cut-off threshold for the factor loadings of 0.3 was used (Hair et al., 2010) to assure statistical significance. The average Cronbach's alpha was 78.03, which indicates that, in general, the items grouped in each factor were a reliable measure of them. Each factor was named according to the relation of the variables that constituted it. Table 3 shows the names given to each component and the rotated component matrix after equamax rotation was performed and the factor loadings depurated.

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[1] For the Descriptive Statistics, please see Appendix B.

Items by Factor	Commonalities	Final Eigenvalues	Rotated Structure	Explained Variance
Factor 1: Digital Autonomy		3.18		12.7%
Our institution effectively uses social networks to access a greater number of users.	0.65		0.74	
Our institution understands the consequences of reducing information on physical media for information in digital formats	0.58		0.66	
Users upload or update daily the information on LIS	0.63		0.46	
Factor 2: Responsiveness to user needs		3.04		12.2%
Our institution has the necessary capacity for the design of relevant and pertinent products according to each population segment	0.62		0.71	
The bandwidth speed is appropriate for the services we offer	0.61		0.68	
Our institution adequately responds to the different needs of users based on their age ranges.	0.72		0.45	
Our institution has appropriate equipment so that users have full access to LIS	0.58		0.42	
Factor 3: Mobile Access		2.95		11.8%
It is more likely that a user uses the phone to access local information services instead of the computer	0.81		0.88	
A user uses frequently the device with which he or she feels more comfortable to access the LIS	0.82		0.85	
Mobile technology has strengthened the purpose of *Infolocal*	0.71		0.56	
Local and state policies can facilitate the creation, introduction and access to more local content that is not available on LIS	0.78		0.49	
Factor 4: Perceived Usefulness of Information		2.73		10.9%
In the last year, our institution experienced an increase in the use of facilities	0.71		0.81	

In the last year, our institution has experienced an increase in the use of the website	0.70	0.75
The social impact of *Infolocal* is reflected in more educated citizens, informed and literate in Antioquia	0.59	0.58
Digital content generated in the last year was useful for users	0.56	0.54
Factor 5: Facilitating Conditions	2.60	10.4%
Our institution receives organisational support to store information	0.70	.70
Our institution has tutorials and tools to help users retrieve digital information	0.57	.64
The special needs of our community are appropriately included in organisational and state policies	0.55	.63
Our community has channels or mechanisms that provide incentives to create local content	0.67	.59
Users frequently use LIS on the premises	0.69	.58
Our institution interacts with community leaders for the production, dissemination and organisation of local content.	0.66	.48
Factor 6: Digital Citizenship	2.30	9.20%
In the future. we will be able to encourage/incentivise other uses to use LIS on our premises	0.78	.77
LIS protects/secures personal information as required	0.80	.76
The more likely a circle of friends have an *Infolocal* ID. the more likely they will all use *Infolocal*	0.65	.69
A satisfied user of *Infolocal* will encourage others to use it.	0.66	.60

Table 3: Exploratory Factor Analysis Output

4.1 Determinants of technology acceptance from the local institutions' perspective

The resulting six factors were interpreted based on the responses of the participating institutions and labelled accordingly. The latent structure identified by the EFA showed that digital autonomy, responsiveness to user needs, mobile access, and digital citizenship varied significantly, while facilitating conditions and perceived usefulness of information remained consistent. In the reliability analysis, one redundant item was removed leaving 25 items dispersed over six factors through 13 iterations. These factors are described below according to the degree of variance. The next section presents the findings from the EFA survey. The findings have been theorised within the context of a local information landscape to produce an integrated framework that informs our understanding of local information practice.

4.1.1 Factor 1: Digital Autonomy

Digital Autonomy accounted for 12.70% of the variance, with three items composing it. Digital autonomy (DA) can be characterised as a relationship of experiences, habits, and facilitating conditions. In the event that institutions and users experience *Infolocal* and develop the habit of using it, autonomy can be expected (Venkatesh et al., 2012). Before autonomies occur, facilitating conditions has greater importance (i.e., at the early implementation stages) for the acceptance of LIS by novel users. However, its importance diminishes as users become more experienced and digitally autonomous, making support staff, tutorials, or other additional strategies offered by the institutions less relevant.

The loadings for the DA items ranged from 0.465 to 0.742. The calculated alpha value for these three Digital Autonomy items was 69.6% and emphasise autonomy for both the end-users and for the local institutions, yielding a differentiated set of information behaviours that redraws the boundaries between the end-user, the institutions, and the organisation. Digital Autonomy would promote equality in information access and lead to an increase in residents' knowledge about information technology (through continued use). Both of these community outcomes lead to reduced information deserts because the end users are better able to define "local" information and the relevant sources for it, disqualifying in a sense, the "material pre-conditions of inequality" of information practice (Lee and Butler, 2019, p.2). Increased levels of DA becomes a conduit for a new self-orientation for users' information practice, facilitated in no small part by the government's digital infrastructure improvements. This change in people's circumstances disrupted the "familiar and certain information landscape" and create "disjunctions" that fractured the information landscape, once dominated by *Infolocal,* and raises questions regarding the capacity of an LIS to show resilience (Lloyd, 2017, p.36).

Digital autonomy does not eliminate information inequality entirely. Local information can be present in formats outside of the digital space and can hinder the exercise of autonomy for the user, which could be considered as varying forms of fragmentation in sources and in the dissemination of information (Lee and Butler, 2019). For example, *Infolocal* receives print forms of events, and bulletin boards are still used at the community level, both suggest that local information maintains a degree of rootedness that falls outside of the reach of the digital systems and vice versa. These two parallel systems contain different types of information that cannot flow across the digital/analogue boundary. Thus, some inequalities and unevenness in information access remain, as does the persistence of information deserts.

4.1.2 Factor 2: Responsiveness to user needs

Responsiveness to user needs measures the local institutions' perceptions of their ability to meet the needs of their constituency and of the relationship that *Infolocal* maintains with them. This factor contains four items and accounts for 12.20% of the total rotated variance. The four factor loadings ranged from 0.424 to 0.711 and yielded a Cronbach's alpha values of 78.6%. The factor is composed of items related to internal and external capacities (items 1 and 3, and 2 and 4, respectively) needed for the delivery of *Infolocal*. The internal-capacities related items (1 and 3) are tied to the institutional capacity to respond to the needs of different user age groups. This capacity deficit was described in van Klyton et al (2017), where they show that while *Infolocal* was using restrictive 1.0 webpages to disseminate local content (i.e., one-sided communication), users were already using Web 2.0 technologies (e.g., Facebook and Twitter). Leonardi and Barley's (2010, p.12) interpretation perspective asserts that users often "transfer or modify previously cognitive frameworks" for new technology situations. Hence, end users would have wanted to interact with local information contents through their mobile devices in the same way that they used social media. The second and fourth external-capacity related items pertain to the infrastructure (i.e., bandwidth and equipment) provided by the state, which are subject to policy decisions regarding investment and budgets. All four items have direct implications for the "information-giving behaviour" (Pettigrew, 1999) of the institutions, which is represented in the LIL model as "information provision."

4.1.3 Factor 3: Mobile Access

Mobile access is constituted by four items and accounts for 11.80% of the total rotated variance, with loadings that ranged from 0.492 to 0.884 and a Cronbach's alpha of 80.7%. The

items here pertain to the impact that state investment and policies have had on users' information behaviour. Ironically, these efforts have in many ways incapacitated the efforts of local institutions to increase accessibility because these physical spaces inherently have limited geographical coverage (Lee and Butler, 2019, p.9). According to information provided to the research team by *Infolocal,* the portal was being accessed with mobile technology at a significantly higher rate rather than on computers. This demonstrates a preference for individual access to information rather than the shared community engagement within a specified geospatial arrangement, such as a library. Greater mobile access would further fracture the information landscape because users no longer needed to physically gather together to partake in local information. It also altered what information each individual user considered relevant, consequently changing the meaning of "local information". This factor elucidates how the material aspects of information inequality can create information deserts for both digital and physical forms of information. For example, users who avidly retrieve local information digitally would be bereft of accessing content not available in digital form. On the other hand, consumers of local information who are not as skilled in using mobile technologies also experience a disparity in accessing content available in online form only. Therefore, information poverty occurs in both instances but for different reasons.

4.1.4 Factor 4: Perceived Usefulness of Information

Perceived usefulness of information is a well-recognised factor in the technology acceptance model. This factor contains four items and accounted for 10.90% of the variance in the model. Items loadings ranged from 0.544 to 0.806. This set of items allowed for local institutions to reflect on the past year of user engagement and on the impact of *Infolocal* on the region of Antioquia, Colombia. The Cronbach's alpha for this factor was 76.6%, which is above the threshold for acceptability. Hence, all the items were retained. The factor's items also linked to the website's usefulness, its contents, and the broader social effects of *Infolocal.* It examines the ease of access and the relevance of information deployed on the platform by measuring the local institutions' perceptions of end user engagement. The "social impact" of this factor intersects with two community outcomes of the local information landscape framework, psychological and social well-being. This suggests that information usage affects and changes citizens' behaviour and their perception of the institutions.

4.1.5 Factor 5: Facilitating Conditions

Composed of six items, facilitating conditions is the fifth factor and accounts for 10.40% of the model's variance. The item loadings range is from 0.481 to 0.702, with a Cronbach's alpha of 81.6%. These items pertain to support received from *Infolocal* and from the state, while the construct encourages respondents to reflect on their internal capacities. This factor also examines the degree of collaboration with community leaders, owing to community leaders' influence and their ability to promote local discussion spaces by hosting debates, forums, and similar events at the institution. Intuitively, facilitating conditions would be negatively correlated with digital autonomy because as users become more digitally literate, the need for facilitating conditions at the institutions is reduced. Ironically, while institutions are compelled to enhance information literacy, they are also capacitating end users to become self-sufficient in their information seeking behaviour and contributing to reshaping the local information landscape (Lloyd, 2006).

The debates hosted at the institutions produce local knowledge and garners relevance for the institutions. This knowledge could be considered as transient information within the LIL model (Lee and Butler, 2019), because these events are not systematically (digitally) registered and thus users in different localities may not know how to find the information, thus creating a form of information desert.

4.1.6 Factor 6: Digital Citizenship

Digital citizenship is composed of four items and has an item loading range of 0.602 to 0.766. The factors explain 9.20% of the variance in the model and the Cronbach's alpha is 81.1%. The items of this factor pertain to the institutions' perceptions about the relationship that users maintain with *Infolocal.* Digital citizenship refers to those voluntary behaviours that users develop, such as recommending the service, helping other users, and tolerance of system failures (Yi and Gong, 2013). These behaviours serve to magnify the perception of value and the in-use value of the system, both for users and the potential users with whom they interact. Digital citizenship promotes community sharing of practice, and meaning making where the information is accessed (Lloyd, 2006). Digital citizenship can be seen as a community outcome of the LIL model, it is a combination (and a culmination) of all seven aspects of this element. Perceived digital citizenship highlights the importance of information behaviour that favours the adoption of the platform and its contents. The positive interactions among users would be mechanism that encourages others to use the platform.

5.0 Theoretical Implications of the Study

The effectiveness of *Infolocal* pivots on changes within the information landscape and on the emergence of information deserts, which act as inhibitors to information sharing and can lead to fractured information landscapes. This circumstance presents complexities for the design and management of a local information service. Our results revealed disjunctions between theories of LIS and the actual practices of it, creating difficulties not only with the technologies and facilities of LIS but also in understanding the concept of "local", both conceptually and computationally (López et al., 2014). The government-led digital infrastructure projects no doubt contributed to the emergence of a fractured information landscape in that they reconfigured information seeking behaviour and altered users' expectations of *Infolocal*.

The TAM and UTAUT literature indicated that each cultural context is unique and deserves to be evaluated (Tarhini et al., 2016; Venkatesh et al., 2012). As such, our findings built upon the shortcomings of these models and lent support to the work of Sovacool and Hess (2017), where they argued that models and theories could include a large number of constructs and relationships in order to explain the phenomenon of acceptance and use of technology with greater rigour (e.g. Singh et al., 2016). This study identified and examined the dualistic role of local institutions because they constitute a critical component in the operation of the LIS system. Our intent was not to develop an extremely complex framework; rather, we sought to explain the particularities of acceptance and use of the LIS in a specific context. Therefore, we have used a parsimonious model to reach theoretical conclusions that clarify the complexities of this case.

The TAM literature referred to how one kind of actor manages technology usage behaviour. In this case, our concern was not the innovation itself but a socio-technical system (Bijker, 1997) within which the local institutions were obliged to reflect on their perceptions of end user acceptance of technology rather than on their own technology acceptance. Hence, while in theory the normal constructs attempt to explain acceptance behaviour, in this case, they should be redefined to capture and contextualise the divergent interests of these actors.

The pre- and post-EFA variable associations indicated that disjunctions exist between the idealised norms of local information service provision articulated by scholars and practitioners of LIS and the discursive and material practices at local institutions. Technology has potentially outstripped the *raison d'être* of *Infolocal* and facilitated the emergence of socio-technical change that obliges *Infolocal* to be more adaptive toward popular platforms or modify its services and contents to achieve the best experience for users.

The disjunctions also arose because of the differences in meaning attributed to the service by these different stakeholder groups (Bijker, 1997, p.74). van Klyton et al (2017) argued that because the Colombian government began its own capacity building activities for citizens to access online information individually, *Infolocal's* layering of new technologies onto its system did little to halt diminishing demand. In addition, the local institutions began disseminating their own information online to mass audiences through web 2.0 tools, further enabling digital autonomy for end users. The reconfiguration and reconstitution of key factors associated with LIS delivery suggest that local institutions are moving farther away from the beliefs espoused by Delphi study participants and from existing academic literature regarding information practices and information behaviour.

6.0 Conclusion and Recommendations

This study integrated a modified technology acceptance model with the newly developed local information landscape framework to identify disjunction between the theorised concepts and expert opinions of LIS and actual information practices of a functioning LIS. We used a two-stage Delphi study to develop the survey instrument, which we then deployed to 195 institutions in Medellin that participate in the *Infolocal* LIS. Using exploratory factor analysis, the survey revealed six factors that highlighted the disjunctions that have contributed to the production of information deserts and ultimately fractured the information landscape.

By integrating TAM with LIL, our study makes three important contributions to understanding local information practice. First, all six factors resulting from EFA were affected by the changing pace of technology. The government's investments in digital infrastructure reduced barriers for end users and facilitated an independence from *Infolocal,* but also jeopardised the relevance of the local institutions. This course of events changed the local information landscape. Lloyd's (2010) work on local information landscapes gives explicit focus to infrastructure and associated government policy that empowers end users (i.e., the promotion of digital literacy). However, the infrastructure focus all but disappears in Lee and Butler's (2019) LIL framework and is subsumed within the community/characteristic feature, "policy" (which also does not appear to receive any significant treatment in the model). In fact, Lee and Butler (2019) seemingly ignored infrastructure altogether as a relevant factor of information practice, while the experts in the Delphi study prioritise it, which flowed into the resources factor (facilitating conditions). Infrastructure was also well acknowledged by local institutions in the survey.

The second contribution concerns the fact that the LIL framework does not attribute the exercise of power to end users and does not explicitly acknowledge their capacity to re-shape the local information landscape. Two of the six factors in the EFA, Digital Autonomy and Mobile Access, function as sources that empower end-users. The resulting user autonomy altered information practices and information behaviour and contributed to the production of information deserts and a fractured information landscape.

The third contribution speaks to a perceived linear nature of the LIL model. Part of the outcomes from the models proposed by Lee and Butler (2019) and Lloyd (2010) is that more knowledgeable citizens emerge in terms of information literacy and technologies. We suggest that the LIL framework give greater attention to the potential contributions of these users in the initial phase of the model (Community Characteristics/Factors), and draw on the totality of end-user knowledge about the various forms of local information retrieval. This suggests that the model should be more resilient, flexible, and iterative in adapting to the growth of citizen's digital literacy. This would enhance digital citizenship, improve the perceived usefulness of information, and better respond to user needs (three of the six factors from the survey).

The authors acknowledge some limitations of this study including a modest sample size of 89 responses out of the 195; however, if this had been a random sample, the sample size would be adequate for the case study. Sending survey questionnaires to a fixed population was appropriate in this case, but there is an inherent limitation for the generalisability of the results.

This case operationalises aspects of the LIL model and raises critical questions about *Infolocal's* capacity for resilience. In closing, we offer recommendations to better align user expectations with the *Infolocal.* The online portal risks becoming obsolete with its technological platform because, unless intermediaries and end users are able to create content interactively. The organisation should place contents on mobile-friendly platforms that take advantage of the government's digital infrastructure improvements, and design and implement information curation tools in order to gather automatically local information from the local institutions' social media.

In a practical sense, our findings are in accordance with the conclusions and recommendations offered by Singh et al (2016) in considering design flexibility, where possible. *Infolocal* should develop interactive solutions such as giving active control to users, reducing response time, and two-way communication. Given greater interactivity, the organisation can make greater use of social media to enhance online visibility and offer local institutions and end users mobile access platforms, which would enhance loyalty from end

users (Cyr et al., 2009) and close the gap between the current platform capabilities and 2.0 technologies.

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Note

1. For the descriptive statistics, please see Appendix B.

6.0 References

Ajzen, I. (1991) The theory of planned behavior. *Organizational Behavior and Human Decision Processes*. [Online] 50 (2), 179–211. [online]. Available from: http://www.sciencedirect.com/science/article/pii/074959789190020T (Accessed 31 March 2017).

Baron, L. F. & Gomez, R. (2012) '*Social network analysis of public access computing*', in [Online]. 2012 Toronto, Canada: ACM International Conference Proceeding Series. p. [online]. Available from: https://iths.pure.elsevier.com/en/publications/social-network-analysis-of-public-access-computing-relationships- (Accessed 1 September 2017).

Bedoya Mazo, S. P. (2011) *Servicios de Informacion Local - directrices y recomendaciones para su desarrollo*. Vive tu Biblioteca 3. Medellin, Colombia: Plan Departamental de Lectura y Bibliotecas -Antioquia Vive La Lectura.

Betancur, A. (2009) '*La biblioteca publica en la perspectiva del desarrollo local: una estrategia para la democracia*', in September 2009 Salamanca, Spain: . p.

Bijker, W. (1997) *Of Bicycles, Bakelites, and Bulbs: Toward a Theory of Sociotechnical Change*. New Ed edition. Cambridge, Mass.: MIT Press.

Casselden, B. et al. (2014) The challenges facing public libraries in the Big Society: The role of volunteers, and the issues that surround their use in England: *Journal of Librarianship and Information Science*. [Online] [online]. Available from: https://journals.sagepub.com/doi/10.1177/0961000613518820 (Accessed 21 January 2020).

Churchill, G. A. (1979) A Paradigm for Developing Better Measures of Marketing Constructs. *Journal of Marketing Research*. [Online] 16 (1), 64–73. [online]. Available from: http://www.jstor.org/stable/3150876 (Accessed 1 September 2017).

Cyr, D. et al. (2009) Perceived interactivity leading to e-loyalty: Development of a model for cognitive–affective user responses. *International Journal of Human-Computer Studies*. [Online] 67 (10), 850–869. [online]. Available from: http://www.sciencedirect.com/science/article/pii/S1071581909000925 (Accessed 27 June 2018).

Davis, F. D. et al. (1989) User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. *Management Science*. 35 (8), 982–1003. [online]. Available from: http://www.jstor.org/stable/2632151 (Accessed 20 August 2014).

Eisenberger, R. et al. (1986) Perceived Organizational Support. *Journal of Applied Psychology*. 71 (3), 500–507.

Evans, J. (1994) 'Sharing spatial environmental information across agencies, region and scales- issues and solutions', in WK Michener et al. (eds.) *Environmental information and analysis: ecosystem to global scales*. Bristol, PA: Taylor & Francis. pp. 203–219.

Fishbein, M. & Ajzen, I. (1975) *Predicting and Changing Behavior*. 1 edition. Routledge.

Gallego, D. & Bueno, S. (2014) Exploring the application of the Delphi method as a forecasting tool in Information Systems and Technologies research. *Technology Analysis & Strategic Management*. [Online] 26 (9), 987–999. [online]. Available from: http://dx.doi.org/10.1080/09537325.2014.941348 (Accessed 1 September 2017).

Gibson, A. N. & Kaplan, S. (2017) Place, community and information behavior: Spatially oriented information seeking zones and information source preferences. *Library & Information Science Research*. [Online] 39 (2), 131–139. [online]. Available from: http://www.sciencedirect.com/science/article/pii/S0740818816300998 (Accessed 16 January 2020).

Hair, J. F. et al. (2010) *Multivariate Data Analysis*. 7 edition. Upper Saddle River, NJ: Pearson.

Hwang, Y. & Kim, D. J. (2007) Understanding Affective Commitment, Collectivist Culture, and Social Influence in Relation to Knowledge Sharing in Technology Mediated Learning. *IEEE Transactions on Professional Communication*. [Online] 50 (3), 232–248.

Kelley, C. A. (2007) Assessing the Trends and Challenges of Teaching Marketing Abroad: A Delphi Approach. *Journal of Marketing Education*. [Online] 29 (3), 201–209. [online]. Available from: http://dx.doi.org/10.1177/0273475307306885 (Accessed 1 September 2017).

Kerr, G. et al. (2016) "Someone Should Do Something": Replication and an Agenda for Collective Action. *Journal of Advertising*. [Online] 45 (1), 4–12. [online]. Available from: http://dx.doi.org/10.1080/00913367.2015.1077492 (Accessed 1 September 2017).

Lee, M. & Butler, B. S. (2019) How are information deserts created? A theory of local information landscapes. *Journal of the Association for Information Science and Technology*. [Online] 70 (2), 101–116. [online]. Available from: https://onlinelibrary.wiley.com/doi/abs/10.1002/asi.24114 (Accessed 9 March 2019).

Leonardi, P. M. (2013) Theoretical foundations for the study of sociomateriality. *Information and Organization*. [Online] 23 (2), 59–76. [online]. Available from: http://www.sciencedirect.com/science/article/pii/S1471772713000067 (Accessed 6 November 2018).

Leonardi, P. M. & Barley, S. R. (2010) What's Under Construction Here? Social Action, Materiality, and Power in Constructivist Studies of Technology and Organizing. *The Academy of Management Annals*. [Online] 4 (1), 1–51. [online]. Available from: http://dx.doi.org/10.1080/19416521003654160 (Accessed 19 February 2017).

Li, D. et al. (2006) An Empirical Investigation of Web Site Use Using a Commitment-Based Model. *Decision Sciences*. [Online] 37 (3), 427–444. [online]. Available from: http://onlinelibrary.wiley.com/doi/10.1111/j.1540-5414.2006.00133.x/abstract (Accessed 1 September 2017).

Lin, H. & Hwang, Y. (2014) Do feelings matter? The effects of intrinsic benefits on individuals' commitment toward knowledge systems. *Computers in Human Behavior*. [Online] 30191–198. [online]. Available from: http://www.sciencedirect.com/science/article/pii/S0747563213002951 (Accessed 1 September 2017).

Lloyd, A. (2006) Information literacy landscapes: an emerging picture. *Journal of Documentation*. [Online] 62 (5), 570–583. [online]. Available from: https://doi.org/10.1108/00220410610688723 (Accessed 17 January 2020).

Lloyd, A. (2010) *Information Literacy Landscapes: Information Literacy in Education, Workplace and Everyday Contexts*. 1 edition. Oxford: Chandos Publishing.

Lloyd, A. (2017) Researching fractured (information) landscapes: Implications for library and information science researchers undertaking research with refugees and forced migration studies. *Journal of Documentation*. [Online] 73 (1), 35–47. [online]. Available from: https://www.emeraldinsight.com/doi/abs/10.1108/JD-03-2016-0032 (Accessed 7 April 2019).

López, C. et al. (2014) Does Anything Ever Happen Around Here? Assessing the Online Information Landscape for Local Events. *Journal of Urban Technology*. [Online] 21 (4), 95–123. [online]. Available from: https://doi.org/10.1080/10630732.2014.971530 (Accessed 6 November 2018).

Magni, M. & Pennarola, F. (2008) Intra-organizational relationships and technology acceptance. *International Journal of Information Management*. [Online] 28 (6), 517–523. [online]. Available from: http://www.sciencedirect.com/science/article/pii/S0268401208000066 (Accessed 1 September 2017).

Malhotra, Y. & Galletta, D. (2005) A Multidimensional Commitment Model of Volitional Systems Adoption and Usage Behavior. *J. Manage. Inf. Syst.* [Online] 22 (1), 117–151. [online]. Available from: https://doi.org/10.1080/07421222.2003.11045840 (Accessed 1 September 2017).

Marique, G. et al. (2013) The Relationship Between Perceived Organizational Support and Affective Commitment: A Social Identity Perspective. *Group & Organization Management*. [Online] 38 (1), 68–100. [online]. Available from: http://dx.doi.org/10.1177/1059601112457200 (Accessed 1 September 2017).

Meyer, J. P. & Allen, N. J. (1991) A three-component conceptualization of organizational commitment. *Human Resource Management Review*. [Online] 1 (1), 61–89. [online]. Available from: http://www.sciencedirect.com/science/article/pii/105348229190011Z (Accessed 1 September 2017).

Noar, S. M. (2003) The Role of Structural Equation Modeling in Scale Development. *Structural Equation Modeling: A Multidisciplinary Journal*. [Online] 10 (4), 622–647. [online]. Available from: http://dx.doi.org/10.1207/S15328007SEM1004_8 (Accessed 1 September 2017).

Norusis, M. J. (1985) *SPSS-X advanced statistics guide*. SPSS.

Nunnally, J. C. & Bernstein, I. (1994) *Psychometric Theory*. 3 edition. New York: McGraw-Hill Higher Education.

Okoli, C. & Pawlowski, S. D. (2004) The Delphi method as a research tool: an example, design considerations and applications. *Information & Management*. [Online] 42 (1), 15–29. [online]. Available from: http://www.sciencedirect.com/science/article/pii/S0378720603001794 (Accessed 1 September 2017).

Ospina, J. A. C. (2018) Servicios bibliotecarios para inmigrantes venezolanos en Medellín. *Información, cultura y sociedad*. (39 (Diciembre)), 115–128. [online]. Available from: https://dialnet.unirioja.es/servlet/articulo?codigo=6732644 (Accessed 26 May 2019).

Pettigrew, K. E. (1999) Waiting for chiropody: contextual results from an ethnographic study of the information behaviour among attendees at community clinics. *Information Processing & Management*. [Online] 35 (6), 801–817. [online]. Available from: http://www.sciencedirect.com/science/article/pii/S0306457399000278 (Accessed 12 May 2019).

Pinto, M. et al. (2017) Information literacy life cycle and its standards and models: A view from Ibero-America. *Journal of Librarianship and Information Science*. [Online] 49 (4), 409–423. [online]. Available from: https://doi.org/10.1177/0961000616654750 (Accessed 21 January 2020).

Plan Nacional de Desarrollo (2010-2014) (2011) *Ley No. 1450*.

Sabelli, M. (2008) *La información y el ciudadano en el entorno de la sociedad de la información*. Montevideo, Uruguay: Ediciones de la Banda Oriental.

Sass, D. A. & Schmitt, T. A. (2010) A Comparative Investigation of Rotation Criteria Within Exploratory Factor Analysis. *Multivariate Behavioral Research*. [Online] 45 (1), 73–103. [online]. Available from: http://dx.doi.org/10.1080/00273170903504810 (Accessed 1 September 2017).

Saumell i Calaf, D. (2002) *Tecnologías de la información y especialización en bibliotecas públicas: el sistema de información local de la biblioteca pública de tarragona*. p.128–134. [online]. Available from: http://hdl.handle.net/10421/1170.

Schot, J. et al. (2016) The roles of users in shaping transitions to new energy systems. *Nature Energy*. [Online] 1 (5), 16054. [online]. Available from: https://www.nature.com/articles/nenergy201654 (Accessed 27 June 2018).

Sey, A. et al. (2015) There When You Need It: The Multiple Dimensions of Public Access ICT Uses and Impacts. *Information Technologies & International Development*. 11 (1), 71–86. [online]. Available from: http://itidjournal.org/index.php/itid/article/view/1363 (Accessed 1 September 2017).

Singh, T. et al. (2016) Social Construction of Technology: A Flexible Strategy for DL Success. *Global Journal of Flexible Systems Management*. [Online] 17 (3), 265–273.

[online]. Available from: https://link.springer.com/article/10.1007/s40171-015-0116-y (Accessed 27 June 2018).

Skovira, R. J. (2004) Using informational landscape as a model to understand information use and design within organizations. *Issues in Information Systems*. V (1), 308–314.

Slota, S. C. & Bowker, G. C. (2017) 'How Infrastructures Matter', in Ulrike Felt et al. (eds.) *The Handbook of Science and Technology Studies*. 4th Revised edition edition Cambridge, Massachusetts: MIT Press. pp. 529–554.

Sourani, A. & Sohail, M. (2015) The Delphi Method: Review and Use in Construction Management Research. *International Journal of Construction Education and Research*. [Online] 11 (1), 54–76. [online]. Available from: http://dx.doi.org/10.1080/15578771.2014.917132 (Accessed 1 September 2017).

Sovacool, B. K. & Hess, D. J. (2017) Ordering theories: Typologies and conceptual frameworks for sociotechnical change. *Social Studies of Science*. [Online] 47 (5), 703–750. [online]. Available from: https://doi.org/10.1177/0306312717709363 (Accessed 27 June 2018).

Tarhini, A. et al. (2016) Extending the UTAUT model to understand the customers' acceptance and use of internet banking in Lebanon: A structural equation modeling approach. *Information Technology & People*. [Online] 29 (4), 830–849. [online]. Available from: https://www.emeraldinsight.com/doi/full/10.1108/ITP-02-2014-0034 (Accessed 6 November 2018).

van.Klyton, A. & Castaño-Muñoz, W. (2017) Local information services in Medellin: technology, institutions, communities and power. *Technology in Society*. [Online] 5020–30. [online]. Available from: http://www.sciencedirect.com/science/article/pii/S0160791X16301294 (Accessed 1 July 2019).

Venkatesh, V. et al. (2012) Consumer Acceptance and Use of Information Technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly*. 36 (1), 157–178.

Venkatesh, V. et al. (2003) User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly*. [Online] 27 (3), 425–478. [online]. Available from: http://www.jstor.org/stable/30036540 (Accessed 1 September 2017).

Venkatesh, V. & Bala, H. (2008) Technology Acceptance Model 3 and a Research Agenda on Interventions. *Decision Sciences*. [Online] 39 (2), 273–315. [online]. Available from: http://onlinelibrary.wiley.com/doi/10.1111/j.1540-5915.2008.00192.x/abstract (Accessed 1 September 2017).

Venkatesh, V. & Davis, F. D. (2000) A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies. *Management Science*. [Online] 46 (2), 186–204. [online]. Available from: http://www.jstor.org/stable/2634758 (Accessed 1 September 2017).

Yang, K. & Forney, J. (2013) The Moderating Role Of Consumer Technology Anxiety In Mobile Shopping Adoption: Differential Effects Of Facilitating Conditions And Social Influences. *Journal of Electronic Commerce Research*. [online]. Available from: http://www.jecr.org/node/347 (Accessed 1 September 2017).

Yi, Y. & Gong, T. (2013) Customer value co-creation behavior: Scale development and validation. *Journal of Business Research*. [Online] 66 (9), 1279–1284. [online]. Available from: http://www.sciencedirect.com/science/article/pii/S0148296312000586 (Accessed 27 June 2018).

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Appendix A

Local institution categories

1. Libraries: 111
2. Theatres: 37
3. Notary publics: 34
4. Non-Profit organisations: 25
5. Museums: 19
6. Library parks: 15
7. Shopping malls: 15
8. Cultural organizations: 15
9. Hotels: 13
10. Travel agencies: 13
11. Local clinics: 12
12. Foundations: 10
13. Universities: 11
14. Parks: 9
15. Municipal offices: 9
16. Health Services: 9
17. Watchdog organisations: 7
18. Taxi cab services: 6
19. Sport complexes: 5
20. Arts schools: 5
21. Police or military: 5
22. Hospitals: 4
23. Cultural Centres: 4
24. Banks: 4
25. Local Government offices: 3
26. Bookstores: 3
27. Language centres or programs: 3
28. Cooperatives: 2
29. Newspapers: 2
30. Public Library Networks: 2
31. Dance programs: 2
32. Mayor's Office: 2
33. Theatre Groups: 2
34. Vocational Colleges: 2

**The remaining 73 institutions were classified as "other" because they did not fit close enough to the 34 categories.

Appendix B

Descriptive Statistics

Factor	Code	Mean	S.D.
F1	E2	4.045	.9642
	C5	3.764	1.0003
	E4	3.045	1.2052
F2	D4	3.573	1.0323
	D3	3.809	1.0540
	C6	3.944	.9695
	D1	3.539	1.1780
F3	C1	3.494	1.2443
	C2	3.663	1.2242
	C4	3.258	1.3015
	D5	3.727	1.0140
F4	B2	3.685	1.0401
	B4	3.663	1.1574
	B3	3.449	1.1967
	B1	3.685	1.0829
F5	F2	3.202	1.1792
	C7	3.180	1.2392
	F4	3.416	1.1059
	F1	3.489	1.0933
	C3	2.944	1.2188
	F5	3.523	1.1545
F6	E5	4.056	.9927
	D6	3.820	1.1732
	E1	3.730	1.1458
	E3	4.360	.8693