PhD thesis

Co-creation and user value in the smart city digital sharing economy: perspectives of expatriates in Dubai, UAE

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Declaration

I declare that this research is carried out by me for the purpose of the PhD programme in Middlesex University London and has not been submitted for any other degree or qualification to any other academic institution.

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Abstract

This study sets out to investigate what the perception of expatriate residents of the smart city of Dubai are in relation to value from co-created services and the sharing economy and how value-in-use is perceived. The study addresses gaps in the current body of knowledge relating to value co-creation in the public sector, as much of the current research is focused on commercial value co-creation. Additionally, the current body of knowledge is focused on the global North, with little focus on the Gulf region and more specifically Dubai. This research also addresses gaps in the literature around expatriates, which is currently focused largely on the assimilation of expatriate talent to their new roles within a workplace environment, rather than looking at the impact their new wider environment is having on them.

This research was undertaken through a sequential mixed method approach, firstly conducting semi structured interviews using a thematic analysis to draw out key value creation themes. These themes and existing literature were used to create a conceptual model which was tested via an online questionnaire and analysed using structural equation modelling. Twenty-two UAE based expatriates took part in the interview stage, this group contains a mixture of ages, genders, country of origins and professions to provide a breadth of experiences. For this reason a purposeful sample was used. The quantitative stage adopted a convenience sample of 482 expatriates to provide a large group with which to examine the value creation phenomena.

The findings from the thematic analysis yielded four overarching themes in relation to value co-creation, these were information exchange, convenience, touchpoints, and experience. These factors coupled with the existing four dimensions of value. This offers new evidence in relation to smart cities and expatriates, while adding to confidence in the existing four dimensions concept. Sixteen hypotheses were drawn from the existing literature and qualitative study for testing with a larger group, all hypotheses were found to be both significant and positive. This provides evidence that information exchange, convenience, touchpoints, and experience have a significant and positive impact on value creation, mediated by the four dimensions of value creation, to create perceived service value in the smart city context for expatriate residents. This work has provided a new framework for examining public sector value co-creation in relation to expatriates, enabling scholars to examine this phenomenon within other public service environments and with expatriates and non-expatriate groups. Additionally, this work aids city managers in both the construction and ongoing development of smart cities, ensuring that they implement activities related to information sharing, convenience, touchpoints and the experience, to improve ongoing co-created value and overall perceived service value.

Keywords: value-in-use, smart technologies, co-creation, public sharing economy

Contents

List of Tables

List of Figures

1. Chapter One – Introduction and Rationale

1.1. Overview of the Chapter

This first chapter is designed to provide the reader with an understanding of this study. First, providing a background to the research problem that is to be addressed, delving into more depth by identifying gaps in the current research in the field and setting relevant objectives which the study will be conducted by. The chapter also defines clear research questions that the study intends to answer. It will also cover key terms that will be used throughout the study and finally provide a detailed overview of the entirety of this work.

1.2. Background to the Research Problem

The United Nations (UN) (2021) predicts that over 2 billion people will be living in urban areas by 2050. The UN considers development in urban or city environments to directly link to eight of their sustainability goals. Skovgaard-Smith and Poulfelt (2018) state that global cities represent key locations for transnational professionals. These cities are increasingly defined by transnational networks and have emerged as partly denationalised platforms for intertwined global capital and labour mobility and these cities offer international career opportunities and professional and social networks. Adding to this, De Falco (2019) comments that increasingly global cities are smart cities. This study will focus on the definition of Ranchordás (2020, p154) "Smart cities are defined as urban centres where local institutions implement smart technologies (IoT, big data, AI or ML, blockchain, virtual reality) to advance the innovative character of the city and improve the inclusion, participation, and well-being of citizens." This definition appears to encompass many of the aspects encountered by this research. Throughout the world, as urbanisation grows and half the world's population find themselves living in cities, there has been a rise in the number of 'smart cities', presenting challenges for citizens and planners alike (Tan and Taeihagh, 2020). Okai, Feng and Sant (2019) point out that cities worldwide are developing technological capabilities in urban areas to deal with this trend toward greater 'smartness' in cities. The United Nations (2021) recognises that the concept of the smart city has morphed over time: there has been a notable shift from what some call now Smart City 1.0 (a top-down

framework, with a focus on ICT infrastructure and deploying solutions) to Smart City 2.0 (a more people-focused, user-friendly framework) to Smart City 3.0 (a framework for inclusive and participatory urban governance mediated through ICT). Yigitcanlar *et al.* (2018) recognise this change as part of the Fourth Industrial Revolution, sometimes referred to as Industry 4.0. Much of what constitutes a smart city now is defined in Giffinger and Gudrun (2010) and will be discussed in depth later, while other authors (Bunders and Varró, 2019; Han and Kim, 2021) point out that developments in digital technology have driven smart urbanisation. Furthermore Pérez-delHoyo *et al.* (2021) relate the smart city paradigm to the UN 2030 Agenda on Sustainability (Goal 13 – Target 11.3), which also requires smart public participation, while bottom-up governed cities remain a challenge.

Smart cities are those cities in which actors or objects (IoT) are connected via ICT, sharing information across a range of facets to improve the living experience for the actors within that city (Oke *et al.*, 2020). The interconnected nature of this smart city concept is built around the sharing of information, the sharing economy, and creation through multiple actors; therefore, co-creation begins to become relevant to the study of smart cities. Actors in a smart city context are seen to be those stakeholders that have some function within the city such as citizens, suppliers, city workforce and private sector. Some authors even recognise the overlap between the sharing economy and smart cities (Šiuškaitė, Pilinkienė and Zvirdauskas, 2019; Ranchordás and Goanta, 2020; Palgan, Mont and Sulkakoski, 2021; Sánchez Vergara, Papaoikonomou and Ginieis, 2021). The development of smart cities is such that quality standards by which they are developed and measured exist in the form of International Organization for Standardization (ISO); ISO 37120 to be exact (Heaton and Parlikad, 2019; Bencke, Cechinel and Munoz, 2020). Adding to this, Hansen and Fuglsang (2020) make the point that the two activities of government are policymaking and service delivery. Wang and Teo (2020) recognise that the public sectors increasingly use both offline and online channels to provide services to citizens. de Jong, Neulen and Jansmas (2019), state that participation of citizens in public governance is important and that governmental institutions have become aware of the potential benefits of engaging citizens in policymaking.

Value is a concept that is central to business and has been the focus of many studies in recent decades by some key authors (Ravald and Grönroos, 1996; Lusch and Vargo, 2004; Grönroos, 2011), these are the foundations for discussion on value co-creation and the sharing economy. Co-creation occurs when consumers create value together with other organisations and/or consumers (Nadeem *et al.*, 2020). The concept of value will be discussed widely in this work; however, a basic definition that will be followed is "all customer-perceived consequences arising from a solution that facilitates or hinders the achievement of the customer's goals" (Macdonald, Kleinaltenkamp and Wilson (2016, p. 97, cited in Sjödin *et al.*, 2020). While much of the research into value has been focused on the commercial sector when customer and organisation operate under a financial transaction arrangement centred around goods and services, there is much more to examine in relation to the citizen (Lenart-Gansiniec and Sułkowski, 2020). A significant amount is written on the developing nature of co-creation in a range of different spheres of commerce (Gong *et al.*, 2020; Laukkanen and Tura, 2020; Sands *et al.*, 2020; Räisänen, Ojala and Tuovinen, 2021). Many of these works highlight benefits such as healthcare provision, traffic flow (Dembski *et al.*, 2020), pollution control (Suciu, Nasulea and Nasulea, 2020), refuse collection (Zhao *et al.*, 2020), innovation (Irazábal and Jirón, 2021) and business development (Johnson, Acedo and Robinson, 2020). Parthiban *et al.* (2021) suggest that ICT has enabled information processing and its dissemination which has opportunities for value creation and value capture. From a commercial perspective, a great deal has been written on value creation as a cornerstone of modern marketing (Schechter, 1984). More recently, research has been undertaken about the co-creation of value. Saha, Mani and Goyal (2020), who examine some of the development in co-creation literature over the last few years, state that much of the research related to sharing and co-creation is focused on commercial transactions rather than in the context of the transaction between smart city actors in nature. However, as discussed further on, it is still unclear what value is created for co-creators within the smart cities' context.

Dubai is largely a city of expatriates. The Government of Dubai (2019) states that 92% of residents are expatriates, with estimates suggesting that this group is made up of approximately 65% from the Indian subcontinent, 13% from Africa, 11% from Asia and a further 11% from the rest of the world (Dubai-

Online, 2020). Additionally, 93 percent of the UAE population are internet users (Jose, 2018). There is potentially much to learn about their experience in the smart city. This make up is typical in most of the Gulf region where local citizens are in the minority (Waxin, Lindsay and Belkhodja, 2018). The Dubai Government's commitment to smart city development is evident within the 2015 law (The Supreme Legislation Committee in the Emirate of Dubai, 2015), which established smart government. Since the law was enacted, over USD58 billion has been invested in smart government infrastructure-related projects (Saif Almuraqab, 2020). The Dubai Government has been very successful in increasing Foreign Direct Investment by acquiring quality international talent (Haak-Saheem, 2020). Quality of life is an increasingly important factor in international talent acquisition (Rodríguez-Sánchez *et al.*, 2020) particularly in the UAE (Kokt and Dreyer, 2018) and Lima (2020) states that smart cities have the potential to create better places to work and live in, while Lapointe, Vandenberghe and Fan (2020) argue that these kinds of environments seek to attract international talent. Research from Skovgaard-Smith and Poulfelt (2018) identifies that 'non-nationals' or 'global persons' require shared social spaces and common circumstances both online and offline. The problem remains of determining what is valuable to expatriate residents of smart cities and what effect their involvement in the co-creation has. This study will focus on the city of Dubai (branded by the Dubai government 'Smart Dubai') as Dubai is the largest city in the UAE as well as being a hub for commerce, tourism, education and culture within the region (Breslow, 2021). A better understanding of these issues would aid in the greater development of existing and future co-created services and in the design of platforms which engage different co-creation actors, however Breslow also cautions that researching Smart Dubai is not straightforward. The autocratic nature of the government makes access to statistics and officials difficult at best.

With the growth predictions within the city, the high proportion of expatriate workers and residents and the importance of attracting global talent, it is important that Dubai not only understands what is valuable to expatriates but also their role in creating value for themselves and others. Expatriates make up a considerable proportion of the UAE population (Masad, 2008; Alhajji, 2017). However, the fact that they are the majority is not the only reason for focusing this research on that group. A report from the United Nations Development Programme (Minasyan, 2020) suggests that global talent is key to the

development of the modern city. The report cites factors such as low tax burden, good cultural, urban, and social life, quality housing stock, good healthcare, schools, and city services as strong drivers for talent to relocate from their country of origin. It goes on to point out that openness, tolerance, and inclusion are key to enable expatriate talent to become involved in the co-creation of the city; these factors are echoed by Lendel *et al.* (2021) and Ali *et al.* (2021) who add 'well-being' to this list. It is perhaps no surprise that much of this aligns with the principles of a smart city laid out by Giffinger and Gudrun (2010) and Giffinger *et al.* (2007). Lepawsky, Phan and Greenwood (2010) add that global talent is attracted by cities that offer high quality of life, cultural opportunities, and a socially diverse population, while Tarique and Schuler (2018) recognise that expatriates are often used to fill skills gaps in the absence of local talent. Caidi, Allard and Quirke (2010) state that over 200 million people currently live outside their country of birth and that rate grows by 2.9 percent every year, adding that these migrants need access to municipal, legal, housing, health and other support services. They further note that these are preferred via ICT technology.

Rodrigues, Sarabdeen and Balasubramanian (2016) state that the UAE is a recognised global leader in e-government, which plays a pivotal role in the life of residents. They also recognise that a large proportion of expatriates are using e-government portals. They state that ICT pays an important part in fostering sustainable growth. Khanna (2021) adds an interesting dimension to the debate on expatriate movement, suggesting that it is no longer solely about money but quality of life, as identified by Minasyan (2020), with the internet providing many the ability to work from anywhere around the globe. This opportunity has been seized by countries looking to attract foreigners, with Estonia (Khanna, 2021), Barbados (Chevtaeva and Denizci-Guillet, 2021), Georgia (Lendel *et al.*, 2021), and the UAE (Federal Government of the UAE, 2021), among others, offering remote work visas. Such visas enable expatriates to live in a country without having employment there.

The concept of digital nomads (Makimoto and Manners, 1997) suggests that, given reliable internet access, people may choose their location based on leisure and quality of life indicators, not necessarily the country where their employer or client is based (Müller, 2016). Thompson (2019) suggests that

digital nomads' selection of living conditions is no different from traditional expatriates. While Polson (2015) and Orel (2021) argue that digital platforms are particularly suited to the lifestyles of what they term 'mobile professionals'. In addition, it has also been noted by Allagui and Walters (2009) that the UAE has the most sophisticated telecommunications infrastructure in the region, with a large expatriate community accessing the internet for a range of uses. Their findings, which are based on a wide analysis of secondary data, shows that Westerners primarily use the web for business, while Asians use the web for entertainment. They showed that 'expatriates are the heaviest users of the internet in the UAE' (Allagui and Walters, 2009). Hyduk and Worrall (2016) suggest that this trend is unchanged; they suggest that ICT is still highly used by expatriates who value the ability to share information with others to support them in acclimatising to the new country. They add that these online communities are socially constructed in nature. Nardon, Aten and Gulanowski (2015) agree with this, stating that technology has a positive impact on adjustment for expatriates, further stating that support in adjustment can be co-created through online media. Finally, Ali (2021) suggests that one of the main barriers to development of smart cities around the world is a lack of qualified and skilled human capital. This leaves cities the choice between developing domestic talent or bringing in foreigners with required skill sets. Both approaches come with their own set of challenges.

Given not only the number of expatriates within Dubai and the wider UAE, but the positive impact on growth and development, the competition for global talent and the levels of engagement that expatriates have with ICT, this population is key for this study in relation to the smart city experience. Added to this is the diversity among smart cities around the world. For example, Okai, Feng and Sant (2019) cite a number of cities around the world when they discuss the growth in the number of smart cities, these include Seattle (US), Helsinki (Finland), Barcelona (Spain), the island city state of Singapore, Songdo (South Korea) and Milton Keynes (UK).

While this study focuses on expatriates within Dubai, the value of this work is not limited to the UAE. Khanna (2021) estimates that that over 275 million people are living outside their country of origin. Beaverstock (2011) makes the point that some cities are demanding expatriates, citing Singapore as a

key example. Bruning, Bebenroth and Pascha (2011) raise similar points regarding Japanese cities, Latukha *et al.* (2019) for cities in Ghana, and Selmer *et al.* (2018) for cities in China and Hong Kong. Furthermore, Meyskens *et al.* (2009) make the point that cities around the world seek talent from outside their national borders. As Coughlan, Fogarty and Fogarty (2019) point out, technology is a factor in successful expatriate transition and it is in part what attracts the workforce, and due to the predicted rise in smart cities (Okai, Feng and Sant, 2019) this research is likely to have application beyond Dubai and the UAE.

1.3. Research Gaps

This study intends to address several gaps within current research around smart cities, value creation, and the sharing economy. In addition, much of the empirical research around smart cities focuses on city managers or workers, rather than the citizens themselves. To the best of this author's knowledge, no research has been done looking at the expatriate community in relation to smart cities which is seen by many as a part of the sharing economy. Given that smart cities are a relatively new phenomena and that there are expected to be many more developments in this area understanding how value is created in this context is important for improvement of existing cities as well as the planning of new ones. The rise in expatriate movement as part of the race for global talent is also required. The need to understand value-in-use (value created and realised at the point of use by an individual), given the experiential nature of the value-in-use concept, smart cities and the sharing economy is one that can be of benefit to academics and city managers alike. By addressing these gaps there will be better understanding of the concepts behind expatriates' value creation in use within the city context as well as being able to plan for the future.

More specifically, Malone, McKechnie and Tynan (2018) state that value creation from the perspective of customer logic is somewhat under-explored, with Katsifaraki and Theodosiou (2024) and Jaakkola *et al.* (2024) adding that further study in value creation and user is warranted. The customers' experience of co-created value in the moment of use, or value-in-use, needs to be examined much more (Abid *et al.*, 2022; Alimamy *et al.*, 2024).

Many scholars call for further study into public value co-creation (Cavallone and Palumbo, 2019; Hansen and Fuglsang, 2020; Yap *et al.*, 2021; Ojasalo and Kauppinen, 2024). El-Haddadeh *et al.* (2019, p.310), in relation to smart cities state that "there is no evidence presently on the influence that perceived value has on citizens' use of IoT enabled services within the public sector", adding "future research should aim to target citizens in other countries to perform a cross-comparison of IoT continuous use intentions among citizens". Looking more specifically at the sharing economy Davlembayeva *et al.* (2024) call for further examination of value co-creation.

Turning to cities, Yigitcanlar *et al.* (2018) recognise that there is limited conceptualisation of the smart city phenomenon, and that further research is needed (Montalvan Castilla and Riel Müller, 2024), particularly in the area of co-created value (José and Rodrigues, 2024).

Other authors suggest that most smart city literature is aligned to a Western perspective and that cities outside the Western model need to be examined further (Lin, 2018; Dudau, Glennon and Verschuere, 2019; Jukić *et al.*, 2019; Alizadeh and Prasad, 2024). Allen *et al.* (2020) add to this, suggesting that the developing world has been somewhat overlooked in smart city research as well as a link between smart cities and citizen production and co-creation. Greater research is required to understand how technologies are driving cities and local government and how private and public organisations co-create sustainable value (Romanelli, 2018; Cao and Kang, 2024; Grossi and Welinder, 2024). Wirtz, Müller and Schmidt (2021) add to the call for investigation into preferences and needs of citizens as customers of smart services. Both Liang *et al.* (2019) and Przeybilovicz and Cunha (2024) point out that little is known about value in relation to ICT in the public sector, and Verma (2020) adds that more research could focus on service contexts and the role of crowdsourcing in value co-creation. Peronard and Ballantyne (2019) recognise the need for a greater understanding of the relationship between actors in a service network such as a city. In relation to the sharing economy there appears to be a great deal of focus on the commercial sector, with little in the public sector, this imbalance needs to be addressed in the literature (Akbar, 2019; Ochieng, Thornton and Owusu, 2024). Eggert, Kleinaltenkamp and Kashyap (2019) state that value is subjective and that value in experience is not well researched, this

they feel is the heart of subjective value. Finally, there is a need to understand expatriates more deeply in relation to their ICT usage (Arifa, El Baroudi and Khapova, 2021). It is the intention of this study to redress some of these gaps.

1.4. Research Aims and Objectives

It is recognised in much of the literature that the smart city approach is very top-down (Porto and Oliveira, 2020; Zandbergen and Uitermark, 2020). Citizens engage with services that may be valuable to them, but their ability to influence what services are created and offered to them is limited. Examination of value creation is widespread in the commercial sector; however, this examination is much more limited in the smart city sphere. This research aims to examine what expatriate smart city residents regard as value in general and explores what is missing from a smart city offering that may be of greater value, then looking more at value-in-use which is the value generated through the experience of using a service. Given what has been stated about Dubai's future directions and the importance to the economy of expatriate workers, this exploration could be key to Dubai's future city development and its ability to continue to attract and retain international talent, which it relies on so heavily.

Furthermore, not only is there scope to examine value creation in much more depth in the smart city arena from the perspective of expatriates, the city of Dubai is somewhat underrepresented in existing work. It deserves more scrutiny because it has been identified as one of the top 10 growing smart cities by The American Society of Mechanical Engineers (Kosowatz, 2020), its desire to be an attractive place for both residents and tourists (Gugler, Alburai and Alburai, 2021) and its aim to create the 'perfect' smart city (Najdawi, Chabani and Said, 2021), the time is perhaps right for this research.

With the broad aims of this work established it is fitting that the aims are narrowed down so that the study can develop a focused literature review as well as providing direction as to suitable forms of data collection and analysis. The research objectives will focus on the value co-creation areas, the expatriates that co-create this value and the city context in which they reside. Therefore, the research objectives (RO) of this study are as follows.

RO1 – To investigate the perception of expatriate residents in terms of value from co-created services developed in Smart Dubai.

RO2 – To evaluate the extent to which the sharing economy determines value to expatriates in smart city services in Dubai.

RO3 – To investigate the role of value-in-use as expatriates engage with smart city co-created services and the shared economy.

1.5. Research Questions

RQ1 – What do expatriate residents perceive to be valuable in co-created smart city services in Dubai?

RQ2 – How does the sharing economy relate to the expatriate residents' service experience?

RQ3 – What role does value-in-use play in the shared economy and smart city co-creation services?

These research objectives and questions are designed to help focus the research on the sharing economy and co-creation of value within the smart city, and within the terms of value-in-use attempt to understand the experiential nature of value co-creation for expatriates.

1.6. Key Terms

There are a number of key terms that will appear in this work. While they will be explored in much more depth in the literature review chapter, it is useful to have a clear basic understanding of what these are, while illustrating the terms that this study will follow.

Firstly **'Smart City or Cities'** is a concept that has many definitions; however, many authors harken back to work from Giffinger and Gudrun (2010) which discusses smart cities as those that provide services in one or more of six areas (economy, people, governance, mobility, environment and living). These services are provided and/or improved by the use of ICT data, provided either by the city government or the citizens themselves. The definition that perhaps incapsulates this best is Ranchordás (2020, p.154) "Smart cities are defined as urban centres where local institutions implement smart

technologies (IoT, big data, AI or ML, blockchain, virtual reality) to advance the innovative character of the city and improve the inclusion, participation, and well-being of citizens."

This leads on to the term **'Smart Citizens'** which refers to those citizens who are engaging with or receiving services from the smart city (Myeong, Kim and Ahn, 2020). Smart citizens are sometimes referred to as actors, or smart principals (Yeo, 2021). Often the term e-participants is used for citizens engaging with smart city services (Webster and Leleux, 2019).

The term **'Value'** is widely used in management studies. The concept suggests that for any business exchange that goes on there are benefits that are received and these are termed as value to the individual. Value is subjective to the individual recipient (Ravald and Grönroos, 1996). Many authors believe that value can only be co-created, this co-creation taking place between the individual and the organisation providing the product or service (Ballantyne and Varey, 2006; Vargo and Lusch, 2008).

'Expatriates' (often referred to as expats); while there are a number of classifications of expatriates, which will be explored later, it is widely accepted that expatriates are individuals who live in a country that is not their country of origin, usually, but not always, for purposes of employment (van Bakel, van Oudenhoven and Gerritsen, 2015).

Finally, the term **'Sharing Economy'**, occasionally referred as the collaborative economy, is a concept that was explored by Botsman and Rogers (2010b, 2010a). It describes a socioeconomic system that uses ICT as a platform that allows users or peers to access, share and often monetarise resources.

1.7. Contributions

This work intends to provide a greater understanding of the theories of public sector value co-creation and value-in-use and the factors that aid in the creation or otherwise in the smart city context; this will be done in relation to expatriate residents. These areas are currently lacking in some of the literature and should add to existing work on value creation as well as providing further insights into both the city context and expatriates' experiences of value co-creation. This will benefit academics and professionals

by providing a better understanding and aiding further study of the phenomenon of value creation within smart cities as it affects expatriates.

This work should also contribute to practice, providing greater insight for city managers as to what processes, services and communications to develop or remove from existing and planned smart cities to enhance value-in-use for expatriates.

This research will undertake primary qualitative and quantitative data collection methods to ensure a broad range of data is examined, which is not widely done in the current public sector value literature or when scholars examine expatriates. Using this mixed method research and a detailed systematic literature review, this study will provide a conceptual framework to understand value co-creation within the smart city context, underpinned with structural equation modelling to give validity to the findings. Katsikeas, Leonidou, and Zeriti (2020) have called for such a framework. Additional items will be created to add to existing constructs so that value creation in smart cites can be more accurately examined and used by future researchers. The quantitative data analysis intends to validate Sweeney and Soutar's (2001) dimensions of value and perceived service value (Li and Shang, 2020) further alongside findings from the quantitative data collection.

This work is focused on value co-creation within the smart city of Dubai for expatriates. It is intended to be available for other researchers to use in other parts of the world and with different groups of citizens.

1.8. Organisation of the Thesis

This study is broken down into eight chapters. This first chapter has dealt with what the study is looking to address, the gaps in the current research and the need and relevance of the study itself to redress the gap. It concludes with stating some research objectives and research questions which will focus the study and enable the author to examine how effective the study has been upon completion. Chapter Two employs a systematic literature review to draw out contemporary academic literature that has been published in relation to value creation, smart cities and expatriates. This systematic approach initially

examines some 13,000+ relevant articles and uses the PRIMA approach. The author was able to identify key publications to fully discuss the concepts, theories and current thinking related to the topic as well as inform the methodology and data collection sections of this work. Chapter Three develops a conceptual framework based on findings detailed in Chapter Five as well as hypotheses which were tested in Chapter Six. Chapter Four explores the methodology for this research, firstly the philosophical approach of constructivism, and why it is relevant for this study. It then moves on to outline the proposed research design for this work; that of a mixed method study incorporating quantitative and qualitative research built on a sequential mixed methods approach. It then details the data collection methods for each; that of semi-structured interview using a purposeful sample and analysed using thematic analysis, followed up by a questionnaire to a wider participant group selected by convenience sample to gain a wider understanding of the themes that were identified. This questionnaire will employ Structural equation modelling for analysis. The chapter also covers the development of a qualitive pilot study. Chapter Five discusses the analysis of the qualitative data collection stage, identifies emerging themes through thematic analysis and develops a conceptual framework and hypothesis for testing with a quantitative data collection tool. Chapter Five also identifies items and constructs for use in quantitative data collection. Chapter Six examines the results of quantitative data collection, using Structural equation modelling to examine the relationship between constructs and testing the hypothesis set out in Chapter Three. Chapter Seven discusses the findings drawn out of both the qualitative and quantitative data analysis, highlighting what each collection method has provided insight into, while also looking at what can be seen when both qualitative and quantitative are examined together. This discussion also relates back to the original research objectives and questions set out in Chapter One. Finally, Chapter Eight is a conclusion chapter, drawing together the key aspects of the research, while looking at the study's impact on theory in this discipline as well as the implications for managers of smart cities around the world. The chapter also highlights the limitations of the study, while recommending areas for further research.

2. Chapter Two - Literature Review

2.1. Introduction

Building on the background outlined in Chapter One, this chapter looks to examine the current literature in much more depth. This is done through a detailed literature review using a systematic process to ensure a consistent and methodical approach to the literature review. This chapter outlines the process followed, the range of sources that were reviewed in order to arrive at a summation of the key concept, theories and frameworks that are relevant to this study, while allowing some critique of the current thinking.

2.2. Overview

To understand the scope of the topic, the following literature review was undertaken using systematic methods (Snyder, 2019). Two databases were used, namely EBSCO Business Source Complete and EBSCO Humanities International Complete, in recognition that the topic goes beyond the purely business discipline into the Humanities. Collectively these two sources contain over 9,800 journal titles. The decision to use these two databases is also supported by Watson and Webster (2020) who argue that literature reviews should not be confined by any one research methodology, single set of journals, or geography of publication or study.

The keywords listed below were used to begin searching for suitable material. The time parameters for the search were 1st January 2018 to 31st May 2024. There appears to be no consensus on how far back a literature review should go, however this timescale is in keeping with the fast-paced nature of the topic and also based on the systematic literature reviews of Shah *et al.* (2021) and Akande, Cabral and Casteleyn (2020) who identify a significant growth in publications in this area around 2018/19. Sánchez-Vergara, Ginieis and Papaoikonomou (2021) also note an upturn in publications in 2018 related to smart cities and Saha, Mani and Goyal (2020) draw a similar conclusion about co-creation literature. The results of the keyword search can be seen in Table 2.1, with the criteria for inclusion

and exclusion documented in Table 2.2 and PRISMA process for selecting what will be examined in more depth is outlined in Table 2.3.

The keywords chosen were: Smart City or Cities, Smart Citizens, User Value, User Value + Perception, User Value + Smart Cities, Expats or Expatriates, Co-creation, Co-creation + Smart Cities, Sharing Economy and Sharing Economy + Smart Cities. These keywords were selected as they broadly align with the research objectives. Based on those search terms the following was found:

Table 2.1 – Results of search terms – source Author.

Key Words	Business Source Complete	Humanities International
Smart City or Cities	3779	135
Smart Citizens	132	9
User Value	3560	103
User Value + Perception	89	5
User Value + Smart Cities	8	0
Expats or Expatriates	937	326
Co-creation	2374	107
Co-creation + Smart Cities	22	1
Sharing Economy	2125	33
Sharing Economy + Smart Cities	24	2

This identified a total of 13,771 potential articles, which comes down to a final total of 13,437 for further examination after deduplication. To decide which of these works to examine more closely, a selection criterion was devised so that material related to the topic could be reviewed more efficiently and effectively while excluding material deemed not to be relevant. The criteria were based in part on the works of Butler, Yigitcanlar and Paz (2021) and Sánchez-Vergara, Ginieis and Papaoikonomou (2021).

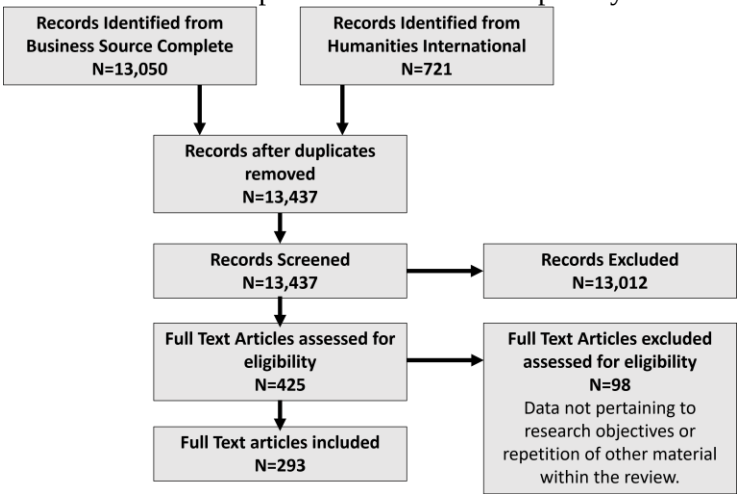
Table 2.2 – Inclusion and Exclusion criteria for literature review - source Author.

Inclusion and Exclusion Criteria			
Primary Criteria		**Secondary Criteria**	
Inclusion	**Exclusion**	**Inclusion**	**Exclusion**
Articles	Books	Relevance to topics	Irrelevance to topics
Peer-Reviewed	Book Chapters	Relation to research aims	No relation to research aims
Full text available	Conference Papers		
Available online	Industry and Government reports		

Using these criteria all 13,437 articles were examined in terms of title, abstract, and aims and objectives to determine their utility for this study. This examination yielded 425 articles for a final full review. In addition, the author also undertook a 'backward' and 'forward' (Webster and Watson, 2002) examination of citations to identify further related research.

The process used has been informed by the PRISMA method (Page *et al.*, 2021) and can be seen in Table 2.3. Many published literature reviews have used this method to ensure a robust, replicable examination of appropriate literature (Akande, Cabral and Casteleyn, 2020; Zainuddin and Gordon, 2020; Köbis, Soraperra and Shalvi, 2021).

Table 2.3 – PRISMA process flow chart - adapted by author from Page *et al.*, (2021)



2.3. Smart Cities

There are many definitions for what constitutes a smart city, Table 2.4 below illustrates some of the commonly used ones.

Table 2.4 – Definitions of Smart Cities compiled by the Author.

Definition	Authors
The terms 'smart city' and 'digital city' are those most associated with the technological capacity of a city.	(Han and Kim, 2021)
Smart City concept provides a high-quality lifestyle using ICT and IoT.	(Kumari, Gupta and Tanwar, 2021)
Smart cities are seen as hubs of innovation and knowledge based economic developments. They are usually costly to develop and promise societal and environmental change.	(Yigitcanlar *et al.*, 2018)
"The purpose of building a smart city is to use the new technology and new organizational forms to create greater value for the society, and to promote government efficiency, community autonomy, and social collaboration."	(Sun and Zhang, 2020)
Urban centres that focus on three dimensions of technological, people and community.	(Pašalić, Ćukušić and Jadrić, 2021)
"Smart Dubai – the political, economic and spatial economies of flow; the management of a diverse and highly mobile population; the restructuring of urban space, mixed-use real estate megaprojects and spectacular decontextualised architecture; and the global competition for the creative class."	(Breslow, 2021)
"Smart cities are defined as urban centres where local institutions implement smart technologies (IoT, big data, AI or ML, blockchain, virtual reality) to advance the innovative character of the city and improve the inclusion, participation, and well-being of citizens."	(Ranchordás, 2020)
"In this perspective, a smart city based on an IoT infrastructure can be viewed as a community of software agents (the intelligent objects) that interact with each other to realize more or less complex goals."	(Fortino *et al.*, 2020)
The application of the term 'smart' to a city, or to its constituent elements, such as smart economy, smart mobility, smart environment, smart people, smart living, smart governance, etc.	(Webster and Leleux, 2019)

Define a smart city as "a city that provides innovative solutions, in collaboration with its citizens and with the support of technology, to solve the specific challenges of its territory in the domains of mobility, economy, governance, environment, living, and people". This definition clearly states the need for citizen participation in the design of smart cities.	(Simonofski *et al.*, 2021)
"A smart city is a geographical entity where digital services are applied in order to improve life quality and environmental protection."	(Staletić *et al.*, 2020)
"At our end, we consider smart city as a complex ecosystem that would include many (living and non-living) stakeholders such as public and private institutions, software applications, citizens, city halls, IT infrastructure, and online services."	(Ugljanin *et al.*, 2020)
The term smart city is often associated with the desire for accelerated modernization of space and urban social interactions, which is fuelled by technological developments, especially of information and communications technologies. Proof of this are the terms used to define the same concept: "digital city", "e-communities", "intelligent city", "e-city" and "wired city".	(Fagadar *et al.*, 2021)
Smart cities aim to integrate information technology with urban infrastructure to enhance sustainability, efficiency, and residents' quality of life.	(Yan *et al.*, 2024)

Almost all the definitions relate to technology, digital, or ICT in some way. There appears to be a consensus that the digital or technological aspect is embraced in some way to deliver or engage with stakeholders. The term stakeholders is often used interchangeably with actors; both are seen as having some power and/or influence (Payne, Storbacka and Frow, 2008; Maalsen, 2019; Roy *et al.*, 2019). This study will focus on the definition of Ranchordás (2020) as this definition appears to encompass many of the aspects contained encountered by this research.

There is no encompassing definition of 'smart city'. Nam and Pardo (2011) recognise that there is no one-size-fits-all definition of smart city and perhaps the definition itself is not necessary, but more the understanding of what the city itself is and does. Even the term smart city is not consistent, with terms like digital city, wired city, intelligent city or sustainable city being used (Webster and Leleux, 2018).

Roy *et al.* (2019, p.1486) state "Since the essence of smart services, value co-creation and service experience co-creation is the ubiquitous interaction between different actors, this study argues for the existence of a new construct labelled as 'smart experience co-creation', which also encapsulates the interactions with smart technologies." Sancino and Hudson (2020) indicate that different cities take different approaches to smart city development, some opting for a formal strategy with projects aligned to this; others adopt an open approach to civic innovation via innovation platforms and living labs which bring together city actors with citizens to co-create value and solutions that meet local needs. Much of this is in line with comments from Yahia *et al.* (2019) who recognise this collaborative nature of actors who co-create. They also emphasise the impact on social capital and culture beyond purely commercial interests, whilst Romanelli (2018) adds that these communities operate in a smart ecosystem. Many in the community access the ecosystem via their mobile phones (Hsiao, Wu and Li, 2021; Verhulsdonck *et al.*, 2021), however this can cause difficulties for some communities that do not have access to the technology (Taylor, 2021). Paskaleva, Evans and Watson (2021) make the point that smartness is not achieved solely through the introduction of ICT. It is essential to respond to the needs of various city actors and findings from Desdemoustier *et al.* (2019) show that cities are becoming a governance space where complex social problems can be solved or developed. This is echoed by Bencke, Cechinel and Munoz (2020). Most research into the topic focuses on one of the six smart city dimensions laid out by Giffinger and Gudrun (2010).

Much of the contemporary research on smart cities draws from Giffinger and Gudrun (2010) who lay out a ranking table for cities as well as a set of domains that define the scope of smart cities activities. These smart domains are detailed below in Table 2.5: -

Table 2.5 Illustrating Smart Domains (Giffinger and Gudrun, 2010)

SMART ECONOMY (Competitiveness)	**SMART PEOPLE (Social and Human Capital)**	**SMART GOVERNANCE (Participation)**
• Innovative spirit • Entrepreneurship • Economic image & trademarks • Productivity • Flexibility of labour market • International embeddedness • Ability to transform	• Level of qualification • Affinity to lifelong learning • Social and ethnic plurality • Flexibility • Creativity • Cosmopolitanism/Open-mindedness • Participation in public life	• Participation in decision-making • Public and social services • Transparent governance • Political strategies & perspectives

SMART MOBILITY (Transport and ICT)	SMART ENVIRONMENT (Natural resources)	SMART LIVING (Quality of life)
• Local accessibility • (Inter-)national accessibility • Availability of ICT infrastructure • Sustainable, innovative and safe transport systems	• Lack of pollution of natural conditions • Pollution • Environmental protection • Sustainable resource management	• Cultural facilities • Health conditions • Individual safety • Housing quality • Education facilities • Touristic • Social cohesion

In earlier work Giffinger *et al.* (2007) described smart living as an embodiment of proper educational and cultural facilities, proper health conditions, safety, improved housing quality, tourist attractions, and social cohesion within a city.

This model is widely used in research around the world as a basis for discussion of aspects of smart cities (Lin, 2018; Camero and Alba, 2019; Koźlak and Pawłowska, 2019; Erdogan, 2021; Pašalić, Ćukušić and Jadrić, 2021) and forms the cornerstone of smart cities provision and definitions of what a smart city is, Table 2.4 above draws together some of the more widely acknowledged definitions. These dimensions provide a useful structure when exploring aspects of the smart city literature.

2.3.1. Smart Economy

As Sharifi (2019, p.1269) says, "Cities have traditionally been the nuclei of change, innovation and economic development." Romanelli (2018) suggests that creating long-term sustainable value depends on digital technology, business and social ecosystems, and smart communities. The main actors in a smart city ecosystem are government, business and communities. Maalsen (2019) adds that smart cities are characterised by those with 'economy and governance driven by innovation, creativity and entrepreneurship, enacted by citizens.' While the economy is vital to cities, most city e-government services are not for profit (Li and Shang, 2020), while Perätalo (2018) emphasises that an open ecosystem approach in smart cities creates value for all city entities, including the economy. Adding to this, Paskaleva and Cooper (2018) say that digital public services now open innovation spaces. Findings from Neumann *et al.* (2019) suggest that collaborative innovation approaches offer greater value for stakeholders. This is supported by Romanelli (2018) who suggests that firms, cities, and communities

should work to develop innovation and sustainable growth, thus co-creating social and public value. Breslow (2021) also makes the point that Smart Dubai has adopted a neoliberal capitalist approach to smart cities, in line with a Western or Global North model. He also says the citizens' points of view are excluded from this model. This is in contrast to many Western, democratic approaches; however, expatriate labour has few rights. Transformation is key to not only the economy generally but smart cities specifically. If the city is to flourish, both the organisation and the citizens need to adapt (De Falco, 2019). Tomičić-Pupek, Pihir and Furjan (2019) add to this by claiming that digital transformation can enable the organisation to provide better products and services to citizens and improve quality of life. However, they also claim that citizens need to engage with the transformation alongside the organisation.

2.3.2. Smart People

Smart people looks at a range of issues around people within the city. There is some focus in the literature around participation in smart cities. de Jong, Neulen and Jansma (2019) look at it from the perspective of the 'participation ladder' (Arnstein, 1969), categorising smart city participants into three groups: firstly, citizen sourcing, secondly collaborative democracy and thirdly citizen ideation and innovation. Citizen sourcing is where citizens support and engage in public administrations tasks, for example, reporting traffic problems. The 'collaborative democracy' is when citizens provide feedback, input and support for decision-making policy issues. Finally, 'citizen ideation and innovation' describes when citizens actively contribute to the identification of societal problems and the development of solutions. Przeybilovicz *et al*. (2022) also use the participation ladder (Arnstein, 1969) as a basis for their examination of citizens, although they recognize that citizens' roles can be fluid rather than linear. Yeo (2021) adds that citizens should be central to policy issues and influence processes and outcomes. E-participation enables citizens to contribute more. Building on this Zandbergen and Uitermark (2020) underline the importance of citizen participation, but state that a bottom-up approach needs to be fostered further in smart cities. Paskaleva, Evans and Watson (2021) show that participation in 'living labs' allows citizens, government and industry to come together to co-create more socially aware and sustainable smart city services.

Paskaleva and Cooper (2018) showed that citizen participation is increasingly being sought by cities, not just in the purely commercial field. Engagement with public sector managers, academics, artists, and other community groups was identified. de Jong, Neulen and Jansma (2019) show that highly educated citizens usually are more willing to participate in government activities than those with lower levels of education; this is supported by Bouzguenda, Alalouch and Fava (2020). This can become a vicious circle for cities if they do not live up to the goals of increasing education levels, resulting in a lowering of participation and potentially a more disengaged citizenry. Indeed, education in smart cities has been highlighted by scholars such as Gebhardt (2020) and Paskaleva, Evans and Watson (2021). They need to view this through the Quadruple Helix model which looks at co-creation through the intersection of four spheres; citizens, business, government and education, all of which should come together for mutual benefit (De Falco, 2019).

2.3.3. Smart Governance

While governments of different forms have embraced the smart city approach the term governance appears in the research. Governance in smart city terms relates to the traditional political government that is familiar to many Urban Studies scholars, but it also includes more broad ideas such as citizen participation in decision making, transparency and social services (Giffinger and Gudrun, 2010). Slingerland *et al.* (2022) echo this, pointing out that local engagement from citizens can have positive impacts on liveability and safety concerns. As Ribeiro *et al.* (2019, p.583) state, "Governance must act through interactions with deliberation, negotiation, self-regulation or authoritarian choice, to reach collective decisions for the good of the cities. It involves political application, state orientation and other institutions." Cities have participated in smart cities initiatives (mobile apps, social media, and other Web 2.0 tools). This has greatly influenced how local and city governments approach the management of urban services (Lin, 2018; Allen *et al.*, 2020). Smart governance is tightly linked with e-governance and e-democracy in Western countries; in many cases, the Western model for cities appears to be dominant, as will be discussed later. Saif-Almuraqab (2020) in examining the smart city initiative in Dubai states that e-government is enshrined in the laws that govern smart cities and that public information disclosure and enhanced citizen participation (or e-participation – participating through

ICT) are a cornerstone of that approach. Ardielli (2020) adds to this, stating that e-participation is considered a mechanism for building civic engagement and a suitable instrument for ensuring open and participatory governance through ICT. Webster and Leleux (2018) feel that the role of the citizen is becoming increasingly important within smart cities; a more bottom-up approach is key. In addition, Romanelli (2018) states that smart city governance or e-government involves the empowerment of businesses, citizens and other stakeholders, whereas digital government refers to the use of technologies as part of government activities to create public value. Adding to this Allen *et al.* (2020) state that governments increasingly concentrate on integrating citizens into the administrative processes through increased openness. This is done to achieve and develop improvements in service quality, e-participation, government transparency and greater public value creation. Li and Shang (2020) suggest that research into e-government and e-governance has largely focused on distinguishing between service value, service quality and citizen satisfaction and how this affects behavioural intentions, but not how this links to public value. Findings from Allen *et al.* (2020) clarify that enabling smart city citizens in the co-production and co-creation through open innovation and transparency of government information will lead to better public sector performance. Research from Sancino and Hudson (2020) highlights that governance within smart cities is hybrid in nature and collaborative. Public–private partnerships appear to offer an effective model for delivering smart city initiatives that can be used to meet the needs of a variety of smart city actors.

2.3.4. Smart Mobility

Butler, Yigitcanlar and Paz (2021) identify smart mobility as a 'key' sub theme of smart cities experience, which is often referred to as Mobility-as-a-Service (MaaS) or Transport-as-a-Service (TaaS). Koźlak and Pawłowska (2019) share the view that MaaS and smart cities are strongly linked. Kee and Ching (2020) look at the viability of smart parking facilities in Malaysia as users explore the usefulness of street parking apps in terms of both availability of space and cost. This has some relation to work undertaken by Valdez, Cook and Potter (2018), who examine the development in parking apps and traffic management more generally. Both works show levels of citizen engagement with these services. Much of these developments in smart city services are made possible by greater volumes of

data. This data comes from crowdsourcing information from users (Lenart-Gansiniec and Sułkowski, 2020) and sensors installed throughout the city. These sensors could be in rubbish bins to identify when collection is needed (Ranchordás, 2020), road sensors to monitor traffic levels and car park volumes (Toh *et al.*, 2020) or air quality and pollution sensors (El-Haddadeh *et al.*, 2019). Both Zhang (2019) and Jeannot (2019) point out that many citizens within city environments are passive sensors, meaning that data is taken from them, largely through city apps to help develop city services. This is passive because the citizen has not directly input the data into some portal. Instead, it has been shared via the apps. Citizens see potential in sensor networks and crowd sourcing to improve city services such as transportation (Valdez, Cook and Potter, 2018). Findings from Wirtz, Müller and Schmidt (2021) show that citizens strongly prefer services such as mobility and social welfare delivered through online platforms and that citizen data is crucial for city managers to improve their provision in a more citizen-centric way. Lim *et al.* (2019) point out that this data from customers is used to provide not only improvements in service but actual value-in-use.

2.3.5. Smart Environment

Noori *et al.*'s (2020) research recognised the importance of environmental measures to be put in place in smart cities. Kee and Ching (2020) echo this in their work on traffic management which not only provides value for motorists to avoid traffic but also offers an environmental benefit in terms of air quality. Ranchordás (2020) adds to this, suggesting that as urban centres develop ICT information, sharing it can foster greater local participation from citizens as well as more environmentally friendly decisions. Gebhardt (2020) suggests that climate policy and affordable housing have become the focus of smart cities, while Coletta, Heaphy and Kitchin (2019) see the technological shift toward smart waste management systems. Findings from Webster and Leleux (2019) suggest that examination of the smart city environment needs to go beyond environmental issues to include organisational and social sustainability. Citizen engagement in smart city initiatives is crucial for long-term sustainability.

2.3.6. Smart Living

Quality of life is a concept that frequently appears in the literature (Camero and Alba, 2019; Buhalis, Andreu and Gnoth, 2020; Cluley and Radnor, 2020). Both Staletić *et al.* (2020) and Allen *et al.* (2020) point out that public administration and citizens need to act together to accomplish development goals and improve the quality of life. This quality of life has many aspects (Giffinger *et al.*, 2007): housing, healthcare, tourism and social cohesion. Maalsen (2019) recognises that housing is particularly underexplored in the city context, commenting that the word 'smart' is often set as a prefix to city activities without much thought about what that means. Femenia-Serra and Neuhofer (2019) make the point that tourism in a smart city has been seen as a great benefit, providing more information for tourists in terms of potential activities and real-time data such as current and potential capacity at venues. This is in line with findings from Khan *et al.* (2017) who researched tourism specifically in Dubai. So important is this data that Dubai has passed laws related to the appropriate sharing and usage of data (Eskhita, Manda and Hlali, 2021), as has neighbouring Qatar (Badran, 2021). Social cohesion is occasionally examined within the smart city context (Oomens and Sadowski, 2019). Chang (2019) makes the point that social cohesion is a key part of cities and can add greater social value. Lima (2020) suggests that attracting talent into a city will help create meaningful social cohesion. Fortino *et al.* (2020) look at social cohesion with the creation of social capital and how it can create greater value.

2.3.7. Smart City Perspectives

Much of the literature examined here views smart cities as an accepted phenomenon. Few critique the nature of smart city development, preferring to focus on its operation and outcomes. Verrest and Pfeffer (2019), De Falco (2019) and Irazábal and Jirón (2021) all state that smart cities are neo-liberal in nature and are constructed to benefit entrepreneurial activities, rather than solving social problems within cities such as poverty and inequality. Rodriguez-Lluesma, García-Ruiz and Pinto-Garay (2021) even take a Marxist view, suggesting that technologies can determine social order and that capitalism itself encourages competition rather than co-operation. Verrest and Pfeffer (2019) go on to suggest that the current concept of a smart city is focused on the political elite and businesses interested in putting forward a utopian idea of sustainable, green, ITC focused living spaces. Quitzow and Rohde's (2022)

work suggests that innovation technology used in smart city grids can work towards a low-carbon city goal. Verrest and Pfeffer (2019) suggest it is top-down in nature, although some authors such as Webster and Leleux (2018) recognise that some cities are bottom-up innovation driven. Kim, Hwang and Choi (2021) agree, while adding that smart cities can also be swayed by political will and this does not necessarily benefit all citizens. Findings from Ranchod (2020) indicate that processes of technological change and innovation are limited. Verrest and Pfeffer (2019), Miller *et al.* (2021) and Hoefsloot *et al.* (2022) feel that the current positioning of the smart city concept is from a Global North position, rather than examining the issues of the Global South. However, Peter and Meyer (2022) point out that smart cities in Africa, such as Kigamboni City in Dar es Salaam, Tatu City (Kenya) and Hope City (Ghana) look to Dubai and Singapore as their model. Certainly Yigitcanlar *et al.* (2018) do agree that much of the main drive for smart cities has come from large corporations who have city related products and services, although they suggest a move toward supporting quality of life for citizens. These points are supported by Jirón *et al.* (2021) and Nieto, Yelpo and Guzmán (2021) who also make the point that Global South smart city research is lacking. Hartmann, Nduru and Dannenberg (2021) also recognise the Global South research deficit, adding that from an urban employment perspective Global North organisations are damaging the workforces of the Global South. Irazábal and Jirón (2021) state that a true smart city should have an agenda that integrates social, environmental and economic goals simultaneously; how most city projects are elite top-down constructs, when a bottom-up approach would be more localised and potentially equal in its distribution benefits and costs. Valdez, Cook and Potter (2018) suggest that smart cities have often been 'urban questions' and are framed as 'engineering problems.' While Yigitcanlar *et al.* (2018) and Heaton and Parlikad (2019) accept that smart cities are largely technocratic and suggest there is no significant evidence to date that smart cities have been able to address many of the issues faced by big cities today. However, Jeannot's (2019) research does provide some small level of comfort for smart cities, as it demonstrates that they are popular when they strengthen longstanding features of the socio-technical regime. Okwechime, Peter and Edgar (2018) suggest that smart cities as a concept are seen as ways of solving urban problems using ICT and that big data is becoming a tool to create value. Webster and Leleux (2018) caution against rampant

enthusiasm for ICT as a panacea, suggesting that there is a disconnect between the perceived power of ICT to transform the public sphere and the actual deployment in public spaces. Alruwaie, El-Haddadeh and Weerakkody (2020) and Innocent and François-Lecompte (2020) add that successful ICT e-government projects require continued post-adoption usage over the initial acceptance, requiring citizens to engage increasingly with ICT. If the technology does not deliver for citizens they are unlikely to do this. Wirtz, Müller and Schmidt (2021) make the point that quality of life is key to cities and they state that smart city projects are often criticised for their lack of opportunities to allow citizens to participate in the decision making process. They feel that citizen centricity is crucial. Neumann *et al.* (2019) agree that citizen centricity suggests that organisations know what customers/citizens want, although Heaton and Parlikad (2019) suggest that the people element of smart cities is often overlooked. Simonofski *et al.* (2021) feel that citizens' requirements have been assumed rather than sought out and understood. Han and Kim (2021) also criticize smart cities as lacking an acknowledgement of the citizens' wants, needs, and involvement, taking issue with the top-down approach of cities that sees the citizen as a consumer and service user rather than a partner. This neglect of the citizen could have serious consequences; Kuzior and Sobotka (2019) suggest that social capital is a key factor within cities that acts to integrate a range of activities. They also make the point that cities need to ensure that they take steps to avoid social exclusion, as this impacts on social capital. Ranchordás (2020) adds that citizens are not always aware of the services available and, as such, do not feel part of the community. Sancino and Hudson (2020) criticize smart cities as having grand strategic visions rather than having any real impact in the community. Gebhardt (2020) suggests that there are unintended consequences of smart city development such as population, affordable housing availability and healthcare provision. Casula, Leonardi and Zancanaro's (2022) work examines childcare in the healthcare sector. They suggest that digital platforms in cities allow citizens to not only co-produce care services but to co-design them. While smart cities are touted as solutions to these and many other issues, this is not always the case. Research from Tomičić-Pupek, Pihir and Furjan (2019) is somewhat damning for smart cities. They found that smart cities failed to report clear results of improvements, and lack of improvement was perceived by customers.

2.3.8. Smart Cities Summary

An examination of these works has begun to illustrate different considerations of co-created value which is the heart of the research objectives of this study. Equally the exploration of differing understanding of smart cities links strongly to the research objectives. Smart cities can mean different things to different people, this is in part due to the direction that city planners have set, but given the subjective nature of value, perhaps smart cities service value is also subjective. How expatriates use the services to co-create and share value is also an objective of this study, many authors have discussed the collaborative way value is created and many examinations of cities allude to the sharing nature of these domains.

2.4. Co-creation of Value

Value is a concept that is central to much of business studies and particularly so in relation to customers. Value was traditionally seen as transactional, with value being created in exchange for good for something else, often money (Eggert, Kleinaltenkamp and Kashyap, 2019). This transactional approach of value in exchanges was characterised by the term Goods-Dominant logic (GD logic) (Lusch, Vargo and O'Brien, 2007; Vargo and Lusch, 2008). Payne, Storbacka and Frow (2008) state that value creation occurs within three different spheres; the provider sphere, the customer sphere and the joint sphere, which is where the value encounter takes place. This mutual interaction between actors is termed as 'co-creation' and is said to result in value creation for all actors. It is through this co-creation that value becomes real for the customer (Payne, Storbacka and Frow, 2008; Roy *et al.*, 2019). Co-creation is considered fundamental in value-in-use, and Bentzen (2022) suggests it is continuous. Value is seen to be subjective (Malone, McKechnie and Tynan, 2018; Sweeney, Plewa and Zurbruegg, 2018; Cluley and Radnor, 2020) and as such can be characterised as perceived value requiring different types of value to be classified in relation to different perceptions of what value is for a given recipient. Zeithaml (1988, p.3) defines perceived value as "consumer's overall assessment of the utility of a product (or service) is based on perceptions of what is received and what is given". Mbama and Ezepue

(2018) show that the perception of value has a positive effect on individual experience. Findings from Alonso *et al.'s* (2018) study of city-based taxi services support the subjective nature of value.

Service Dominant (SD) logic asserts that the customer can only realise value during the usage of the product or service, not during the creation process, not in the production phase of the product, and is dependent on the use context (Vargo and Lusch, 2008). Value creation does not only occur during usage or consumption (Sheth, Newman and Gross, 1991) but in conjunction with other stakeholders (Prahalad and Ramaswamy, 2000), while value is said to be created in use or consumption. Empirical research from Holmqvist *et al.* (2020) suggests that in some contexts value is created before consumption.

Due to this recognition that value was no longer focused on the exchange but on the perception of value, consideration was increasingly given to how and where value was created and by whom. It is widely recognised that the role of the customer in value creation is central (Grönroos, 1984; Ravald and Grönroos, 1996; Lusch and Vargo, 2004; Prahalad and Ramaswamy, 2004; Vargo and Lusch, 2008). This is supported by findings from Löbler and Wloka (2019, p.1010) who state, "Our research supports the idea of service-dominant logic that; customers' skills and knowledge play a significant role in co-creating value." Customers' knowledge and skills are important for value co-creation and its linkage to the concept of co-creation of knowledge, ideas and design (Dey *et al.*, 2019; Jukić *et al.*, 2019). Dey *et al.* (2019) recognise that user-driven technology greatly aids the ability of individuals to develop and share knowledge, ideas and design. Hsiao (2019) and Parthiban *et al.* (2021) also recognise the impact of ICT enabling greater opportunities for the practical application of knowledge to create mutual benefit for all actors within the value creation process. Holmqvist *et al.* (2020) and Agafitei, Avasicai and Tudose (2020) recognise this as a social interaction to create value with active consumers. Tashakkori, Lotfizadeh and Doroudi (2024) point out that co-creation can have a positive effect on retention.

Grönroos (2008) and Holmqvist *et al.* (2020) posit that in service logic no value-in-use can exist before interaction with the customer, there is only the potential of value. As Bagdoniene and Valkauskiene (2018) put it, organisations cannot deliver value, only offer value proposition for customers to create

value. They go on to use the real value to relate to value-in-use. Merz, Zarantonello and Grappi (2018) suggest that value-in-use is customers' experiential evaluation of a service proposition beyond its functional attributes. Value-in-use has also been linked to convenience, in that a service that is convenient to use is valuable (Hartwig and Jacob, 2018, 2021).

2.4.1. Dimensions of Value

Numerous scholars have categorised value. Probably the most widely used model is the dimensions of value created by Sweeney and Soutar (2001) who suggest that value could be classified as emotional, social, functional in terms of value for money, or functional in terms of quality and performance. Innocent and François-Lecompte (2020) add other dimensions such as utility value, hedonic or experimental value, spiritual value and knowledge value. Chang (2019) discusses green value, which shows the creation of value within environmentally sustainable ways. This has some linkage to the goals of some smart cities. Authors such as Mbama and Ezepue (2018) and Wang *et al.* (2019) also explore three perceived value dimensions; economic (including functional), epistemic (emotional) and social benefit. They discuss three primary value constituents; utilitarian, hedonic and social value. Wang *et al.* (2019) argue that there is a positive interrelationship between perceived value and consumers' willingness to use ride-sharing services and this also has a strong effect on consumer adoption. Work from Karjaluoto *et al.* (2021) suggests that value can be explored though the Theory of Consumption Values (TCV's) and Technology Acceptance Model (TAM) to examine behavioural intentions. Jang, Bae and Kim (2021) suggest that 'big data,' which comes from sources such as smart cities, greatly aids the understanding of the buying patterns of consumers and informs the creation of value-added services. It is the four dimensions of value (Sweeney and Soutar, 2001) that will be employed for this study given its wide usage in other studies and the breadth of type of value which should give scope to examine the city experience.

2.4.2. Convenience

Value has also been examined in terms of convenience to the consumer, this is conceptualised by the term SERVCON, which covers various aspects of convenience within service provision, such as

convenience of decision-making, access, benefits, convenience of transaction and convenience that occurs post purchase for the consumer (Seiders *et al.*, 2007; Kaura, 2013).

The concept of convenience has been widely explored in previous literature, where Vale and Ventakash (1986) attempt to draw together constituent aspects of the convenience construct. These attempts saw them try to classify the following aspects; time utilization, accessibility, portability, appropriateness, handiness and avoidance of unpleasantness. Many of these aspects still appear to be relevant to a contemporary discussion of convenience (Srinivasan, Anderson and Ponnavolu, 2002; Colwell *et al.*, 2008). Convenience is widely valued by consumers, particularly those who are time-poor (Butt *et al.*, 2024). Griffiths, Perera and Albinsson (2019) recognise that convenience is not only important to the city context but also to the sharing economy itself.

2.4.3. Information Exchange

Some of these convenience factors relate to information exchange, which is at the heart of the smart city concept (Giffinger and Gudrun, 2010), as well as being central to the internet of things (Jiang, 2020). Information exchange enables value co-creation (Vargo and Lusch, 2008), as well as being key to value provision in cities (Iványi and Bíró-Szigeti, 2019). More recently the term ‘sharing’ has begun to be used in literature, linked mainly to the rise of the sharing economy (Cheshire, 2007; Botsman, 2014).

Both the sharing economy and smart cities are driven by big data. Big data is characterised as an approach to data that collects, mines, stores and process data in new ways, it has become well established over the last two decades as the volume of data increases (Batty, 2013). Big data is closely aligned with transformation of both public policy and service delivery (Ylijoki and Porras, 2016). While Neves, de Castro Neto and Aparicio (2020) build on this, detailing a much wider range of information exchange opportunity for cities from big data leverage. These include communication and interaction between citizens, citizens interacting with the urban environment as well as business and public sector institutions.

As has been highlighted in many of the smart city definitions information exchange and data in general is pivotal to smart city foundations and activities. The technological infrastructure or, as Talebkhah *et al.* (2021) conceptualise it, the smart city architecture is what enables the six dimensions of the smart city to operate. Taking this concept further Ullah *et al.* (2024) explore the smart city data life cycle, which covers four stages: data acquisition, data pre-processing, data analytics and service provision. These stages all build value first by obtaining information, then data cleansing and processing before finally providing value through co-created services. They characterise the created value through three different avenues; economic growth, smart governance and public safety. The approach offered by Ullah *et al.* is taken further by Löfgren and Webster (2020) in relation to big data and building a big data value chain as they recognise not only the value of data within co-creation, but also within the smart city context.

Linked to both smart city and big data concepts is that of Artificial Intelligence (AI) which is increasingly being used to manage a range of city services replacing humans in the decision-making process (Allam and Dhunny, 2019). Everything from waste management (Fang *et al.*, 2023), to energy grid management (Sulaiman *et al.*, 2023) to traffic control (Hasanujjaman, Chowdhury and Jang, 2023) and metro operation (Lin *et al.*, 2024) is beginning to be managed, controlled and improved by AI through information exchange. The interface between users and city services is also using AI, with improvements in user engagement being fostered by AI managed applications (Abdulqadir *et al.*, 2024).

Neves, de Castro Neto and Aparicio (2020) also highlight the importance of data in terms of continual improvement. This concept of ongoing improvement is also central to cities (Giffinger and Gudrun, 2010) and value co-creation (Vargo and Lusch, 2008), AI is helping to optimise improvement across a wide range of city services.

Fan, Hsu and Lin (2020) recognise that information connection is important to a wide range of consumers, as well as acknowledging the social value impact of information connection as well as the connection to customer dominant (CD) logic and social contract. Szymanski and Hise (2000) identify that access to good quality information has a positive impact on satisfaction, but also decision-making,

while supporting convenience, Meng *et al.* (2024) make the point that it can improve the social well-being of individuals. Ardielli (2020) makes the point that better quality of information makes engagement more likely; engagement being a fundamental aspect of value creation.

2.4.4. Touchpoints

Much of the smart city service provision is ordered through and/or received via ICT channels (Gil, Cortés-Cediel and Cantador, 2019). These points of contact are often called touchpoints (Jaakkola and Terho, 2021) which refers not only to ICT channels, but to any point where the citizen comes into contact with city services. Jia and Xu (2021) recognise the importance of touchpoints within the city to capture data for service improvement. This is echoed by Muschkiet and Wulfert (2022) whose research suggests that both physical and digital touchpoints within a city help to co-create value. Touchpoints is a concept widely used in digital marketing, it characterizes the points at which a customer/user engages with the organisation (Chaffey and Ellis-Chadwick, 2022). Research from Muschkiet *et al.* (2022) has demonstrated that journey mapping helps improve the citizen's quality of life as well as promoting innovation.

However, Zheng *et al.* (2019) caution that while a range of touchpoints for citizens to provide information and receive services is beneficial, exchange of information should not be asymmetrical, as this can cause difficulties. Sharing should take place on a more even footing. Zheng *et al.* (2019) recommend an integrated approach to touchpoints, which is echoed by Sreejesh (2024) who suggests that touchpoints should be smooth for users. Litovchenko and Skurupskaya (2016) take this further, suggesting that integrated marketing communication (IMC) is fundamental for smart cities. They add that communication not only takes place between individuals, but also machines and through IoT. What is lacking from their work is a recognition that service delivery also takes place via integrated touchpoints, but this point is taken up by Wirtz, Müller and Schmidt (2020) who state that not only is communication a key part of smart cities, but that service delivery through digital and physical touchpoints is undertaken. Rodriguez, Fernandez and Arboleya (2018) make the point that multiple touchpoints within the city allow improvement of access, improvement in quality of life, as well as

fostering human and social capital. Given that social capital focuses on connected networks of human beings and their ability to aid one another (Gannon and Roberts, 2020), it is logical to consider this in an examination of co-creation within cities where individuals exchange data and action work in conjunction to co-create value for themselves and others (Kuzior and Sobotka, 2019).

2.4.5. City Experience

Information exchange, convenience and touchpoints are all part of the city experience. The experience that citizens have with the city is the focal point of value creation (Ballesteros, Alvarez and Markendahl, 2015), with positive experience having a clear effect on adoption and continual use of service (Guo and Poole, 2009; Zhu, Yan and Song, 2022). The experience can be physical or digital. Ulijaszek's (2018) research suggests that physical interaction and data capture within smart cities has benefit for the city and the individuals. Tjønndal's (2019) research suggests that smart city services such as parks, cycle tracks, walking and hiking paths, all add to the experience of the city, while providing quality of life and positive health benefits. Adding to this, Lee *et al.* (2019) make the point that smart parks have a positive effect on users' experience, while Wu's (2020) findings show that when citizens enjoy life and are satisfied this has a positive effect on their experience. Mamakou, Zaharias and Milesi (2024) make the point that digital technologies can mediate the on and offline experiences to improve satisfaction. Han and Kim (2021) highlight the continued value of SERVQUAL (Parasuraman, Zeithaml and Berry, 1988) in examining the experience in smart cities, but also suggest that citizens' engagement through touchpoints and experiences within the city needs to be the focal point for development of cities for the future. Lemon and Verhoef (2016) make the point that the customer experience has a strong relationship to the mapping of the customer journey, the touchpoints have a significant effect on the quality of the service experience. Adding that SERVQUAL aspects are beneficial in understanding the experience. Anderson, Fornell and Lehmann (1994) examine the experience as evaluating satisfaction through the consumption of the experience, this is in keeping with service dominant (SD) logic.

2.4.6. Perceived Service Value

Li and Shang (2020, p.4) state “In practice, government websites are a good way to create value for the public: they allow the government to share information, offer services conveniently and efficiently, and provide a wider platform for public participation”. Their work examining the public sector culminates in the concept of perceived service value, this is supported by Prohl and Kleinaltenkamp (2020) who show that value does not just develop over time. It must be proactively influenced and grown in a structured way to benefit all parties. Findings from Hu, Chohan and Liu (2020) indicate that while all citizens who are users of digitally provided services are important for the co-creation of public value, if they are not active then the co-creation of that will be diminished or destroyed.

2.5. Value-in-Use

Value-in-use is defined as the value obtained from a service during the customer's usage of that service (Ballantyne and Varey, 2006). This usage of a service is assessed by the individual (Hartwig and Jacob, 2018) customer and like other definitions of value is subjective. In keeping with other definitions of value, value-in-use is considered to be co-created, with Hsiao (2019) making the point that service dominant (SD) logic promotes value-in-use, suggesting that value is dependent on the integration of resources from stakeholders and that is context-specific. Eggert, Kleinaltenkamp and Kashyap (2019) suggest that this could also be termed experienced value-in-use, as the value is experienced by the customer. Grönroos (2008) points out that this experience during use is deepened over time through repeated use. Malone, McKechnie and Tynan (2018) suggest that value-in-use is inherent in value creation through customer-dominant logic (CD logic) which is based on customers’ experiences and activities within a service context. As with much of the work on value co-creation it is based on traditional commercial interactions, however research from Heinonen (2009) examines e-services and concludes that continual use of e-services does improve value-in-use, echoing what was said about traditional services. Moving to the context of cities, work from Scutella, Plewa and Reaiche (2024), who focus on value-in-use in public services, shows that value-in use is participatory, which is in keeping with many definitions of smart cities and well as necessary for co-created value generally.

2.6. Public Sector Value Creation

Narrowing down the discussion of value to the context of this research, we can look at value creation in the public sector. Ardielli (2020) suggests that in the context of public administration, citizens operate in two roles; firstly as the objective of the service and secondly as the sources of legitimacy. Osborne is an author widely cited in the area, putting forward the term public service-dominant logic (PSDL) (Osborne, Radnor and Nasi, 2013; Osborne, 2018) or 'public service logic.' In keeping with SD logic, Public Service Organisations (PSO) do not create value for citizens, only provide public service offerings; the citizens create value in using this offering. The term New Public Government (NPG) is also being used to characterise this shift (Varkey *et al.*, 2024). This change in emphasis is echoed by Petrescu (2019), Engen *et al.* (2021), Sønderskov and Rønning (2021) and Modrzyński and GawłowskiI (2019). In terms of both public value and smart cities, citizen well-being is often a focus (Järvi, Kähkönen and Torvinen, 2018). Value is not the exclusive preserve of the commercial sector. Cluley and Radnor (2020, p.6) examine the public sector, defining value as "The subjective phenomenon (this could be a feeling/ emotion, a physical effect, a material object, or an event) that emerges through the interaction of all elements (human, material, environmental, political, cultural, experiential) involved in the relationship between a service user and a public service organization". Jukić *et al.* (2019) and Järvi, Kähkönen and Torvinen (2018) suggest that co-production of public value is focused on improving the quality of public services, cutting costs, developing greater links between civil society and government, as well as trying to empower citizens. Neumann *et al.* (2019) suggest that this is increasingly happening online in the context of digital government and Allen *et al.* (2020) add that citizen e-participation can help governments improve service delivery. This view is shared by Zhang *et al.* (2022) whose findings suggest that co-creation in cities between local administrators and citizens is an effective way to manage and deploy city data. Findings from Kopackova, Komarkova and Horak (2022) suggest that e-participation helps to form greater engagement and activity between citizens and government, and research from Salmoria *et al.* (2021), who focus on the perception of public value of citizens in Brazil, suggests that citizens' role in creation and improvements in public services is key to value.

2.7. Public Service Management

Petrescu (2019) recognises that in the context of public management, the process of co-creation, 'the voluntary or involuntary involvement of public service users in any of the design, management, delivery and/or evaluation of public services', adds value not just to the citizens but to the society itself. Cavallone and Palumbo (2019) share the view that public services co-production is seen as a process of citizen empowerment, enabling participation. Their finding suggests that greater public value can be achieved when citizens are involved with city managers. Hafer and Ran (2022) add to these findings by suggesting that citizens' public value is subjective and that individuals' perceptions influence public value. Jaspers and Steen (2021) view public value creation and public value as a value appraisal of government or government service providers and the outcomes. They also recognise that public value potentially offers value to the individual members of society. This social value can take many forms, such as social cohesion, environmental value and political value, with stakeholders engaging in the democratic process and participating in the planning of services (Chang, 2019). Citizens can take on different roles within the public service co-creation process, such as clients or volunteers, while providing a variety of resources that include knowledge, energy, time, assets, compliance, ideas and legitimacy (de Jong, Neulen and Jansma, 2019; Petrescu, 2019). Public value refers to public managers finding ways to solve issues around the collective needs of citizens (Klievink, Van Der Voort and Veeneman, 2018). These can include transport and welfare services. Public value had been seen as the opposite of private value. However, increasingly public bodies have been turning to public private partnerships (Dudau, Glennon and Verschuere, 2019). This introduction of partnerships and market management approaches to public problems is termed 'new public management' (Desmarchelier, Djellal and Gallouj, 2018).

Desmarchelier, Djellal and Gallouj (2018) provide good examples of co-creation in a public setting; a student co-produces the education service by attending classes and learning lessons. Esashika, Masiero and Mauger (2021) also recognise the importance of education in developing the citizenry of a smart city; this is echoed by Karatzimas (2021). The citizen co-produces the crime prevention service by

being vigilant and reporting any suspicious event to the police. Findings from Machala and Havíř (2019) into public transport suggest that customers were not only interested in participating in public co-creation, but that this improved their overall perception of the experience. Citizens are becoming more enthusiastic about engaging with their community in aspects of urban planning through ICT (Bisschops and Beunen, 2019). As public value creation is undertaken by multiple actors in the society, social forces will impact the actors' value perceptions (Stampacchia, Tregua and Coppola, 2020). Alhashem, Moraes and Szmigin, (2020) also suggest that participants gain social value through value-in-use.

2.8. Value Co-destruction

While much of the discussion around value is framed positively, the idea of destruction of value should not be overlooked. Value co-destruction can be defined as "an interaction process between service systems that results in a decline in at least one of the systems' wellbeing" (Plé and Cáceres, 2010). So, value co-destruction can refer to a failed interaction process resulting in a negative outcome. This could also be characterised as customer misbehaviour which can happen on or offline and can be deliverable or caused by a lack of clear information or genuine mistakes on the part of the customer (Järvi, Kähkönen and Torvinen, 2018; Ogunbodede, Papagiannidis and Alamanos, 2022). Equally value destruction can be brought about through poor service delivery on the part of staff or failure of on and offline systems and processes (Engen *et al.*, 2021). Research findings from Malone, McKechnie and Tynan (2018) suggest that value destruction is grounded in negative emotions and that emotions are a driving force in co-creation and/or co-destruction. Work from Sthapit, Stone and Björk (2024) looking at the sharing economy suggests that co-destruction increased during the pandemic due to restriction in movement placed on many individuals and their ability to access some physical services.

Having looked at the positives and negatives of value creation and destruction it is possible to examine public value more objectively. It is not without its criticisms. Fledderus, Brandsen and Honingh (2015) are concerned that the market-driven idea of co-production is being used by governments to undo the welfare system, and Howlett, Kekez and Poocharoen (2017) are troubled by cost cutting and reduction

by the state in terms of public services. While organisations such as public institutions move to a more customer-driven or customer-centric stance, if they do not understand what the customer wants or needs they are unlikely to deliver it (Brege and Kindström, 2021). Güemes and Resina (2019) recognise the importance of city managers and citizens having an open dialogue and a continual one if they hope to achieve mutual value creation. Hansen and Fuglsang (2020) recognise public value as a societal value created in a democratic environment. However, not all public service organisations are in the democratic tradition. De Silva *et al.* (2021) caution that social value creation must be examined with care, since it is based on values of those living in the city, which are not necessarily universal. Wang and Teo (2020) and Güemes and Resina (2019) share similar concerns that in the push to create what organisations feel represent public value (cost reduction and improving efficiency of service) the goals of the citizens are overlooked. Wang and Teo (2020) also acknowledge the increasing trend in governments to provide services both offline and online (in keeping with smart city approaches), while less attention is being paid to service quality particularly in the offline delivery. For all the grand visions for smart cities and the value they create, research from Karjaluoto *et al.*, (2021) suggests that customers are more interested in functional value than social value. This kind of insight goes to the heart of this study's research objectives as it attempts to understand the nature of value in the smart city context. Furthermore, Karjaluoto *et al.,* touch upon dimensions of value (Sweeney and Soutar, 2001) which this study uses as part of the construction of a conceptual model as can be seen in Chapter Three. Having examined the collaborative nature of value creation it is appropriate to now examine sharing in value creation.

2.9. The Sharing Economy

Much of the work on the sharing economy stems back to work by Botsman and Rogers (2010b) in their book entitled What's Mine Is Yours: The Rise of Collaborative Consumption. Moorman *et al.* (2019) define the sharing economy as a socioeconomic system that employs technology-enabled platforms to provide users with temporary access to tangible and intangible resources that may be crowdsourced. They recognise that it involves change for stakeholders, channels, process and value creation. Adding to this, Nadeem and Al-Imamy (2020) define the sharing economy as being primarily driven by the idea

that underutilised assets can be provided to individuals in exchange for some other form of benefit or compensation. Griffiths, Perera and Albinsson (2019) take this further by stating that sharing has gone beyond simple peer to peer sharing and is now a much larger scale commercial concern. Markman *et al.* (2021) offer this definition, adding that engagement is an important factor in the sharing economy as the phenomenon is dynamic in nature, while Geissinger *et al*. (2021) and Arteaga-Sánchez *et al.* (2020) add that ICT has aided in the adoption of the sharing economy. Činjarević, Kožo and Berberović (2019) also make the point that the sharing economy can be monetary and non-monetary in nature, while Gerwe and Silva (2020) add that some still consider the concept in terms of underutilised resources such as capacity or labour. Pădure (2021) suggests that the sharing economy goes beyond a geographical community and Ranchordás and Goanta (2020) claim that the sharing economy has had a positive effect in enabling SMEs to enter the marketplace. Finally, Akbar (2019) makes the point that the sharing economy has become an umbrella term which covers the shared distribution and consumption of goods and services via platforms (usually digital). Altinay and Taheri (2019) suggest that a number of different terms are used throughout the literature to describe the sharing economy such as 'crowd-based capitalism', 'commercial sharing system', 'access-based services', 'peer-to-peer economy', 'access economy' and 'gig economy'.

2.9.1. Collaborative Consumption

Tunçel and Özkan Tektaş (2020) recognise that collaborative consumption is a subset of the sharing economy; using online platforms to swap, trade or rent. These can be for profit or not for profit and either P2P (or C2C) or B2C. They discuss the concept of 'consumer cosmopolitanism,' that is the consumer who places little value on the importance of national boundaries, which has some similarities to the expatriate mind-set. Akbar (2019) makes the point that collaborative consumption requires people coordinating distribution and acquisition of some forms of resources for fees or other compensations, which is in line with the concept of the sharing economy. Bhalla (2021) suggests that economic benefits of the sharing economy have no direct impact on attitudes of consumers toward collaborative consumption, but they go on to say consumers may not engage in sharing services as they could perceive that unacceptable behaviour could result in a fine or penalty. Ciulli and Kolk (2019)

suggest that some incumbents in the market have been given the choice 'share or die' and the sharing economy takes hold. Akbar (2019) also discusses the idea of access-based consumption, which provides limited or temporary access, but not ownership of resources to consumers. Laczko *et al.* (2019), Lehr *et al.* (2020), Markman *et al.* (2021) and de Lange and Valliere (2020) all agree with this characterisation; however, they point out that in this model legal ownership remains with the provider.

2.9.2. Sharing Platforms

Markman *et al.* (2021) and Kyprianou (2018) state that sharing platforms provide the opportunity to both create and capture economic value. While Akbar and Hoffmann (2020) suggest that value creation in the sharing field does not take place purely between firm and customer, but with a 'whole host of actors', they recognise that this set of actors co-create value-in-use. Adding to this Kim and Yoon (2021) state that shared value is dependent on collaboration and cooperation, not just between customers and firms, but between customers and other customers. This is in contrast to Amat-Lefort, Marimon and Mas-Machuca (2020) who state that the sharing economy requires two peers (provider and consumer). Laczko *et al.* (2019) explore the idea of multiple actors through stakeholder theory, confirming the concept that value is created through stakeholders within a network jointly creating value. They state that in the context of the sharing economy this activity is also creating value throughout the whole platform or ecosystem for mutual benefit. This is also endorsed by Hlady-Rispal and Servantie (2018). Laukkanen and Tura (2020) acknowledge that traditionally value was created through monetary trade-offs, however increasingly environmental and social value elements have become key. This is built on by Činjarević, Kožo and Berberović (2019) who suggest that many different types of value can potentially be in play in the sharing economy; they refer back to Sheth, Newman and Gross (1991).

2.9.3. Sharing Encounters

Mittendorf, Berente and Holten (2019) draw on the term service encounter, which has been around for some time, and apply it to the sharing economy. Like service encounters there is interaction between two or more actors in the service ecosystem (customer, provider, intermediary). These encounters can

be experienced through touchpoints (Bolton *et al.*, 2022). Building on the findings, Kyprianous (2018) suggests that intermediaries create value through continuous and concurrent use of sharing platforms. Work from Prandi *et al.* (2021) suggests that these platforms can go beyond the commercial into areas such as cities. These ideas are something that is found in literature around value, and Shah, Noor, Lei, *et al.* (2021) state that SD logic is the 'backbone' of the sharing economy.

Within these encounters Mittendorf, Berente and Holten (2019), Altinay and Taheri (2019) and Amat-Lefort, Marimon and Mas-Machuca (2020) all agree that trust and perceived value are important. Consumer expectations and perceptions need to be managed and delivered appropriately if the sharing encounter is to succeed in enabling creation of value-in-use by the consumer. Research from Nadeem and Al-Imamy (2020) explores the theory of 'relationship quality' which they claim serves as a strong mediator between consumers' ethical perceptions and their intention to co-create value. Co-destruction can also be found in the sharing economy as highlighted by Danatzis, Möller-Herm and Herm (2024) which they characterise as 'customer-to-customer misbehaviour'. Research findings from Arteaga-Sánchez *et al.* (2020) identify social value as a key motivation in the sharing economy, also suggesting that perceived usefulness leads users to be more satisfied. Findings from Akhmedova, Mas-Machuca and Marimon (2020) suggest that the quality of service is fundamental to the creation of value and loyalty of users in the sharing economy, and that quality of service and customer value develop increased loyalty.

Schiavone *et al.* (2020) state that 'Technology-based experience providers can be viewed from different perspectives (e.g., transformative service research (TSR) or service-dominant (S-D) logic). TSR analyses how the relationships between the providers and stakeholders of an experiential network influence the outcome value created for both." This is echoed by Leroi-Werelds (2019) whose research examines Transformative Service Research (TSR) and its effect on well-being. Laukkanen and Tura (2020) add to this in their discussion of social value which they claim includes elements that society in general or individuals consider valuable, including issues related to well-being and happiness. Akbar and Hoffmann (2020) suggest that online communities can also create hedonic value for consumers in

the sharing economy as the consumers can feel a sense of belonging and enjoyment in the group. Findings from Liang, Lin and Hou (2021) state that perceived value can help predict the intention to adopt a sharing platform. Perceived value can be increased by reducing transaction costs and increasing the perceived benefits. Finally, research from Ranchordás and Goanta (2020) raises the question that as there is no consensus on what is in the public interest or a societal value, how can that value be achieved?

2.9.4. Sharing Economy and Smart City

Many scholars have identified the overlapping concepts of smart cities and the sharing economy (Šiuškaitė, Pilinkienė and Zvirdauskas, 2019; Ranchordás and Goanta, 2020; Palgan, Mont and Sulkakoski, 2021; Sánchez Vergara, Papaoikonomou and Ginieis, 2021). Mont *et al.* (2020) recognise that the sharing economy can have a transformative impact on cities and their economic prosperity, social viability and quality of the environment. This is endorsed by Akhmedova, Mas-Machuca and Marimon (2020) who state that smart cities' use of the sharing economy plays an important role in the management of city resources. Barbu, Bratu and Sîrbu (2018) feel that sharing should have well-being and pro-social behaviour, while Guo *et al.* (2018) make the point that the sharing economy can have a positive effect on the more sustainable consumption of resources. However, findings from Curtis and Mont (2020) show that the sharing economy is not sustainable by default, so city managers must be strategic and deliberate in how they design and implement business models. Coelho and Romer (2020) acknowledge that sharing services such as parking, toll roads, bike sharing and healthcare services have been growing in urban centres, supported by local government initiatives. This growth has been made possible by ICT (Geissinger *et al.*, 2021). Coelho and Romero (2020) also recognise the potential of the sharing services in cities and that they have a positive impact on citizen satisfaction. Findings from Tunçel and Özkan Tektaş (2020) suggest that cosmopolitan citizens, who are more open to experiences, are more likely to participate with sharing services within the sharing economy. Sánchez-Vergara, Ginieis and Papaoikonomou (2021) discuss the idea of a 'sharing city' which has the potential to achieve a range of smart city goals such as stronger community, citizen empowerment, sustainability and efficiency and innovation through new economic arrangements. Akbar and Hoffmann (2020) agree

with the community aspect of this, adding that community co-creation can be developed further in the sharing city space. Findings from Bernardi and Diamantini (2018) also warn against cities overly focusing on technology infrastructure and sharing economy elements and that attention needs to be paid to the human dimensions, skills, knowledge, human and social capital.

Aspects of the sharing economy have been criticised. Griffiths, Perera and Albinsson (2019) and Pies, Hielscher and Everding (2020) state that ridesharing has caused controversy in relation to eroding public transit, unfair competition and an increase in traffic congestion in some cities as well as a lack of leave, sick leave and other benefits for workers. Mont *et al.* (2020) agree with the issue of workers' rights while voicing concerns about public safety, privacy and health. Palgan, Mont and Sulkakoski (2021) concede that many issues such as security and labour law have not kept pace with developments in the sharing environment. Findings from Ahsan (2020) appear to back this up, suggesting that there is unethical behaviour and a polarisation of power within the digital sharing economy, this is also in contrast to smart city goals (Giffinger and Gudrun, 2010). Research from Buhalis, Andreu and Gnoth (2020) suggests that the sharing economy has its dark side in the form of intentional or unintentional value co-destruction activities from actors. In line with some of the criticisms levelled at smart cities, Ciulli and Kolk (2019) suggest that while the sharing economy creates social value and economic value, it has also developed a new economic system that could be seen as an alternative to capitalism. This may help to assuage some of the critics who feel that both smart cities and sharing economy activities are neo-Global North (Mont *et al.*, 2020). Ertz *et al.* (2018) share this view and add a concern about the lack of social responsivity in the sharing economy. In contrast to the concerns that smart cities are too top-down Sánchez-Vergara, Ginieis and Papaoikonomou (2021) find that top-down and bottom-up need not be opposing forces but could work together. While Palgan, Mont and Sulkakoski (2021) outline some of the sustainability challenge facing cities today, including air quality, waste, healthcare and gentrification, they feel that ideas to combat these issues include 'sharing economy', 'circular economy' and 'smart cities'. This discussion has helped highlight some of the key aspects of public service value which is at the core of the aim of this research and begins to explore some of the research

gap identified in Chapter One, such as the need for greater understanding of public service value co-creation (Cavallone and Palumbo, 2019; Hansen and Fuglsang, 2020; Yap *et al.*, 2021).

2.10. Expatriates

Given that the focus of this study is around expatriates, the proportion of expatriates living in Dubai and more broadly the movement of global talent around the world that was highlighted in Chapter One, it would be wrong not to explore concepts related to expatriates. Additional exploration of value co-creation in cities is linked to the expatriate experience, therefore an understanding of the underlining concepts will be useful as this research develops. Expatriates can be defined as individuals who relocate for employment purposes to another country, often, but not always for a finite period (Dimitrova *et al.*, 2020). Expatriates can come in different forms, self-initiated skilled expatriates (SIE) decide to relocate on their own initiative (Lapointe, Vandenberghe and Fan, 2020). Others are assigned by their employer to work in other countries for a defined period before being repatriated, these are referred to as International Assignees (IA) (Canhilal, Canboy and Bakici, 2020). Kokt and Dreyer (2018) suggest that these assignments can be short (a few months) to longer-term (several years). Skilled immigrants (SI) relocate due to a particular job offer or migration programme set in place by countries looking to address skills gaps (Chwialkowska, 2020). Hajro *et al.* (2019) define international skilled migrants or skilled immigrants as those being degree qualified or higher, moving for a better life and opportunity. International Business Travellers (IBT) are those who travel internationally on a very temporary basis and return to their home country (Dimitrova *et al.*, 2020). While there are a number of different classifications for expatriates, Gevorkyan (2022) warns against treating any group based on ethnicity, regional or cultural background.

Kumar *et al.* (2019) suggest that much of the current research in this field looks at discrepancies between expatriate workers and Host Country Nationals (HCN) employers (Peltokorpi, 2020) and the management of and adjustment of both. These mainly, but not exclusively, look at topics such as language barriers and ease of communications, work-family interactions, demands of the job within the new country, political stability and educational opportunities for offspring (Coughlan, Fogarty and

Fogarty, 2019) and wellbeing (Cai *et al.*, 2024). Kim (2021) highlighted the necessity for expatriate workers, and suggested that without expatriate workers with skills and experience, it is challenging to develop FDI projects and operations. Anderson (2020) points out that while most migration takes place in countries in the Global South, the bulk of research on this topic is focused on the Global North. Adding to the discussion of Global North and South, Falkof (2022) examines expatriate living in cities in the Global South, namely Cape Town (South Africa) and Santiago (Chile), suggesting that the developed areas within these cities are more aligned to Western culture.

Waxin, Lindsay and Belkhodja (2018) show, perhaps unsurprisingly, that local workers may lack skills and expertise that expatriates possess, and that expatriates are well compensated for this. However, this is one of the areas of criticism of expatriate workforces. Foreign workers can bring much-needed skills to a nation but also cause local populations to be concerned about job losses and falls in wages (Zhu *et al.*, 2018). Adding to this, Fei (2021) points out that companies bringing in expatriate workers can cost more and can forgo the much-needed investment in upskilling local workers for the longer term.

Kunz's (2020) research findings point to the idea that even the term 'expatriate' is controversial, often referring to highly skilled migrants, often in senior, well paid, positions. Kunz suggests that a more suitable term could be 'migrants of privilege', as 'expatriate' can reaffirm a particular Western whiteness (or perhaps post-colonial) as superior, going further to suggest that migrants are often associated in terms of race, ethnicity and religion. Skovgaard-Smith and Poulfelt (2018) offer the term 'highly skilled migrants' rather than 'expatriates' to recognise the skills rather than Western 'whiteness'. Kunz (2020, p.2150) states that "Perhaps the most widely used definitional criterion is residence, although international legal consensus on the term 'residence' is lacking". Controversy in discussion of expatriates is not limited to skills and ethnicity; human rights considerations are receiving increasingly more attention in relation to expatriate labour. In a recent article, Al Thani (2021) highlights the treatment of expatriate workers brought into Qatar in preparation for the World Cup in 2022. Yang (2022) examines the effect of Chinese workers moving to work on projects in Africa and the impact that has had on collective labour rights.

Anderson (2020) discussed migration in terms of border controls, suggesting that countries like the US, Canada and European countries control migration through strict border enforcement, rather than allowing migration to happen naturally. Anderson does not limit criticism to the Global North countries, adding that Gulf countries have aggressive migration control.

While little research directly links the expatriate research to work on smart or sharing cities, findings from Khalfan and Ul Haq (2019) suggest that expatriates consider factors such as public transport, parking facilities, and cheap forms of taxis when planning to relocate. This chimes with work from He and Shin (2022) on bike sharing and findings from Kim (2021) that call for local government to improve liveable environments for expat communities. These factors are more widely discussed in city literature.

For the purposes of this study, expatriates will be considered to be those living and working within the UAE who are not Emirati nationals; factors such as education level, country of origin and ethnicity will not be considered.

2.11. Summary

Drawing these four concepts together might seem somewhat disparate. However, the concept of the creation of value has long been established (Priem, 2007). Indeed, contemporary thought has moved beyond the transactional two-way exchange of value towards greater co-creation of value, whereby the customer/user of the product or service becomes an integral part of what is valuable (Lusch and Vargo, 2004; Payne, Storbacka and Frow, 2008; Roy *et al.*, 2019). While the sharing economy itself is a relatively new term (Botsman and Rogers, 2010b, 2010a) the feature that customer/users create value remains essential (Prahalad and Ramaswamy, 2000; Sheth, 2020). It has a strong link to ICT technologies (Balaji and Roy, 2017; Hu, Chohan and Liu, 2020), and through the use of technology disintermediation can reduce or remove the need for service providers (Alhashem, Moraes and Szmigin, 2020). The sharing economy concept also encompasses tangible and intangible benefits, not necessarily commercial in nature, and is considered by some to be developing underutilised resources (Carè *et al.*, 2018; Staletić *et al.*, 2020; Pădure, 2021). These points are similar to the goals of smart cities. The use

of underdeveloped resources in an efficient way (Osborne, Radnor and Nasi, 2013; Sta, 2017), the engagement of the citizenry (Hoelscher, 2016; Lin, 2018), the provision of valuable services (Hasija, Shen and Teo, 2020) and interconnection of those citizens (Noori *et al.*, 2020; Noori, Hoppe and de Jong, 2020) all draw these concepts together. The inclusion of expatriates in this work is a recognition of the increasingly mobile nature of global talent and the need and desire of cities to attract international talent (Park *et al.*, 2022).

3. Chapter Three - Conceptual Framework and Hypotheses

3.1. Introduction

A conceptual framework is key for the development and testing of any hypotheses. This chapter examines the development of a conceptual framework for this study, which was initially drawn from an examination of the literature (Chapter Two) and shaped by the outcomes of qualitative data collection (Chapter Five), this is in keeping with the sequential mixed methods approach (Harrison, Reilly and Creswell, 2020). The model is also designed with the research gaps in mind, so that this study can achieve its objectives while adding to the body of knowledge.

3.2. Development of Conceptual Framework

There has been a great deal written around the topic of creating conceptual and theoretical frameworks (Luse, Mennecke and Townsend, 2012; Grant and Osanloo, 2014; Singh, 2015; Dipper *et al.*, 2021); a conceptual framework allows the researcher to represent the relationship that is expected between characteristics or variables that are being studied.

There have been numerous efforts to build conceptual frameworks to better understand and test value both in the commercial and public sectors and the relationship between customers, users and service providers (Holt and Payne, 2001; Ballantyne and Varey, 2006; Lusch, Vargo and O'Brien, 2007; Vargo, Maglio and Akaka, 2008). Attempts have been made to conceptualise public value (Harrison *et al.*, 2010; Chourabi *et al.*, 2012; Nam and Pardo, 2014; Desmarchelier, Djellal and Gallouj, 2018), incidentally none of these attempts really look at the smart city context. It is perhaps work from Roy *et al.* (2019) and Salmoria *et al.* (2021) that comes closest to looking at the smart city phenomenon in relation to value co-creation. Nevertheless, the model from Salmoria *et al.* (2021) is somewhat limited covering only a few elements in creating public value, such as needs of citizens, social needs and service provision. Information exchange is not explored, despite ICT being a key aspect of many definitions of smart cities. Touchpoints are not always explicitly covered in an examination of innovations in the public sphere. The framework from Roy *et al.* (2019) does go into more depth around different factors

creating value in the smart city context. Firstly, it recognises the co-created nature of the smart city, as well as the service elements required to make up value. It also recognises interaction with people being important even in a digital context. However, the reference to touchpoints is reduced to a consideration of word of mouth, there is little reference to information exchange and convenience is not considered at all. None of these models address expatriate citizens specifically, hence the development of the model in this study. None of these works draw together information exchange, touchpoints, convenience, experience of the city, and dimensions of value and public service value, although some research from Roy *et al.,* (2019) does incorporate many of the value dimensions, including a brand equity aspect, but does not look at public value explicitly.

The conceptual model developed below (Figure 3.1) has been built on the literature review while being informed by the emerging themes from the qualitative data collection to develop a model which is to be tested in the quantitative research stage. Bell, Bryman and Harley (2019), when discussing mixed method research, highlight the value of qualitative findings in setting hypotheses.

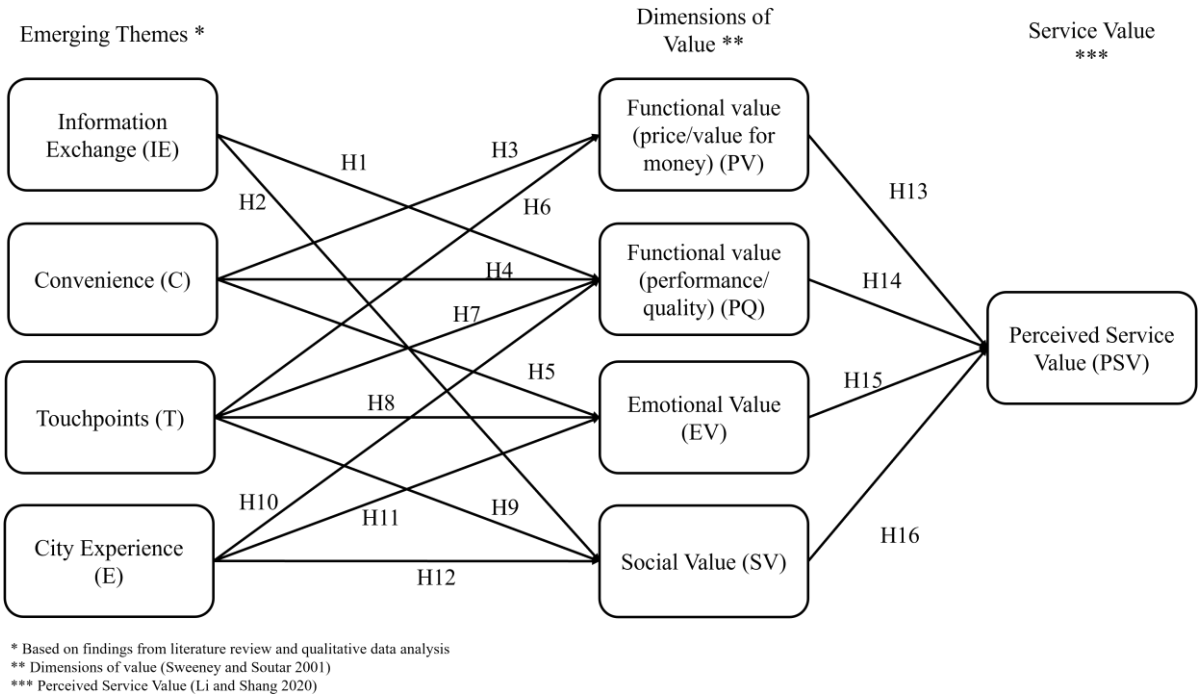
While much of the creation of the theorical framework within this study has originated from the literature review (Chapter Two), the role that qualitative research results have played, should not be overlooked or underestimated. Conceptual models provide simplicity to something complex and can help draw existing literature and qualitative findings together (Meredith, 1993), adding to this Jabareen (2009) suggests that conceptual frameworks can be developed and constructed through a process of qualitative analysis. This approach to using qualitative data (such as literature review and interviews) has been used by other scholars (Yin and Heald, 1975; Sandelowski, Docherty and Emden, 1997). Shah and Corely (2006) go as far as to suggest that quantitative data cannot build theory, only qualitative can do this. It should also be remembered that conceptual frameworks ask the researcher to identity 'world views' from their research; while this has been done in part through the literature review, a view of expatriates within Dubai can only be taken through interview data, this is particularly relevant as the literature around expatriates in connection to smart cities and value creation is very limited (Green, 2014). Given that the literature review for the UAE is sparce the qualitative research provides some

reassurance that the constructs used in the conceptual model are relevant and valid to the Dubai context. This is in keeping with guidance from Harrison, Reilly and Creswell (2020) who recommend that each aspect of data is examined thoroughly before use.

More specifically, the interviewees uncovered four main themes that were highlighted in the literature review which appear to be important to expatriates within Dubai and therefore formed the basis for the conceptual model. These were information exchange which was heavily referenced in relation to Smart Dubai, with both providing and receiving information, with respondents feeling this was an important part of their interactions with the city. Convenience was universally cited by interviewees multiple times, highlighting that it was clearly an important element of value creation that needed further investigation. Touchpoints formed the basis of most discussion with participants as this was normally the focal point of engagement with the city. Despite the fact that this work focuses on smart cities, which are largely digital in nature, much of the discussion from interviewees highlighted the physical experiences, as such it was felt that the experience was something to be examined further.

In summary, the benefit of using both the results of thematic analysis and literature review to create a conceptual model is essentially twofold, firstly generalization to other parts of the world and other participant groups, the second is context, being able to take research done in Dubai itself to ensure that what is being tested in the quantitative element of the study is context specific and more relevant to the very market is it attempting to explore. Chapter Four details the methodology of this study, highlighting how the quantitative and qualitative elements were undertaken. Chapter Five demonstrates the emerging themes of the interview stage of this research. These themes were information exchange, convenience, touchpoints and experience which aligned with findings from the literature review.

Figure 3.1 – A conceptual model of value creation dimensions in relation to smart city experience of expatriates – source Author.



The conceptual model has been developed by using three distinct parts, firstly that of independent variables which are drawn from the emerging themes within the literature and the qualitative data collection from this study, these were, information exchange, convenience, touchpoints and the city experience. Information exchange which deals with the exchange or sharing of information both between the individual and the city as well as between individuals, had been covered in the literature and discussed many times by interviewees. Given the importance of this theme it was included in the model. To measure information exchange items from Barnes and Vidgen (2003) have been used as this work has been focused on the online experience. Convenience is a concept widely discussed in service literature, so it was perhaps unsurprising to find it heavily discussed in the interview stages, hence its inclusion in the model. To measure convenience, items from Chang and Chen (2008) were used as this work looked at convenience with an online setting. The points of interaction with the city, touchpoints, were also discussed by interviewees a great deal as well as being examined in current literature, the work chosen to help measure this was from Jaakkola and Terho (2021) as this work looks at touchpoints in a service context and relates to the customer journey. Experience within the city was again something that came out of the interview stage and is well documented in service literature stretching back decades,

here work from Verhoef, Franses and Hoekstra (2002) was used to measure as it encapsulates the on and offline nature of service encounters. The themes (information exchange, convenience, touchpoints and experience) impact on a dependent variable, namely the concept of Perceptive Service value (Li and Shang, 2020) is beneficial because it looks at the city context, and finally these two variables are mediated by the four dimensions of value.

The dimensions of value (Sweeney and Soutar, 2001) lend themselves well to this model, it breaks value down into four distinct areas where value is created. These dimensions are as follows functional value (price/value for money) which is the value derived from the costs of a product or service. Functional value (performance/quality) is seen as the value a product or service has in relation to quality and/or performance. Emotional value is related to feeling generated by a product or service and finally, social value which is the ability of the service or product to enhance the social self. One or more of these dimensions has emerged during the qualitative data collection and development of themes. With the model in place, it is now possible to propose testable hypotheses for value creation within the smart city context.

While concepts such as value-in-use, public sector value creation and sharing economy were discussed in the literature and are important to the overall understanding of this study, it was decided not to include them in the conceptual model. Value-in-use is potentially inherent in the experience of all these concepts (Stampacchia, Tregua and Coppola, 2020). The constructs within the conceptual model are designed to provide more detailed insights into public sector value creation and the sharing economy.

3.3. Development of Hypotheses

Hypotheses development enables the data collection to be structured so that it is quantifiable, verifiable, replicable, and defensible (Creswell and Creswell, 2019). Hypotheses also form part of what Schulte (2003) refers to as the ‘hourglass’ approach, meaning research beginning with a broad topic for investigation, narrow it down with objectives, refine it further down into a testable hypothesis, the results of which enable the researcher to draw conclusion against their research objectives and make statements about how the phenomenon can affect the wider world. Whereas Macleod, Clark and

Hockey (1981) view the hypotheses as group of statements that as yet have neither been proven nor unproven. Sarantakos (1993) takes a broader view of hypotheses, suggesting that they are a tentative explanation of the research problem or an 'educated guess' about the outcomes. Given the exploratory nature of this study, this view of hypotheses is somewhat fitting. Adding to this Prakash, Badiger and Phil (2014) suggest that hypotheses can be predictors of consequences, again this fits with exploratory research.

Hypotheses can be presented in either visual or written form and are used in both qualitative and quantitative research. Conceptual models are not without their critics. Blumer (1954), who is still well cited today, points out that in social science definitive concepts can become too fixed in the quantitative realm, which restricts the exploration of qualitative findings. Lazarsfeld (1958) also questioned the term measurement in social science and suggested that it could be viewed differently by those coming from a natural science background.

Turning to this research, the literature review and the conceptual framework enable this research to focus on the hypothesis that will test the validity of the conceptual framework and provide insight into value creation. Hypotheses are designed to predict what might happen in relation to the constructs under investigation (Bell, Bryman and Harley, 2019). This study expects that information exchange will have an effect on functional value (quality/performance) and social value. It is also expected that convenience will have an effect on functional value (price), functional value (quality/performance) and emotional value. Touchpoints are expected to have an impact on all four dimensions of value, while the city experience is anticipated to have an effect on functional value (quality/performance) as well as social and emotional value. In turn the four dimensions of value are predicted to have an effect on perceived service value. With all of this overview in mind, it is possible to examine the hypotheses in more depth below.

3.4. Information Exchange

Information exchange and its performance/quality has long been recognised as an important aspect of value creation (Camp and Sexton, 1992), adding to this Dagger, Sweeney and Johnson (2007) suggest

that the quality of information exchange is key for service delivery value creation. Kuo, Wu and Deng (2009) see information for service performance as vital in their exploration of service delivery, albeit in the commercial sector. While Amit and Zott (2001) point out that not only value of information but richness of information is important to commercial e-commerce and exchange between parties. They also recognise that information exchange needs to be two-way engagement not asymmetrical. Findings from Kang (2006) shows that performance factors have an impact on service quality. While Lee, Lee and Choi (2011) show that information can have a positive impact on functional value and service value. Therefore, this study hypothesises that.

> H1 – Information exchange within the city is perceived to have a positive impact on functional value (performance/ quality) for expatriates.

The term information sharing is occasionally used in the literature, and findings from Meng *et al.* (2024), show that information sharing has a positive effect on social value and engagement in services. The move to the information age heightened the need for information in social value creation (Sheth and Uslay, 2007), Cheshire (2007) adds to this claiming that there is both economic and non-economic value within information exchange and that it can foster public good (such as social benefits as well financial ones). These studies have looked largely at commercial uses of information exchange in value creation, some studies have begun to look at this within the smart city context. Dinev and Hart (2006) recognise the use of information exchange within e-services and its importance to providing social value in complex government services. Finally work from Mao *et al.* (2023), looks at the importance of information within e-government and e-services and their impact on creating value for citizens. Accordingly, this study proposes the following hypothesis.

> H2 – Information exchange within the city is perceived to have a positive impact on social value for expatriates.

3.5. Convenience

Convenience is a concept that has been well documented in the literature and has been widely used in a number of contexts to examine customer perceptions with great success. This has been demonstrated in work from Mbama and Ezeque (2018) who examine performance/quality in relation to convenience. Kaura (2013) and Kaura, Prasad and Sharma (2015) test both performance/quality and price in connection to convenience in a commercial setting focusing on banking customers as well as work from Colwell *et al*. (2008), who used performance/quality and price to observe convenience in the telecommunication sector. Looking at e-services more specifically, findings from Jiang, Jiang and Liu (2011) appear to show that performance and price have a relationship with convenience in e-services in commerce and an impact on customer perceptions. All these studies found convenience to be an important construct in examining value, with this in mind this study proposes the following two hypotheses.

> H3 – Convenience of city services is perceived to have a positive impact on functional value (price/value for money) for expatriates.
>
> H4 – Convenience of city services is perceived to have a positive impact on functional value (performance/ quality) for expatriates.

Turning to convenience in relation to emotional value, Lin *et al.* (2019) examine emotion in relation to convenience in their work examining residents in smart cities in China, finding convenience to be an important factor, which is supported by Chang and Horng (2010) in their work which focuses on delivering convenience to local communities and the emotional impact. With these studies in mind H5 is proposed to be examined.

> H5 – Convenience of city services is perceived to have a positive impact on emotional value for expatriates.

3.6. Touchpoints within the City

Touchpoints is a topic well covered in the literature and has formed the basis for hypothesis development in other works. Savastano *et al.* (2023) investigate citizens' views in relation to touchpoints and how they create value through aspects such as price. Muschkiet and Wulfert (2022) suggest that the price of a service could be determined by the channel that is used. Bolton *et al.* (2022) consider price to be an important factor in designing touchpoints for service provision, therefore this next hypothesis is proposed.

> H6 – Touchpoints within the city are perceived to have a positive impact on functional value (price/value for money) for expatriates.

There is significant usage of ICT touchpoints within high quality or performance service delivery (Mossberger, Wu and Crawford, 2013). Findings from Savastano *et al.* (2023), looking at smart services in Milan, show that perceptions of value are affected by use of ICT and the users' experience of service delivery and quality. Work from Wirtz, Müller and Schmidt (2021) towards developing a smart city service provision framework has a range of touchpoints at the centre of the framework, viewing them as vital to information provision and good quality service delivery. Sreejesh's (2024) findings show the importance of channels, (touchpoints) relationships, quality and the brand experience in the banking sector. This discussion leads to the proposal of H7 below.

> H7 – Touchpoints within the city are perceived to have a positive impact on functional value (performance/ quality) for expatriates.

Mansourimoayyed, Hoseini and Sabahi's (2020) findings that investigate touchpoints in relation to shopping show that emotional value is generated. This is echoed by Gabriel, Acosta and Grandey (2015) whose work demonstrated that positive emotional experience when coming into contact with touchpoints is considered valuable. Heller *et al.* (2021) suggest that the use of ICT touchpoints can have impact on both individual emotional responses and value-in-use. With these points in mind this next hypothesis is proposed.

H8 – Touchpoints within the city are perceived to have a positive impact on emotional value for expatriates.

Findings from Anttiroiko *et al.* (2014) have touchpoints as being central to value creation and recognize that value is co-created and that those touchpoints are two-way methods of communication. The work goes on to observe that types of communication (e.g. short messaging, content sharing, social networking and crowdsourcing) can impact on different types of value, such as functional and social. Looking to the city context, findings from Molinillo *et al*. (2019) suggest that touchpoints are beneficial to both residents and tourists in terms of information and social engagement. The discussion of social value leads to the following hypothesis.

H9 – Touchpoints within the city are perceived to have a positive impact on social value for expatriates.

3.7. City Experience

The fourth emergent theme of the city experience appeared to relate to three dimensions of value in the minds of respondents; those of functional value (performance/quality), emotional value and social value, therefore the next three hypotheses relate to these value dimensions. Any service experience has been broadly explored, perhaps most widely in relation to the SERVQUAL model (Parasuraman, Zeithaml and Berry, 1988), which attempts to view experiential factors within a service experience. SERVQUAL had originally been applied to commercial experience. Ahamd, Akbar and Javed (2023) look at value creation but focus on e-service experience in terms of quality and satisfaction, using functional value within their conceptual model. Other scholars, such as Mao *et al.* (2023), have applied it to city contexts to look at service experience and quality. Evidence from Zhu, Zhong and Wei (2024) suggest that improvements in efficiency can enhance the service and raise users' satisfaction in the service value. Findings from Mamakou and Cohen (2023) examining e-government service experience and continued use demonstrate that service quality has a positive impact on continual use. Looking further at e-government services in relation to on and offline services and user experience, work from Ilieva *et al.* (2024) underlined the importance of user experience in generating value, linking their work

to the UTAUT model (Venkatesh *et al.*, 2003). Therefore, this next proposed hypothesis is related to quality and performance within the experience.

> H10 – Smart city experience is perceived to have a positive impact on functional value (performance/ quality) for expatriates.

Hilmiyati-Mas'adah *et al.* (2024) adopted the four dimensions of value (Sweeney and Soutar, 2001) when developing their conceptual model for value creation in commercial services experiences, their findings show emotional and social value are created. Adding to this Lemon and Verhoef (2016) demonstrate that a blend of on and offline touchpoints can provide a seamless experience and create emotional and social value. The user experience is also highlighted as a future trend for smart cities in work from Yaqoob *et al.*, (2023) who observe social value creation. After examining emotion and social value the following two hypotheses are proposed.

> H11 – Smart city experience is perceived to have a positive impact on emotional value for expatriates.

> H12 – Smart city experience is perceived to have a positive impact on social value for expatriates.

3.8. Service Value

The final set of hypotheses have been largely developed from work from Li and Shang (2020), which focuses on the overall value of service in e-government and is widely cited by other scholars. Their consideration of aspects such as service (including SERVQUAL), touchpoints, information exchange, convenience and value encompass much of what this study has identified. This approach is echoed by work from Patrick and Marques (2024) who use Li and Shang's work to examine smart cities further identifying touchpoints and services providing quality, trust and social value. This has led this study to develop hypotheses based on their work. Jayanti and Ghosh (1996) see functional value (price and quality) as determinants of service value co-creation, adding to this Heinonen (2006) sees functional value both price and performance/quality as essential building blocks in e-service value creation. These

findings are echoed by other researchers (Toncar, Alon and Misati, 2010; Liu and Lee, 2016; Anggita and Ali, 2017; Kartikasari and Albari, 2019). In order to examine functional value in relation to perceived service value the next two hypotheses are proposed.

H13 - Perceived functional value (price/value for money) has a positive impact on perceived service value for expatriates.

H14 - Perceived functional value (performance/quality) has a positive impact on perceived service value for expatriates.

Emotion has been seen to have an impact on service (White, 2010) and on service quality (Slåtten, 2008). Emotional response has also been found to have an impact on service quality and behaviour (Chang, Wang and Yang, 2009). Building on this, emotional and social value have an impact on service satisfaction (Rasoolimanesh *et al.*, 2020). Raza *et al.* (2012) see social and emotional value in the creation of service quality and perceived value. Social and emotional value have been used to examine public sector service value (Surydana, 2017). This discussion leads into the final two hypotheses for this study below.

H15 - Perceived emotional value has a positive impact on perceived service value for expatriates.

H16 - Perceived social value has a positive impact on perceived service value for expatriates.

All these hypotheses have been tested using Structural equation modelling. Each of these hypothesis groups has been measured using peer review work that has already tested them in the field. The themes of information exchange within the city have been tested by using scales used by Barnes and Vidgen (2003), convenience of city services (Chang and Chen, 2008), touchpoints within the city (Jaakkola and Terho, 2021) and the city service experience (Verhoef, Franses and Hoekstra, 2002). For value dimensions Sweeney and Soutar (2001) have been used and finally for the perceived service value Li and Shang (2020) was chosen. All constructs have been tested using a 7-point Likert scale. The full questionnaire design can be seen in Appendix Three.

3.9. Summary

This chapter has explored existing literature to create a conceptual framework to assist with the data collection, drawing on the concepts of information exchange, convenience, experience and touchpoints, which have been used in other studies, to help understand value co-creation and the sharing economy albeit not necessarily with a focus on expatriates. Coupled with these constructs is the inclusion of established dimensions of value, which are used in many different contexts to help examine value creation and finally perceived service value which has been used in the city context. Out of this model hypotheses were developed to enable the model to be tested. It has also proposed some hypotheses which can be tested, the findings of which can be seen in later chapters.

4. Chapter Four – Research Methodology and Qualitative Study

4.1. Introduction

With a greater understanding of the topic area being drawn out of the literature review, it is now possible to examine the methodology of this study, beginning with the philosophical approach to learning that this study will follow, then moving on to discuss the research design that this study will adopt. This chapter will also discuss data collection and analysis techniques that will be used to address the research objectives. Finally, this chapter will examine the qualitative pilot study that was undertaken and its value to the study and how it shaped the wider qualitative data collection process.

4.2. Philosophy of the Study

Ontology refers to the understanding of the nature and structure of reality (Rawnsley, 1998). It also recognises that there are multiple realities. The ontology of this study is constructivism. Constructivism is a position that states that knowledge and skills are built up by the individual researcher through investigation. This building process is affected by outside environmental stimuli (Piaget, 1972). Constructivism also asserts that social actors in social phenomena create meaning, and this meaning is not fixed, instead it is continually adapting (Bell, Bryman and Harley, 2019). In addition, meaning is created from an interplay between the subject and objective (Liu and Matthews, 2005) and is likely to be both knowledge-driven and behavioural in nature (Peters *et al.*, 2013). Constructivism recognises the subjective nature of these constructs of the reality of the object itself (Liu and Matthews, 2005). It is the subjective nature of co-created value (Sweeney and Soutar, 2001; Ballantyne and Varey, 2006; Grönroos, 2011), central to this topic of study, that aligns with a constructivist ontological approach. This individual subjectivity or perspective recognises there is no single truth. Bunge (1993) and Grönroos and Voima (2013) point out the subjective nature of value creation. Holbrook and Hirschman (1982) and Holbrook (2006) state that value creation occurs through active experience, and Fosnot (1989) makes the point that constructivism means that people learn through an active process. Amineh and Asl (2015) go further, suggesting that within constructivism, knowledge comes from a 'meaning making' search when individuals construct their own interpretations of their own experience.

Annansingh and Howell (2016) make the point that constructivism, as a paradigm, focuses on understanding the social world through a subjective experience. Burrell and Morgan (1979) develop this further stating that constructivism attempts to understand the social world through the perspective of the actors directly involved in that experience. Again, the process of value creation is seen through the perspective of actors (Vargo and Lusch, 2008). Annansingh and Howell (2016) add that the constructivist approach seeks to understand socially constructed phenomena and is particularly used in the social sciences, the domain of this research.

Constructivism is not without its difficulties. Doyle (1997) recognises that as this ontology examines both knowledge and behaviour, connecting these two elements has proven difficult given that they are both influenced by external situation variables such as relationships. Epistemology looks at the nature of knowledge in relation to ontology and how that knowledge can be reached. "The central question addressed in epistemology is whether or not there are necessary and sufficient conditions for justifying belief and refuting scepticism" (Rawnsley, 1998, p.3). Constructivists take the view that to understand reality, which is a social construct, it is necessary to interpret meaning (Peters *et al.*, 2013). Thus, interpretivism is the epistemology for this study. It recognises that natural science methods cannot apply in social science research and that interpretations of reality that are constructed are culturally derived and historically situated. Interpretivism has been criticized for being subjective, thus leaving greater latitude for bias on the researcher's part (Doyle, 1997). Also, criticisms are levelled at primary data, and the collection of individuals' personal thoughts, experiences and feelings which cannot be generalised as it is in a positivistic approach (Staver, 1998). It is this generalisation that has led to a mixed-method approach to counter some of these criticisms.

This research will be primarily inductive, attempting to draw meaning from the participants as they construct their reality and potentially theory based on observations (interviews) of the participants' realities (Creswell, 2012). The inductive method has been used by Wortmann *et al.* (2020) to more closely examine value creation in an IoT city setting. However, it is recognised that value-in-use has

been difficult to measure because of its subjective nature (Verma, 2020). For this reason, authors such as Schiavone *et al.* (2020) and Hartwig and Jacob (2018) have used an inductive approach to their work.

Constructivism is based on interaction, interpretation and joint produced data with the researcher and the participant (Bell, Bryman and Harley, 2019). This has led to some criticisms in relation to bias. However, Glaser (2007) makes the point that bias should not be considered a vice, rather it is a variable in the social product of constructivist research and that if the research is applying any particular bias, then that is part of the research itself. Smith and Noble (2014) build on this by stating that bias exists in all research designs, and at all stages (plan, implementation and analysis) and that bias can have an impact on validity and reliability of a study. In addition, the lack of replicability in qualitative research has been expressed as a concern by scholars (Aguinis and Solarino, 2019) in terms of bias. Quantitative research can more easily be replicated by other researchers.

4.3. Mixed Method Considerations

This mixed method study encompasses both qualitative and quantitative methods. Qualitative research tends to fall into constructivist or interpretivism camps, while quantitative research is seen as producing clear outcomes that align more naturally with a positivistic approach (Park, Konge and Artino, 2020). Johnson and Onwuegbuzie (2004) reject this dichotomy, suggesting that only absolute purists do not recognise the benefits of both methods. They go on to suggest several different approaches when using mixed methods, suggesting that researchers should consider carefully what would best suit their research objectives, research questions, and overarching paradigm. They also point out that the research chronology may have an impact on which method may be dominant. Often, in sequential mixed methods, and in the constructivist foundation which this study is using, qualitative research is the dominant method. Developing this further Johnson, Onwuegbuzie and Turner (2007) suggest that during data analysis, quantitative data can facilitate the assessment of generalisability of the initial qualitative data, which can lead to new findings that otherwise would not appear with a pure qualitative approach. As Harrison, Reilly and Creswell (2020) suggest, quantitative analysis is used in this approach to elaborate and triangulate the data. Morse (1991) proposes that sequential qualitative

analysis followed by quantitative analysis helps to examine the distribution of phenomena within the population, while strengthening rigour in the results.

A mixed method approach is not uncommon in social science research and the value of combining different methods has been recognized by scholars (Morgan, 2007). Qualitative research enables the researcher to ask questions to explore issues and gain insight, while quantitative research enables measurement and prediction in order to generalize, providing wider potential usage (Dures *et al.*, 2011). While others point out that in trying to understand a social world with multiple viewpoints (as is common with a constructivist approach), multiple methods are more suited to this undertaking (Greene, 2008).

There are a number of reasons why this study has taken a mixed method approach. Qualitative research allows a greater understanding of the value related issues, while quantitative research enables a generalization of the findings with a larger group (O'Cathain, Murphy and Nicholl, 2007), providing confidence of application to other cities beyond Dubai. Most mixed method research is qualitatively driven (Dures *et al.*, 2011) as this study is. In addition, qualitative research supports researchers in generating hypotheses for quantitative data collection (O'Cathain, Murphy and Nicholl, 2007). It is recognized that both methods may not perfectly align, however that is not the goal, the important element is that of understanding meaning (Dellinger and Leech, 2007). This is echoed by Creswell and Plano Clark (2007), who recognize that greater understanding is created by using both methods rather than one alone. Triangulation is also seen as a benefit of the mixed methods that this study wishes to capitalize on. By using two methods of research a more in-depth understanding of the research objectives can be formed (Mertens and Hesse-Biber, 2012; Venkatesh, Brown and Sullivan, 2016). Qualitative research has often been criticized for lacking objectivity, by contrast quantitative research comes under fire for lacking meaningful interpretation (McKim, 2017). Therefore, a mixed method could be argued to provide a more balanced approach to research (Morse and Chung, 2003), which is what this study aimed to produce when examining expatriates within the smart city context. Taking a

more practical view Ormerod (2010), suggests that justification for methods should be based on what works in practice.

Mixed method research is also highlighted as beneficial when addressing 'bottom up' real world experience, when information is sought to take action and when audiences for the research are different stakeholders (e.g. academic and professional) (Dures *et al.*, 2011). This research is very much examining the real-world experience of expatriates and while an academic audience is in mind in the writing, given the rise in smart cites around the world, practitioners are not to be forgotten here. Their need to develop and improve city services is part of what this study will try to assist.

4.4. Research Bias

While bias cannot be entirely eliminated, it can be recognised. To address issues of validity and reliability outlined above, Mackieson, Shlonsky and Connolly (2019) suggest actions that can be taken to enable a greater understanding of the process by the researcher and accessible to others, these include publication of rationale for literature review and research plan, inclusion criteria for participants which is detailed in Table 4.2, interview questions outlined in Table 4.3 and questionnaire questions (Appendix Three), an audit trail for the codes that are developed and a detailed codebook. These actions are supported by Roberts, Dowell and Nie (2019). In addition, reflexivity is also suggested to aid the researcher in developing rigour and quality. This is the process of recognising that the researcher impacts on the study and that their background (race, age, socio-economic status, culture background), identification of this, can help increasing the credibility of any findings while enabling the reader to better understand the creation of knowledge (Berger, 2015).

Table 4.1. Researcher's background

Criteria	Researcher
Race	White British
Age	45-50
Education	Master's degree qualified
Social Background	Middle class

Income	Moderate
Political views	Liberal
Religion	Agnostic, raised Church of England

Based on Berger (2015) and Teh and Lek (2018), adapted by Author.

Dodgson (2019) makes the point that reflexivity can only be understood through the experience of doing it. Dodgson also provides helpful advice on how best to present reflexivity in research as it progresses. Firstly, identifying the social context the research comes from is key and is outlined in Table 4.1. However, she goes on to state that the majority of reflexivity takes place in the data collection and data analysis section of research work as the researcher themselves consider their own position as they elicit data and analyse it. This transparent approach is designed to provide some level of reliability, as well as leading to both rigour and quality, while not forgetting that constructivism cannot ignore the impact of the researcher in knowledge creation.

4.5. Research Design

The literature review (Chapter Two) identified very few mixed-method studies relating to this topic; only a handful compared to much more widely used qualitative and quantitative data collection and analysis methods. This study has used a mixed-method approach following the explanatory sequential rigours mixed methods approach detailed by Harrison, Reilly and Creswell (2020). The data collection has been approached in two stages, the first stage being a qualitative stage, the second being quantitative. This sequential approach is designed to address the research aim, objectives and questions outlined in Chapter One.

Stage one has used qualitative methods to draw out rich data collection to enable a detailed thematic analysis. Based on those themes, stage two, which is the quantitative part of the research design, has used a questionnaire which has been developed based on the findings of the thematic analysis in stage one. The aim of the second stage is to generalise with a larger sample those elements that were drawn out of the smaller qualitative sample (Franklin, 2008; Niño-Zarazúa, 2012). Emerging themes from the literature and stage one have provided a range of operationalised variables for stage two in order to

obtain measurable results. This process is defined by many as 'QUAL+quant' (Johnson, Onwuegbuzie and Turner, 2007) as the qualitative element is dominant with the quantitative element being a confirmation of what has emerged from the qualitative.

4.5.1. Data Collection - Stage One – Qualitative

The first stage of this research was undertaken via semi-structured interviews using open-ended questions, as qualitative approaches can bring more rich and detailed data from respondents (Carey, 1996; Weller *et al.*, 2018; Hennink, Hutter and Bailey, 2020). Interviews focused on expatriate users of the co-creation sharing smart city services based in Dubai. A purposeful sample of 22 expatriate users was used, in keeping with similar work from Neumann *et al.* (2019), Akhmedova, Mas-Machuca and Marimon (2020), Valk (2021), Lopes, Macadar and Luciano (2019) and Bagdoniene and Valkauskiene (2018). Research findings from Boddy (2016) suggest that at least 12 participants are needed for qualitative data collection. Other studies identified in the literature review propose larger samples, e.g., 20 participants (Järvi, Kähkönen and Torvinen, 2018; Laczko *et al.*, 2019; Prohl and Kleinaltenkamp, 2020; Palgan, Mont and Sulkakoski, 2021). The choice of semi-structured interviews is supported by Peralta *et al.* (2020), Butler, Yigitcanlar and Paz (2021) and Hartwig and Jacob (2018), who identify them as a common tool for identifying customer value. Additionally, Leroi-Werelds (2019) recognises the value of this approach to uncover personal and situational views and experience of value. Liu *et al.* (2019) state that semi-structured interviews provide the freedom to explore the participants' ideas and perceptions, while providing a structure that enables some level of standardisation for data analysis.

The selection criteria for participants are detailed in Table 4.2. They are designed to allow a large pool of potential expatriates who are familiar with Smart Dubai to be recruited. The main exclusion criterion is having Emirati nationality, which would mean that someone is not an expatriate and thus is outside the scope of this study. The focus on expatriates will also aid the research in having a more global application to the research outcomes (Polson, 2015; Kirk, 2021; Valk, 2021).

Table 4.2 - Criteria for participant selection

Inclusion criteria	Exclusion criteria
Not Emirati.	Emirati national.
Residing in the UAE for at least one year.	
Has used Smart Dubai digital services in the last month.	
Has been using Smart Dubai digital services for longer than 6 months.	
Over 18 years of age.	
English speaking (but not necessarily first language).	

Based on Bouzguenda, Alalouch and Fava (2020) adapted by Author.

The interview questions were based around the smart cities dimensions model (Giffinger and Gudrun, 2010) as well as drawing on other work that has examined connected topic areas; see Table 4.3. The questions have been designed to draw out detailed and rich data about individuals' views and experiences of value within Smart Dubai, how they engaged in co-creation of city services, and the rationale for choosing their services such as utilities, transportation, healthcare, education, police, and housing (Digital Dubai, 2020) over traditionally created products and services (Hennink, Hutter and Bailey, 2020). The value these individuals gain for co-creation, both pre- and post-purchase, patterns of usage, and how involved someone is in the co-creation, have been examined. Researching these stakeholders will enable the researcher to triangulate data from different perspectives and analyse commonalities and variations as covered in Chapter Seven. Thematic analysis was then used to draw out key themes which have formed the basis for a conceptual model based on user value in a smart city as well as the formation of the hypothesis which will be tested in stage two of the data collection process as part of the QUAL+quant mixed method approach (Morgan and Hoffman, 2021).

Table 4.3 – the connections amongst RQ(s), RO(s) and interview questions (simplified version to be created for use by interviewer in interviews) – source Author.

RO's	RQ's	Question Number	Essence of the interview question	Suggested Prompts (used at interviewer's discretion)	Sources of interview questions (adapted from)
			Name Age bracket		(Chevtaeva and Denizci-Guillet, 2021)

			Country of origin Time in UAE as an expat Is the UAE your country of employment?		
RO1	RQ1	1	Where do you most engage with City services? Why?	Apps Customer Service Centres (physically or via call centre) Self Service Kiosks	(Priporas, Stylos and Fotiadis, 2017; Simonofski *et al.*, 2021)
RO1 RO2	RQ1 RQ2	2	When engaging with city services, which type of services are you using?	RTA Dubai Health SPS Dubai Police DubaiNow DEWA Federal Authority for Identity and Citizenship (ICP)	(Giffinger *et al.*, 2007; Ranchordás, 2020)
RO1 RO2 RO3	RQ1 RQ2 RQ3	3	What benefits and/or drawbacks to you see from digital smart city services?	Ease of Use Time Convenience Ease of Access	(Dreyer *et al.*, 2017; Wang *et al.*, 2019; Innocent and François-Lecompte, 2020)
RO3	RQ3	4	What areas of service would you be prepared to get more involved in?	City Planning Citizen Advisory panels	(Berntzen and Johannessen, 2016; Zandbergen and Uitermark, 2020)
RO3	RQ3	5	What impact does other users' activity on digital smart city services have to benefit you? What do you feel you contribute?	Alhosn App Traffic information 1 Billion Meals	(Hartwig and Jacob, 2018; Malone, McKechnie and Tynan, 2018; Chevtaeva and Denizci-Guillet, 2021)

				Feedback Surveys Careers App Dubai Pulse App Salik App mParking	
RO1 RO2	RQ1 RQ2	6	Can you tell me about how smart city services impact your life in Dubai? How does this compare with your home country?		(Lendel *et al.*, 2021)
RO1 RO2 RO3	RQ1 RQ2 RQ3	7	Is there anything else you'd like to add about your experience with smart city services in Dubai?		(Lee, McLoughlin and Chan, 2008)

The decision to examine the stage one data through a thematic approach, rather than something like Grounded, is based on work from Braun and Clarke (2021), who are some of the most prolific authors on thematic analysis. They recognise the value in both thematic and grounded and provide a helpful guide to the researcher in selecting a suitable analytical tool. They suggest that thematic analysis could be used over grounded theory when researchers are looking to identify patterns in data. Thematic is helpful in describing and interpreting those patterns and, finally, when sample sizes are small, thematic can be more effective. While grounded theory also provides a useful tool for qualitative analysis and building theory from the ground up, there are drawbacks to it. As Bryant and Charmaz (2007) highlight, grounded theory can produce large volumes of data which can be a challenge both to manage and to analyse and it lacks a structured process that thematic provides. Benoliel (1996) points out that grounded analysis can sometimes focus on the description, rather than discovery of theory. Becker (1993) echoes this, stating that many researchers using grounded theory are focused on finding data that allows them to create a theory that meets their research problem, rather than allowing the data to take them on a journey of discovery.

4.5.2. Data Collection - Stage Two – Quantitative

Stage two has taken themes identified in stage one by breaking those themes down into measurable variables in a process called operationalisation (Morse, 2008; Morgan, 2015). With these variables it has been possible to begin to measure aspects of themes on a larger sample. These variables have been taken from existing articles. It is important that the variables used are both valid (capable of examining an aspect of the theme) and reliable (the accuracy of that variable and its ability to be replicated) (Morgan, 1998; Barab *et al.*, 2007). Adding to the issue of validity and reliability, the full stage two data has been subject to a Cronbach's Alpha test.

As mentioned earlier stage two has built on the responses from semi-structured interviews, drawing out key themes through thematic analysis to develop a series of questions for an online survey which was distributed to a much larger sample of expatriate Dubai residents. An appropriate sample size is determined by a sample size calculator (RoaSoft, 2004), which details a sample size of 385 based on an expatriate population the size of 2 million in Dubai, a confidence level of 95% and a confidence interval of 5%. Confidence level and interval figures are based on work from Morris (2003). Findings from Krejcie and Morgan (1970) suggest that a sample size of 385 is suitable for any population size over one million and therefore suitable for all quantitative studies. However, it is recognised that to achieve this sample size, many more potential participants must be contacted. Grossmann *et al.* (2018) suggest that a response rate to questionnaires can range between 10% to 25%. Phillips and Phillips (2004) agree with this return rate and go on to suggest ways to optimise the return rate. These include making the questionnaire as simple as possible, making it appear professional (using a platform such as Survey Monkey or Microsoft Forms), simplifying the response process using web or email, indicating how long the questionnaire is likely to take, and clearly stating the purpose of the questionnaire and its purpose in the overall study. The sample size of this study ended up being 482 (N=482).

A convenience sample will be used to collect quantitative data (Luo *et al.*, 2019). While this type of sample is most straightforward to collect from, it can present difficulties for quantitative analysis in that it may not be representative of the population, so it is important to examine the profile of the

respondents. Convenience sampling was chosen partly due to its wide usage in many of the papers examined for the literature review (Pantano and Priporas, 2016; Scandelius and Cohen, 2016; Hsieh *et al.*, 2018; Luo *et al.*, 2019; Staletić *et al.*, 2020) which suggest its appropriateness in addressing issues related to co-creation, citizen interaction in smart cities and service quality. It is also selected due to its ability to access a wide range of potential respondents (Etikan, 2016) along with the efficiency of the method, the ease of implementation, and its ability to meet participant inclusion criteria (Jager, Putnick and Bornstein, 2017). Nonetheless, convenience sampling is not without drawbacks. It limits the ability to extend the results of the study to the general population (Acharya *et al.*, 2013), and it presents a problem of outliers that can skew the data (Farrokhi and Mahmoudi-Hamidabad, 2012). Stratton (2021), while acknowledging these issues, suggests this should not be a barrier to using this sample method. Indeed, he goes on to recommend some actions to mitigate some of the issues identified, such as avoiding vague study objectives (see Chapter One), developing clear inclusion and exclusion criteria (see Table 4.2), recruiting as many participants as possible, describing characteristics of the data (this has been done in a later section), using diverse approaches to collecting data, and validating the questions used. Participants were recruited from social media groups for expatriates such as https://www.facebook.com/groups/Dubaiexpat/ and LinkedIn. This is in keeping with work from Liang, Lin and Hou (2021) who suggest that as sharing platforms are available online, participants should also be recruited online. This is supported by Selmer *et al.* (2018) who also use online recruiting to successfully engage with participants.

4.6. Data Analysis

Using qualitative and quantitative data has enabled the study to draw on the best aspects of both methodologies; qualitative can draw out rich lived experiences and quantitative data's ability to look at more generalised trends (Harrison, Reilly and Creswell, 2020). Using explanatory sequential design (Lugo-ocando, 2020) has facilitated the integration of both types of data, leading to a more robust validation of data as a whole and a greater understanding of the validity of the responses from the in-depth interviews.

4.6.1. Thematic Analysis

Thematic analysis has been used to examine the data collected in stage two via interviews. An inductive approach to thematic analysis should allow the researcher to examine themes that arise and how frequently, what issues and ideas the participants have raised, and how that links into the literature review and other material discovered during the lifetime of this research project. Braun and Clarke's (2020) six-phase approach has been followed to code, examine and analyse the data and reach detailed conclusions that address the research questions. The phases of thematic analysis will be followed within this work. These phases are 1. Familiarizing yourself, 2. Generating initial codes, 3. Searching for themes, 4. Reviewing themes, 5. Defining and naming and 6. Producing the report (write up). This process has been outlined by Braun and Clarke (2006, 2020). Thematic analysis has been used by many of the researchers examined in the literature review (Hartwig and Jacob, 2018; Albin Shaikh, Purchase and Brush, 2019; Dey *et al.*, 2019; Schiavone *et al.*, 2020).

NVivo has been used to support thematic analysis of stage one data. Hilal and Alabri (2013) suggest that software tools such as NVivo enable researchers to more efficiently code their data, work more methodically, and obtain greater rigour. Bazeley (2009) adds that NVivo provides key elements that are important to qualitative analysis, managing and organisation data, managing ideas, query and retrieval of data, visually representing and modelling data, and reporting on data. These are activities that have traditionally been associated with quantitative analysis in software such as SPSS; they are now more readily available to the qualitative researcher. However, computer-assisted qualitative data analysis software (CAQDAS) is not a panacea for all issues relating to qualitative analysis. Seidel (1991), Gilbert (2002) and Dean and Sharp (2006) warn that software may guide researchers in a particular direction rather than allowing them to uncover key findings. Adding to this, Sapat *et al.* (2017) outline some drawbacks to be wary of when using software in the analysis stage, such as over-analysing codes, rather than interpreting what the codes provide in terms of meaning; coding and quantifying rather than focusing on the whole research outcomes; and finally failing to recognise that it is a tool, not a methodology. Fielding (2000) suggests that any use of software in coding and qualitative data analysis is contrary to interpretivist research, while Welsh (2002) suggests this kind of software

allows a researcher to interrogate their data much more effectively and build meaning. To mitigate some of the concerns around the use of software within qualitative research, Bazeley (2009) adopts a framework to use when developing meaning from the data; 'describe, compare, relate'. The first step, 'describe' looks at what the data has said, what interviewees have discussed, and how many of them have done so. The next step, 'compare', looks at how frequently similar themes occur and in which groups. Finally, 'relate' is when the researcher compares data to other themes that have been identified, what they might mean to one another and under what circumstance did these themes appear. These steps are repeated throughout the research with every theme. Bazeley (2009) also encourages revisiting this process throughout the stage of analysis. This approach has some synergy with the thematic analysis process (Braun and Clarke, 2020). A combination of thematic analysis and Bazeley's three steps has provided clear themes drawn from the data collected.

4.6.2. Refining the original conceptual model

The results from the first stage of data collection (semi-structured interviews) contributed to the evolution of the conceptual model (see Figure 3.1) which was based on the literature review in Chapter Two. The qualitative findings confirm the following:

The exchange of information to and from the city was an element that frequently was raised by interviewees. Many discussed information relating to utility activation, management and billing and vehicle registration and fines. Others pointed out the value of only needing to input data once and found it available in other applications without the need for re-entering the same data, as well as the single-entry point that the UAE PASS affords users. The importance of security of data was also cited by interviewees. These points help to provide validity in the decision to include information exchange into the conceptual model. The literature does highlight this to some degree, often in the commercial context and while security and use of data had been explored in the public service context it had not been looked at broadly, the interviews provided further confidence of its suitability for use in the quantitative data collection stage.

Convenience is a construct that is widely cited in the literature in relation to commercial service provision (Vale and Ventakash, 1986; Seiders *et al.*, 2007; Kaura, 2013), but to a lesser extent in the public sector value creation literature. The discussions of convenience within the quantitative data collection provided reassurance that this was a suitable construct to be used in the conceptual model. Interviewees would often make statements such as 'The app or service was convenient, or they 'found something convenient to use.' The highlighting of convenience also led to the creation of a new item (C4 City services save me time), which was included in the quantitative data collection stage. This will enable the research to have a better understanding of the impact of time on the construct of convenience in the Dubai expatriate context as well as being useful to other researchers as time is a consideration of some of the convenience literature. Convenience is often seen through the lens of timesaving (Srivastava 2014), and this does appear to be relevant to the interviewees. Building this item into the preexisting construct of convenience will provide a better understanding of its importance with the wider quantitative sample of expatriate residents.

Touchpoints were discussed by participants in a wide range of aspects of interaction with the city, from payments to service provision, and information access. In most cases this was interviewees primary contact point with the city. These are all seen in the commercial sector (Bolton *et al.*, 2022), however less so in the city context (Kabadayi *et al.*, 2019). The term 'touchpoints' is often used in relation to customer journey mapping in digital marketing practice, its use as a construct is more recent than the other constructs that make up the conceptual model. The qualitative findings added to the suitability of the use of touchpoints in the quantitative stage, with most interviews framing their discussion through the digital contact points or touchpoints they used. E.g. 'I use the DubaiNow app' or 'I used the DEWA website.' Again, the qualitative research provided confidence that the construct was valid and from it an additional item was created for testing in the quantitative stage (T5 The city provides a wide range of connection points for me to access services). The rationale for this is that touchpoints are such an important aspect for the interviewees in terms of engagement through a range of channels which was not fully covered in the existing construct's original items. Given the importance that Dubai expatriates placed on a range of different touchpoints it was felt important enough to add the additional item to

make the construct more fulsome and relevant to the city context. Additionally, a few interviewees had minor concerns about too many apps and websites. It will be important to understand if the range is too big and rationalising the touchpoints may be relevant in the Dubai context. This is also something that is not addressed in the existing construct, on which the qualitative element can help develop the construct and the overall conceptual model further.

In terms of experience the qualitative data stage had highlighted a great deal in relation to physical experience, as such customer service centres, parks, and recycling centres. These points have been covered in previous literature although rarely as one construct, the interview responses provided reassurance that use of the construct was suitable in the city context. Additionally, the responses from interviewees in relation to the experience provided validation that a new item could be included in the quantitative data collection (E5 City services are responsive to my needs), as many respondents had expressed how well the different service experiences fitted their needs. Responsiveness is something that is encapsulated in SERVQUAL discussion being a key aspect of service value. Value creation is a two-way process and the smart city concept itself is intended to be reciprocal, it was felt that an item capturing the responses of a city user and how effective that response is would be needed to shed further insight into the value creation process. The responsiveness or otherwise may have an impact on usages and perceptions of value creation. A service that was not responsive to what was needed may have an impact on the overall perception of service quality or even an impact on co-value destruction, which one or two responses had mentioned in relation to poor service provisions. A service experience that responds to individual needs is likely to be used again, whereas a poor or unresponsive service is unlikely to be engaged with on a regular basis. Responsiveness, like value, is in part subjective which is why identifying it in qualitative data collection has been valuable. However, only by adding this item will it be possible to gain some insight into this aspect of the smart city experience for expatriates and its impact on the conceptual model.

Participants often discuss value in different ways; terms such as price, performance, social and emotional led to confirmation that Sweeney and Soutar's (2001) dimensions of value are more suitable.

Terms such as utilitarian, hedonic, knowledge and spiritual were not seen, therefore value frameworks from other authors (Mbama and Ezepue, 2018; Wang *et al.*, 2019; Innocent and François-Lecompte, 2020) were not favoured in the construction of the conceptual framework. Additionally, despite the fact that Smart Dubai has its focus on suitability, very few interviewees explicitly discussed this, as such the green value framework was also not adopted as part of conceptual model (Chang, 2019).

Many of the constructs used in the conceptual model have originated from the literature review, and as can be seen above were, refined by the quantitative data collection. The actual hypotheses themselves have been informed and guided by examining the interviewees' statements in relation to the constructs. Information exchange was cited as valuable in relation to performance and social value. Convenience was cited by all participants in relation to price, performance and emotional value, but not social. Touchpoints were cited by many different participants in relation to all of the four value dimensions. Finally, data from interviews led to hypotheses linking experience to performance, social and emotional value. A more detailed exploration of how the qualitative data aligns with the quantitative constructs can be found in Chapter Five section 5.9 onwards.

4.6.3. Structural Equation Model (SEM)

As Johnson, Onwuegbuzie and Turner (2007) claim, qualitative data can greatly assist in the creation of quantitative data collection, by helping form conceptual ideas that can be examined with a larger sample. They go on to add that quantitative data can assist in the generalisation of qualitative data collected, with which both Franklin (2008) and Niño-Zarazúa (2012) agree. With this in mind, the themes drawn from the code book in stage one will be used to identify variables, and to find standardised measures of these variables, in order to gather views from a wider group and provide greater insight into the research objectives and questions.

The data from stage two, quantitative data collection, has been analysed descriptively to understand the sample in much greater depth before moving on to inferential statistics (Allanson and Notar, 2020). The validity of the data was examined by using SPSS, before moving to AMOS to undertake the structural equation modelling (SEM) which was used to examine the relationship between constructs

(Morris, 2003; Gao and Scariano, 2021). Structural equation modelling is a comprehensive approach for statistical analysis to test hypotheses relating to the relationship between latent and observed variables (Hoyle, 1995). It also provides a methodology for estimating and testing theoretical frameworks (Rigdon, 1998) and is used widely in social science research (MacCallum and Austin, 2000).

The results from both stages have been used to determine the outcomes of the research in relation to research aims, objectives and research questions. Not only have areas of compatibility been identified but also areas where qualitative and quantitative data may contradict can be examined to provide insight into the aims, research objectives, and research questions of the study (Jonsen and Jehn, 2009).

4.7. Qualitative Pilot Study

A pilot stage was undertaken for the interviews. This allowed for identification of any error, or ambiguous elements not previously identified by the researcher (Lanphear, 2001). Pilot studies are also helpful for assessing the practicality of a study and avoiding problems before moving on to a full-scale study (Thabane *et al.*, 2010). This is echoed by Perry (2001) who states that it also provides feedback to make improvements or clarification to the interview structure and script as well as any other unforeseen issues. The pilot study involved three interviews of participants who meet the inclusion criteria outlined in Table 4.2, feedback from which was helpful in informing improvements to the interview process (Thabane *et al.*, 2010). However, Ismail, Kinchin and Edwards (2017) and Kim (2011) make the point that a key benefit of a pilot study is to inform the researcher of potential adjustments and revisions, rather than to fully represent the results of the final work.

The decision to use pilot data in the larger study is the topic of some debate. Lancaster, Dodd and Williamson (2004) state that pilot data should not be used, whereas Thabane *et al.* (2010) state that this can be done as it often increases the efficiency of the main study. Van Teijlingen and Hundley (2002) agree with the latter authors, and further add that qualitative research in particular is progressive in nature thus pilot data can be subsequently built upon. However, they add that this needs to be clearly documented. Indeed, the debate is not just regarding the subsequent use of pilot data, but rather whether

pilot interviews add value. Holloway (1997) feels that in qualitative research pilot studies are not needed at all, whereas Ismail, Kinchin and Edwards (2017) feel that pilot studies are beneficial for novice researchers. Kim (2011) suggests that pilot studies can add rigour to a quantitative study. Pilot studies can also aid in reflective practice as the researcher comes to grips with their own position in the context of the research (Wray, Archibong and Walton, 2017). The value of a pilot study has been highlighted by authors such as Vogel and Draper-Rodi (2017) and Van Teijlingen *et al.* (2001). Being able to test the data collection process, the instruments of data collection and the approach of the interviewer prior to rolling out to the full sample are all beneficial to researchers, not only to saving time, but perhaps more importantly so that research objectives can be met.

With this in mind the researcher conducted a pilot to test the viability of the data collection tool for stage one of the research, that of semi structured interviews. Three interviews were held between 10th June 2022 and 24th June 2022 to test the viability of the interview script detailed in Table 4.3, with participants fitting the inclusion criteria (see Table 4.2). Interviews were between 31 minutes and 47 minutes in length, this length of the interviews was one indication that the interview script was suitable to facilitate discussion around the topic (Bush and Parasuraman, 1984). In addition, during the interviews participants would often naturally move onto the next topic within the script without being asked, providing a more natural flow to the discussion (Doody and Noonan, 2013).

As noted above, the flow of the interviews themselves was well received and they provided a platform for an engaged dialogue with the participants. However, one change that has been made to the interview script was in the order of questions. Originally question 1 asked ‘Where do you most engage with city services?’ followed by question 2 ‘When engaging with city services, which type of services are you using?’. Participants appeared to be more comfortable with discussing the types of services before expanding on where these services were being accessed. This was put in place when interviewing the full sample. Given the success of the pilot and the limited changes made to the interview script it was decided to include responses from the pilot in with the rest of the qualitative data collection, which is

in keeping with some of the academic work explored earlier (Van Teijlingen and Hundley, 2002; Thabane *et al.*, 2010).

The value of a pilot study has been highlighted by authors such as Vogel and Draper-Rodi (2017) and Van Teijlingen *et al.* (2001). Being able to test the data collection process, the instruments of data collection and the approach of the interviewer prior to rolling out to the full sample are all beneficial to researchers, not only to saving time, but perhaps more importantly so that research objectives can be met.

Interviews were recorded and transcribed using Otter and checked for accuracy before being imported to NVivo software to examine themes, using Braun and Clarke's (2020) thematic phases. As this is an initial pilot study there is no intention of following process entirely at this stage. However, the early phases of familiarisation with the data and initial coding are helpful in examining whether the responses from the pilot participants begin to provide some insight in relation to this study's research objectives.

Although this pilot study involved only a small number of respondents, the breakdown of which can be seen in Table 4.4, three themes were evident, along with evidence of other emergent themes. The emergent themes have not been examined in the pilot stage but may become more prominent as the data collection moves to a wide sample size.

Table 4.4 – Pilot study participant breakdown – source Author.

No	Participant Code No	Occupation	Age Range	Sex of Participant	Country of Origin	Time as Expat
1	P1	Learning Development Specialist	55-65	Female	UK	7 years
2	P2	Lecturer	45-55	Female	US	9 years
3	P3	Entrepreneur	35-45	Male	Philippines	15 years

The initial themes that emerged from the interviews are.

1. The value of convenience and time saving

2. Connectivity of service

3. Co-creation & sharing.

Convenience and time saving is a theme that came up frequency and respondents associated a great deal of value to a range of city services. In reference to the automated passport control gates at Dubai International Airport (DXB) airport, one respondent states;

> *So smart gates is a lovely, lovely thing. So I remember getting stuck in our long queues coming off planes, and that just doesn't happen anymore. Or at least I haven't experienced that. But then to be fair, I haven't travelled a lot recently. But yeah, I like the smart gates. I haven't been through one of these tunnels yet where they recognize your biometric information. That'll be interesting. That's quite Big Brother. P1*

Building on this, another respondent had this to say in relation to the Alhosn App, which is an app designed to store vaccination and PCR information to allow access to public buildings in Dubai:

> *I was using the app for some time, but now it's a convenient app in having your updated information, your vaccination information. So you know when you need to travel, it's a matter of just, you know, opening the app and it's great that the record is updated. P3*

This is a theme that is reflected in the literature (Okwechime, Peter and Edgar, 2018) as well as building on work by Ratten (2020) who has examined the effects of Covid on value creation.

However, it is fair to say that not all the experiences around the services were necessarily positive. One respondent, outlined some time-wasting issues when trying to obtain a Covid vaccination through the Health Ministry app.

> *[Apps]don't give you any information. So there was more than once that I took time off from work, went all the way down to Parks and Resorts and I got there and they said, Oh, we're out of vaccines for the day. Why wasn't that on my app because I have to open it up to show them anyway when I enter to show them that I have an appointment. So why don't they just have a pop up saying, We're sorry if you have an appointment at Parks and Resorts today, come back tomorrow P2*

This provides some evidence of co-destruction which is also highlighted in research from Galdolage (2021) and Smith (2013). Although preliminary in nature, this theme of value of convenience and time saving begins to provide some insight in relation to research objective one.

Connectivity of service is another theme that arose from the pilot. One respondent pointed out the value of data and people being connected to one another.

> *But there is a level of connectivity. So very often you'll go into a service and all you have to provide is your Emirates ID and that's enough to unlock a lot of information about yourself. So there's a lot of information held electronically by lots of different agencies and they appear to share it. I think the most useful one was during the pandemic. P1*

Another respondent was keen to point out the value of being connected to a range of services through the peer-to-peer app Careem. Work from Köbis, Soraperra and Shalvi (2021) suggests that Careem is a significant presence in the sharing market in the UAE.

> *A lot more services are integrating multiple services. So now with Careem you can get a Covid test. You can get groceries, you can rent a car. They've got a whole host of services. P2*

Value of connectivity is reflected in work from Bagloee *et al.* (2021) and Markman *et al.* (2021) and this theme begins to shed light on research objective two.

Finally, the theme of Co-creation and Sharing came out of the pilot. A number of comments were made, firstly in relation to travel and the usefulness of traffic data;

> *Really useful because if there was an accident near Mirdif, City Center Mall, I would then go in a different route. So that kind of way they're tracking people's travel and picking up when the lines go red, and then letting people know traffic management is good to here. And it's very, very useful and I couldn't benefit from that unless all of those other people were trapped as well. P1*

Traffic management is highlighted in much of the literature around smart cities (Toh *et al.*, 2020; Hsiao, Wu and Li, 2021). In particular, Okai, Feng and Sant (2019) (2019) recognise the importance of traffic management to citizens, as well as Mefolere (2016) who examines the positive effect of social media in aspects such as traffic reporting, while work from Šiuškaitė, Pilinkienė and Zvirdauskas (2019) recognises the importance of traffic management in relation to the sharing economy. Looking more broadly, another respondent felt that the peer to peer sharing of information was hugely beneficial in the city environment.

> *I think for myself and for many expatriates, we rely on these things because we live in such a dynamic environment and things are constantly changing. And so to be updated, we don't normally have one source of information to go to. The news is, you know, most of the time, limited in the information that they post. And so we tend to rely on conversations with others who have had experience with that. And I think yeah, that's how we get to learn some of these things here. P3*

The participant also added the benefits of sharing in relation to mobility.

> *So it's great that you know, they've shared the information and made it portable for people like us for mobility reasons for, you know, within the emirate and outside of the country, you know, inter emirate check in to hotels as well. It's part of the requirement here. So, so yeah, I mean, it's a great convenience to have that. Yeah. P3*

This interconnectedness of smart communities is in line with work from Lima (2020) and Polson (2015) who look specifically at mobility and expatriates. Both the references above help build understanding in relation to Research Objective three.

With this in mind, it is perhaps fair to say that the interview script itself was sound, and an appropriate document to use with a large group to investigate the research objectives that this research is seeking to understand. In addition, Sampson (2004) suggests that researchers reflect more widely on their experience and that of the interviewees. This researcher felt the pilot was better than expected, touching on the aspects of the research that this study is looking for. In some cases, the knowledge of the participants about the aspects of the smart city they live in was greater than expected and this does provide a basis to perhaps be more in-depth with future interviews to gain further insight. Participants also commented that they had enjoyed the experience it had given them. This suggests that the interviewer's style is also suitable, this rapport with participants provides a safe space to share experiences and is also helpful in gaining research data going forward. This is reflected in work from Malmqvist *et al.* (2019) and Sampson (2004).

4.8. Summary

This chapter has outlined the research philosophy that underpins this study, before moving on to introduce the research design this research has followed. The chapter also details the two stages of data collection, the first being qualitative semi-structured interviews, which is the dominant method in this

mixed method approach, the second stage of data collection is that of questionnaire designed to confirm the results of the qualitative stage with a larger sample. The chapter goes on to detail the data analysis techniques that will be used to draw insight from the data, that of Thematic Analysis and Structural Equation Model. Finally, the chapter covers the pilot qualitative study, which allowed the researcher to test the interview script, which was found to be suitable and therefore used for the wider study which is explored in the next chapter.

5. Chapter Five – Qualitative Data Analysis and Quantitative Pilot Study Findings

5.1. Introduction

This chapter will explore the themes identified from qualitative data collection. Four themes have been identified: information exchange with the city, convenience of city services, touchpoints within the city and, finally, city experience. This chapter will take each theme one by one and examine the value creation that has been identified using direct quotations from participants and supported with published literature related to that aspect of the theme. Having identified these key themes in this chapter, it is now possible to develop a conceptual framework for value creation based on the qualitative research, as well as setting some hypotheses to be tested with a larger sample group through quantitative data collection. This chapter also outlines the pilot quantitative study which was undertaken to ensure that the data collection method was suitable.

5.2. Sample Profile

Based on the criteria laid out in Chapter Four, the following participants detailed in Table 5.1, were recruited and interviewed. These interviews took place between 24th March 2023 and 17th April 2023, and they lasted between 25 minutes to 59 minutes in length.

Table 5.1 Breakdown of interview participants – source Author

Participant Code No	Occupation	Age	Gender	Country of Origin	Time as Expatriate
P1	Learning Development	55-65	Female	UK	7 years
P2	Lecturer	45-55	Female	US	9 years
P3	Entrepreneur	35-45	Male	Philippines	15 years
P4	Assistant Professor	35-45	Male	Argentina	5 years
P5	Admission Counsellor	18-25	Female	Pakistan	20 years

P6	Lecturer	45-55	Male	Australia	15 years
P7	Chartered Accountant	35-45	Female	India	10 years
P8	Lecturer	35-45	Female	Ireland	11 years
P9	Lecturer	35-45	Male	Turkey	5 years
P10	Sales Associate	18-25	Male	Sri Lanka	20 years
P11	Photographer	45-55	Male	Ireland	9 years
P12	Consultant	35-45	Male	US	3 years
P13	Marketing & Events Exec	25-35	Female	UK	7 years
P14	Marketing Professional & Consultant	35-45	Male	India	29 years
P15	Graphic Designer	55-65	Female	Australia	3 years
P16	Marketing Manager	35-45	Female	UK	26 years
P17	Researcher	35-45	Male	South Korea	3 years
P18	Lecturer	25-35	Female	Russia	4 years
P19	Lecturer	35-45	Female	Algeria	3 years
P20	Flight Attendant	35-45	Female	Russia	16 years
P21	Mental Health Counsellor	35-45	Female	Sudan	6 years
P22	Economist	35-45	Female	Greece	1 year

These twenty-two people represent a good spread of ages, genders, time as expatriates as well as being from a wide range of professional backgrounds and originating from many different parts of the world.

5.3. Identification of Themes

Following the approach laid out by Braun and Clarke (2006) the author spent time getting familiar with the data firstly by checking accurately the transcription and secondly by reading through the transcripts in full. The transcripts were then uploaded to NVivo to enable coding to begin. All transcripts were

reviewed and coded to produce a final set of codes (Appendix One). These 38 codes were used to develop key themes and sub themes that draw together the codes that have a close relationship to one another. The themes and related sub themes can be seen below in Table 5.2. A detailed exploration of the construction of these themes and sub themes is the focus of this chapter.

Table 5.2. Emerging Themes and Sub themes – sources Author

Theme	Sub themes
Information Exchange within the City	Access, use and collection of information
	Information inconsistencies
Convenience of City Services	Convenience
	Time wasting/saving
Touchpoints with the City	Channels
	Transactions
Smart City Experience	Tangible Physical Services Experience
	Intangible Experience

5.4. Theme 1 - Information Exchange within the City

Information is the cornerstone of smart cities; ICT provides the bedrock for smart cities to exist according to most modern definitions (see Table 2.4). So, it is perhaps no surprise to see this theme come out, the theme itself emerge from two main sub themes; one sub theme covering 'access, use and collection of information' and another looking at 'information inconsistencies'. The exchange of information is what makes a smart city work and provides value to the expatriate residents themselves. In relation to information, access to information was discussed by interviewees. This is evident in the quote below from a participant in relation to the information he was able to access from Smart Dubai.

> *Getting information easily whereas in the Philippines is all replication of the same information from one institution to another and you have to fill out forms and all of this. So you always you know, remember how easy it is here when you're in those settings. P3*

Work by Talari *et al.* (2017) discusses the benefit of centralised information in relation to smart cities and its power to inform individuals in a range of different city activities. This is echoed by Xu and

Geng (2019) who take this further in their identification of what they call ‘Theoretical framework of people-centric service intelligence’, which is based on Maslow’s hierarchy of needs and the stronger bond that can be fostered through communications. Work from Kim (2020) suggests that citizens are not isolated from city information. By contrast, a number of respondents had issues with the access to information, one summing it up as follows;

> *And it's a better way of working out what it's about, you know, access to information about the workings of the place. can be difficult to find here. You know, what, again, I said that's part of living here. P11*

This provides some evidence of co-destruction which is also highlighted in research from Galdolage (2021) and Smith (2013). Lack of information, either intentional or unintentional, can constitute, at least in part, co-destruction. The issue of communication with citizens has been discussed in work from Gooch *et al.* (2015) looking at a UK city, who state that communicating with smart city citizens can be challenging but is very necessary.

Linked to this access to information there was no firm understanding by respondents of what actually constituted a smart city. This is perhaps to be expected, given that within academia there is no one clear definition (see Table 2.4). Many respondents when asked about the smart cities services they use did not see a distinction between the services that the city provides and the private sector. This has some linkage to work from Magnussen and Rønning (2021) who discuss the linkage of public and private in value creation, they recognise that both sectors have a role in the creation of value and suggest that often citizens are interested more in the creation of value rather than the source. This confusion is perhaps illustrated well in the following quotes when respondents were asked unprompted about city services.

> *So I'm finding banking apps so useful? So again, it saves you queuing at the bank. So I will I do most of my banking now online, which I never used to do. But you know, there's always the opportunity there were always is always the time where you have to go and speak to somebody, but I've got a little guy that I target in my Emirates NBD and he always helps me used to be a student. P1*

Adding to this another interviewee said:

> *I'd say I mainly use bill or utility bill payments online, grocery shopping online. P19*

This issue was highlighted in a study by Kwak and Lee (2023) who have examined the past 20 years of the smart city experience in Korea. They found that there was confusion amongst stakeholders as to what a smart city actually provides. This confusion was also highlighted by Jameson, Richter and Taylor (2019) in their work examining the smart city of Amsterdam. Perhaps in the case of Dubai this confusion is in part to be understood as the UAE government does have a significant stake in many private firms, such as the telecommunications company du, which many people use to access the city services. Additionally, the city of Dubai does have links with private organisations to provide services which will be discussed in a later theme. It also suggests that there may be scope for the city of Dubai to provide clearer information as to what it does provide. Issues of poor, or lack of, communication were occasionally raised by participants, the value of connected information was strong. Many had seen benefits in various pieces of information being used in a joined-up way to add value. The UAE PASS was an often-cited tool for this. The UAE PASS itself allows individuals to authenticate their identity and access a range of documentation and services through one access point, rather than having to store or remember lots of different usernames and passwords (Breslow, 2021). Tools such as the UAE PASS led to the topic of the connectedness of information, which came out of the discussions.

> *I downloaded the application and sometimes I log in through the UAE PASS I think if I'm correct Yep. So what else I did I was interested in applying for a trade license and after to start the business etc. So I used again online every everything I did it online from documents required from UAE PASS applying to the free zone area everything came through. P22*

In conjunction with the UAE PASS, is the DubaiNow App, which is a one stop shop for all government services online, allowing users to access 50 applications with more than 22 government agencies (Mohasses, 2019). A number of respondents made comments about single apps or access points for governments service as being beneficial, with others bemoaning large number of apps on their phones which took up space.

> *I also use the DubaiNow application, which is the go-to buy is one generic application. P9*

Work from Vasilev and Ognyanski (2020), who have examined the DubaiNow app as well as similar apps for Moscow, Berlin and São Paulo, suggests that these types of apps are the 'fruits of connectivity'. They go on to suggest that they can lead to higher social added value. Social value is something that has been outlined as one of the main types of value by Sweeney and Soutar (2001).

This connectedness of information is dependent on collection of data by the city (Hasija, Shen and Teo, 2020) and this point is built on by Löfgren and Webster (2020) who state that within smart cities there needs to be a good relationship between stakeholders (including citizens) and efficient exchange of data to realize the benefits of the city. Participants were quite vocal on the collection of their data by the smart city. This feedback was both positive and negative, starting with the negative, where concerns about misuse of data were apparent.

> *…you kind of hear some kind of funny things people think caught on, you know, wrongly caught, you know, so maybe some kind of cyber, you know, confidence that you have the cybersecurity and those kinds of confidence that you have. If that is strengthened, you have the confidence and I think I think that that's the only limitation if at all you hold it but otherwise he recently bought we bought a property out here. P7*

This response is perhaps understandable when you consider the work of Andrade, Yoo and Tello-oquendo (2020) who state that the main concern of smart city users is that of security and protection of data, closely followed data privacy.

> *I think it's still some sort of breach of your freedom. But then it's another issue that I'm not comfortable discussing. P19*

Concerns by citizens around collection of data has been raised by authors such as Ismagilova *et al.* (2022). Adding to this, findings from Shah *et al.* (2021) suggest that co-creation activities can be compromised if citizens believe their data is not safe. This leads us back to co-destruction where value can be damaged or destroyed by aspects such as data. Findings from Ogunbodede, Papagiannidis and Alamanos (2022) state that negative experiences around information sharing and withholding, irresponsible behaviour and neglect can lead to destruction of value.

However, there are some positive aspects to data collection. Kirimtat *et al.* (2020) state that people within smart cities provide data to access services within the city, such as healthcare and transportation, providing benefits such as quality of life. They also make the point that data in the city provides an environment for co-created value. This next respondent has had someone crash into their car while it was in the car park; had there not been CCTV it would have been much more troublesome to resolve, although he did strike a note of caution of being recording generally.

> *I think it's extremely useful. Again, how much data do you really want on there? The fact now that we live under a world where it was great last week at the CCTV cameras are on all the time and they caught the girl that crashed into my car. The fact that they're recording every single place in the world that you walk now is also not great. P6*

Another goes on to highlight some benefits, but also demonstrates a lack of knowledge about what the city currently offers to its citizens, suggesting that more information needs to be provided to citizens about what is available to them.

> *I see it from an efficiency perspective, I'd say it's it's good because it's simply good because you have your information available there. I had actually an issue a few weeks ago now few months ago where I lost my insurance card. And then I wasn't aware that you could retrieve information through your Emirates ID and then I went to the cashier and said, I don't have my insurance card and she said no. It's absolutely no issue for us. Because we could retrieve your information. So I guess if you see it from a practical side, yes, it's good. Your information is stored there. And if there is an issue, they can just retrieve it. P19*

These points also start to touch on the value of sharing information (Griffiths, Perera and Albinsson, 2019; Moorman *et al.*, 2019) and its impact on the sharing economy. Findings from Chang (2021) suggest that data collection within smart cities provides a range of benefits for citizens in areas such as transportation, healthcare and education, although Chang does recognize that citizens have issues around collection and usage of their data.

Engaging with the city through activities such as feedback is important in any city project (Goodman *et al.*, 2020). This engagement is often termed e-participation (Zandbergen and Uitermark, 2020). Findings from White *et al.* (2021) suggest that engaged citizenry are a valuable source of feedback for a city in areas such as urban planning and policy making, as well as service improvements (Patrão,

Moura and de Almeida, 2020). Feedback was one of the information exchanges that came up readily in interviews; as this is a key part in engagement these comments are important to note. One respondent, in reference to the service feedback ranking touch screen that appears in most government buildings said,

> *I feed back on their services with their little happy sad faces every single time I go in and I always press happy because they do have excellent customer services in the government building. P16*

While another participant largely confined their feedback to the private sector, however they make the point that feedback had not been sought.

> *Well, I have at some times but it's normally like private companies and normally I use it when I really liked the service of a particular person. So just to show that I appreciated this person's service. It's not about the company. Because I work in service. I can appreciate others who can give you a great service. It's only in this manner, but in general nobody ever asked me to give a feedback. P20*

Another participant during the discussion of feedback and engagement took a more in-depth tack but discussed the prospect of citizenship of the UAE.

> *I wish Dubai was more of or the UAE is more of is the, you know, getting the citizenship status, P3*

Findings from Allen *et al.* (2020) strongly support the importance of feedback and engagement of residents in term of service delivery and improvement. Zandbergen and Uitermark (2020) make the point that empowering citizens and giving them access to information as well as eliciting it from them builds greater citizenship. Adding to this Levenda *et al.* (2020) suggest that citizen participation was beneficial for future planning within cities.

While this study is focused on Dubai, many respondents discussed experience with other cities in the UAE such as Abu Dhabi which is just over an hour's drive from Dubai. This discussion highlighted inconsistency between the Emirates (Federal States of the UAE).

> *So and now you know Abu Dhabi has a toll system. So if you have fines in Abu Dhabi, it'll be on their app. And then if you have fines in so I had some fines in Sharjah. And so, some of the fines like I can't even remember it's so complicated. If you get fines in other emirates, so like, if I get any fines. P10*

Studies looking at inconsistency between cities in the same nation are somewhat lacking, however there is work from Veselitskaya, Karasev and Beloshitskiy (2019) suggesting that different cities have developed very differently with the smart city experience in different countries. Adding to this, findings from Xu and Tang (2020) suggest that there can be disparity in the quality of public service delivery between neighbours.

Not only was there perceived to be inconsistency over services between states (Emirates), but inconsistencies were also observed in terms of different communication channels in relation to services. One respondent, who was not alone in this experience, recounted some interactions with government services.

> *I mean, honestly, if you go somewhere like RTA or you go to DEWA. You get a different answer with every single person you talk to. Yeah, I mean, like, I was trying to close an account for my aunt and uncle who had left the country and I went over to Dewa and like to get their final payment. And they said, the first guy I talked to said, Well, you need a copy of your uncle's passport. So I said, Okay, so I had to go back and you know, they're only open till two. So you have to take time off from work to go there. And then I came back a couple days later with a copy of my uncle's passport. I got someone else and I'm like, Here you go. And he was like, What's that for? We don't need that. P10*

This was not an isolated experience.

> *So we went to the centre, the Al Manara one and we had she has everything that she needed to be able to go to the kiosk. Then, when we first tried it said that she needed an eye test. So she went back to the desk and was like, it says that I need an eye test. Like what do I do next? She said, You don't need an eye test because it's not a new license. It's just a license renewal. So I'll do something on the system. And if you go back and do it again, then it'll just let you do it. So we went back and did it again. And it didn't it just kept saying you need the eye test. So then we went back to the desk and it was a different woman. And then she was like, Oh yeah, you do need an eye test for renewals. So then we had to go to the opticians do the eye tests come back wait for the woman to put it onto the system so that we could go and do it on the machine and it was quite an ordeal. P13*

This inconsistency of information has the potential to lead to co-destruction of value and a loss of trust in the service. It may also inhibit future sharing of information. Chen *et al.* (2018) make the point that speedy communication of information is the backbone of smart cities and therefore misinformation has a damaging effect on social cohesion and can erode the trust of citizens. Findings from Li and Shang (2020) state that the quality of information provided to citizens is key to any service offering.

While not widely discussed, the feeling of intrusiveness did come up occasionally in relation to data, the idea that the state was intruding into the private and personal space.

> *But that's only because I haven't done anything medically, which would be controversial. I wouldn't be worried. I would be if there were, if you if you understand by what I mean by that. If there are women who had undergone a controversial procedure or had controversial medication and that information was kept about her. I actually trust the system that that medical data is actually kept private. P16*

This does have some linkage to work from Simon and Roederer (2019) who have examined depleting customer value in relation to intrusiveness, and they find that intrusiveness can have a negative effect on customer satisfaction.

While sharing is implicit in much of the co-creation research (Lusch and Vargo, 2004; Dellaert, 2019; Nadeem and Al-Imamy, 2020), explicit mentions of it were more infrequent in the primary research. The discussion of sharing took different forms, firstly information:

> *You know, I'm living here, the social contract. I benefits followed by any rules that they have and it doesn't really bother me. I know when I mean in every country, there's going to be some sort of document some ID. It might not have all that information and it might not be a smart, smart card. But I think more and more countries are moving towards this idea and anyway like having this information stored digitally somewhere, and then being like a sort of having multi functions rather than just this is your ID card you can use for this. P8*

The reference to 'social contract' is interesting. The idea of a social contact is not new, dating back thousands of years it relates to the idea that people living together in a society behave in an agreed way (Ritchie, 1891). Attempts have been made to link the social contract theory to smart cities. Jathan and Frank (2015) examined the theory and they caution against social theory, suggesting it could be used to control citizens rather than emancipate them. Adding to this Mann *et al.* (2020), in their work which focuses on Barcelona as a smart city, concluded that citizens must forego some of their privacy as part of the social contract with the city.

This idea of social contract leads us onto the discussion of sharing (Hielscher, Everding and Pies, 2022), which was raised by a few interviewees both directly and indirectly. One respondent discussed sharing in relation to peer-to-peer services.

> *Yeah. So you know you if I have documents or if you came to my house and you left your bag or nothing to again under your own thing if you lose it, but if you left the bag and I can't drop it to you, I order a Careem box. Yeah. So usually, I guess people would think oh, I'll just get a taxi and put it in a taxi. But they have this this green box, just like a delivery box. And you select like how big whatever the item is, and they'll come and they'll deliver it to that person, which has been the best thing. P21*

Sharing of information is key to this kind of service and is clearly a positive experience for this interviewee. Findings from Zhou and Lin (2019) into this kind of peer-to-peer delivery suggest that this sharing of resources can be beneficial in terms of deployment of labour, cost, time and resource usage. Building on these, other respondents discussed the benefits of sharing information as characterised by the following quote.

> *So that kind of way they're tracking people's travel and picking up when the lines go red, and then letting people know traffic management is good to here. And it's very, very useful and I couldn't benefit from that unless all of those other people were trapped as well. P1*

Work from Nguyen (2021) which focuses on information sharing transport platforms found that users deemed these platforms valuable, while also finding a relationship between the quality of that service and an intention to use it further. Nguyen also noted that privacy concerns of use might have a negative effect on continuance intention, which does align with some of the concerns highlighted in this study.

This theme, 'Information exchange within the city', has drawn together ideas of 'access, use and collection'. Firstly, the responses have been able to demonstrate the benefits and drawbacks of collecting data as well as connecting data, its value in being used to co-create further value, which link back to the overall research objectives. Aspects of sharing have also come out in this theme, which also link back to the objectives. Secondly, the data shows some of the contrasting elements of information, in the form of the subtheme 'Information inconsistencies', this covers elements such as conflicting information in terms of information sources as well as inconsistencies between states' (Emirates) offerings as well as confusion. These aspects have the potential to provide value co-destruction, undoing the benefits created from information sharing and the interconnectedness of data. Information is the cornerstone of ICT and therefore smart cities, so these themes will also impact on the subsequent themes discussed below.

5.5. Theme 2 - Convenience of City Services

The theme of 'Convenience of City Services' was the most highly discussed by respondents, with almost all of them commenting on it in some way. Woodall (2003) highlighted convenience as one of the benefits in a value exchange, so it is perhaps unsurprising that it was so widely discussed during the interviews. The convenience of services did not seem to be confined to any one particular area of smart cities services; however, the discussion did fall into two broad sub themes, that of the 'convenience', how easy, efficient or convenient the services were and 'time wasting/saving', how much the services saved or wasted for people in terms of things like journey or time. Starting with convenience, which was widely discussed across a range of services the city provides, as one respondent put in terms of using her Emirates ID when accessing services.

> *Yeah, it is convenient. Absolutely. The fact that I've never had to show my passport anywhere it that's not a thing in other countries. So I do think that it is convenient. I understand why some people may be would have privacy concerns. But for me, I think I value the convenience. Okay. P18*

The convenience of smart functions in airports has been discussed by a number of authors (Almarri, Kamalrudin and Sidek, 2021; Azman and Sharma, 2022; Turkinevych and Badánik, 2022). Recent findings from Kim and Park (2022) do indicate that convenience is seen as valuable in the airport sector. Building on this, the participants below took the convenience theme beyond the airport into the vaccination track and trace app Alhosn. These next respondents felt that there was value in having an app with up-to-date vaccination information that could be shown when needed to enter buildings and travel.

> *And it's also very convenient to use it on airports because you can pull up the thing and say, Yes, I am that [vaccinated] and you can put it up at museums or galleries that require kind of proof vaccination. That's I'm okay with that. P11*

Building on this value, the next respondent highlighted the up-to-date nature of the app.

> *I was using the app that time been but now it's a convenient app in in having your updated information, your vaccination information. So you know when you need to travel, it's a matter of just, you know, opening the app and it's great that the record is updated. P3*

This sharing of vaccination information starts to link into the sharing aspect of cities; the fact that large numbers of the community are vaccinated provides some safety with greater numbers of vaccinated people helping to prevent the spread of the disease (Mont, Curtis and Palgan, 2021). Findings from Trang *et al.* (2020) reflect this as they also found that convenience is very important to users in this context. Their work also highlights that convenience should be considered in the app design stage as well as during use.

> *I'm using RTA mobile application to renew my driver's license and to re-register my car is so convenient. P17*

RTA refers to the Road and Transport Authority. This is the government agency in Dubai that is responsible for all elements connected to transportation. The agency's services are all available through a number of apps. Research from Alshamsi, Ameen, Isaac, *et al.* (2019), who focus specifically on government services in Dubai including the RTA, suggested that service provision was of high quality. Further findings from Alshamsi, Ameen, Nusari, *et al.* (2019) suggest high user satisfaction with these services. Both sets of findings would echo the outcome of this research.

> *Convenience, I just walk away from it and it's easier to do it on my phone plus, plus doing it on the phone was that not that NOL card if I do it for an hour, then if I'm over an hour, it'll send me a reminder because I don't want to pay the fine for being over the hour. P6*

The NOL card is a contactless prepaid travel card, similar to Oyster cards in London or Octopus in Hong Kong. NOL is also able to allow users to pay for car parking at selected meters (Srouji, 2020). Work from Elzeweidy and Sayed (2019) suggests that the NOL card provides convenience, this is echoed by findings from Riaz *et al.* (2022) who interestingly found convenience was felt more highly in men rather than women. Shaheen *et al.* (2019) demonstrate that convenience was the most common motivation for using transport in cities.

Alongside discussion of convenience, ease of use was often mentioned in relation to smart city services, often in relation to apps such as the afore mentioned Alhosn medical app.

> *I never find the Alhosn app cumbersome to use. You know, like straight and when you open it, the dashboard is there with your face with your details. And some of it*

> *is hidden. You click on it to show it and it will show you your status, you know whether you're green or whatever. So it's like super user friendly. P16*

A note of caution was cited by another respondent.

> *But it's always only the initial setup, isn't it? Because once it is, once you take the time to set things up, it actually works really well. And I think I just personally get frustrated with technology sometimes and I just think Ah, why can't we do this? P15*

It is interesting to note that this last respondent is from the oldest age demographic and perhaps not a digital native, however this respondent did also recognise the value once the initial set up was done. Ease of use within m-health (mobile healthcare) has been explored with studies from Mansour (2021) suggesting ease of use is an important factor in mobile healthcare apps. Adding to this, findings from Wahab and Saad (2022) suggest that citizens using health care apps felt there was both ease of use and perceived usefulness within these apps. Other respondents discussed health applications in relation to usefulness.

> *And things like the DHA app. I mean, I found that really useful when I was travelling, you know, because it's got your vaccination certificate on it. It's got proof of your vaccinations, you know, it's useful in those kinds of circumstances. P1*

However, health was not the only service that was discussed. The Dubai Electric and Water Authority (DEWA) was often cited as an efficient service app. This next respondent had moved rental apartments a number of times and the DEWA transfer was something that was found to be straightforward.

> *Really easy to change because I was living here in different properties. So from one place to another one that the DEWA Bill has been really easy. You get online, you log in and you say I'm living here to this date and from this other date onwards. I want to move my DEWA so your deposits and everything gets moved from one property to the other one that's been really see and efficient. P4*

Research from Xu and Tang (2020) who were specifically examining e-government utility operators found that efficiency considerations were at the centre of decisions made by service providers. Building on this, Chadoulos, Koutsopoulos and Polyzos (2020) have examined e-government utility apps and recognise that the user effectiveness needs had an impact on efficiency and that using AI would help develop a whole range of efficiencies. This is echoed by Mohanty, Chughtai and Rabhi (2019). Looking more broadly, efficiency is seen as a key aspect of public value creation by authors such as

Twizeyimana and Andersson (2019) and Xanthopoulou (2020), although Lopes, Macadar and Luciano (2019) point out that this efficiency can only be maintained and developed through the engagement of citizens.

This efficiency discussion leads onto the sub theme of time wasting/saving. Issues of wasting and saving of time and travel often arose from respondents during the interview process; time and spending time traveling or wasting time were all highlighted. Initially, journey saving was discussed, firstly in the context of the metro system.

> *I would probably I would usually just jump on the metro because it's quicker. P13*

Then in relation to car journeys and RTA traffic information.

> *…which was really, really useful because if there was an accident near Mirdiff, city centre more, I would then go in a different route. P1*

It is worth noting as we sum up this theme that while time saving and journey saving were often seen from the viewpoint as something similar, i.e, that avoiding traffic would save the time you spend and the journey you take to get your destination. There was no mention of energy saving, i.e, that a different route may use less energy or fuel. This aspect of environmentalism is covered in pillars of a smart city (Giffinger and Gudrun, 2010) as well as more focused work from Zhao *et al.* (2019) who look at the fuel saving that can be made through these kinds of apps. This builds on the idea of the usefulness of the information, but also there is a recognition that they are benefiting from information shared by those who were already in the traffic. Chen, Ardila-Gomez and Frame (2017) and Wang and Moriarty (2019) both highlight the benefits of journey saving in smart cities, while Jiang (2020) and Bellini, Nesi and Pantaleo (2022) go on to add the value of data sharing to avoid traffic. The discussion also led naturally into time saving. One participant, who needed to attend a court appearance for an undisclosed legal matter, stated:

> *It was easy to arrange those appointments. It was very quick. So I had that expectation that it was going to be something that would take maybe many months and the whole thing was just finished in one week. Okay, very smooth very quick. I brought about my document with me. I got a ticket. I waited for a little while not too long. There was a lovely Emirati lady very cheerful. She stamped the document*

> *instructed me how to do a payment the whole thing was the whole thing maybe took an hour. P18*

Another participant looked at time in relation to topping up their NOL transport card via a smart kiosk.

> *And I would always mostly use that than stay on the queue because it saves me time. P10*

This was reflected in work from Kuo, Leung and Yan (2023). Another discussed time saving in relation to the interconnectedness of data, which was discussed earlier. The value of time was also highlighted by Boztepe (2007) in their work on value. This next interviewee was discussing the UAE PASS and its benefits in providing an access point for a range of city services online.

> *straightforward to use, if any app of the UAE have an option to say okay, use UAE PASS. Instead of me uploading an ID or something like that. It says use password goes to the [UAE] app, it pulls out what's needed…so as long as you set up the app, probably in the beginning, it's good. P14*

This connectedness and time saving was reflected by Toli and Murtagh (2020) who look at smart cities widely. They make the link further in saying that not only is time saving a value produced by cities, but it produces better quality of life and convenience. In contrast to time saving, participants also raised the issue of time wasting in some form, in this quote they are focusing on self-service machines.

> *Anyway, so I just cut out the middleman and just go there. But then they're quite often let you wait in a queue for half an hour. And then when you get to the front, they say, oh, there's just a machine there that does it and then the machine doesn't work and then you go back and they say, No, the machine does. Okay, like, No, it doesn't so yeah, I would, if it's something simple that like I do, say like monthly or like a common thing, I would always just go like to an app first. Yeah. And then outside of that, I'd probably just take a trip to go and speak to someone. P13*

Other times it was related to the technology. This next quote builds on earlier comments regarding the UAE PASS.

> *I think they realise that it's a little clunky, okay, because that was the pain part for me when I was setting it up. But it took some time to set it up. So a lot of people don't sit through that. I wanted to do it just to see how is it for me. P14*

Adding to this, is the comment below regarding the Dubai Museum of the Future, which is supposed to showcase new technological developments, they had this to say about the experience.

> *By being a museum of the future, you'd imagine that you would be straight into the exhibits, but we were actually in the reception hall for about an hour trying to get our little smart wrist pass, which was, which was a bit of a contradiction in terms, wasn't it? Waiting for an hour to get a smart pass? P1*

Work from Kenny (2021) which focuses on app design states that it is important to understand the needs and values of the end user since badly designed apps lead to a bad customer experience and time wasting.

Drawing together this theme of 'convenience of city services' has outlined a high value of convenience being cited as well as ease of use and efficiencies, and in addition the savings that can be made in terms of time and journey. This theme not only explores value issues, but also issues of sharing, which helps in part to address the overall research objectives of this study and helps to inform the research questions.

5.6. Theme 3 - Touchpoints Within the City

The theme 'touchpoints within the city' is focused on a range of ways in which the citizen could potentially engage with the city in some way, through managed (formal) channels such as apps or unmanaged (informal) channels such as WOM or EWOM. The term touchpoints is often used in the study of digital marketing to describe this (Chaffey and Ellis-Chadwick, 2022; Hanlon, 2022). Within this theme, two sub themes were found, one of channel of communication, the other is that of transactions which covers things like payment, fine and costs.

While the discussion on channels was wider and varied between respondents, the issue of accessibility to services came up, this has perhaps been raised because five of the respondents were in the 45 or older age categories. The issue of exclusion from smart cities for vulnerable groups and those lacking digital access has been written about by some authors such as Willis (2019) and Engelbert, van Zoonen and Hirzalla (2019). This next quote looks at the accessibility not only from an age perspective but also that of affluence.

> *Well, I think at the very least they need to provide alternatives like you know, convenient, decent alternatives for people who don't have access to that technology. Because I mean, I think I think, you know, for the most part even you know some poor worker has a phone because it's the only way he can talk with his family back home. But, again, there's someone on a very limited budget might have a very*

> *limited phone might have a very basic phone that doesn't do everything. Just for example, I'm just guessing, but you know, for some people that might not be so useful. P2*

Hou *et al.* (2020) point out the issues supporting the less affluent and their limited access to basic technology that would enable them to access smart city services. This digital divide is echoed by Shin, Kim and Chun (2021) and Toli and Murtagh (2020). Building on this point, the next respondent made this point about the issue of accessibility in relation to guests.

> *…just last weekend actually had a friend here from Kuwait. She came down and stayed with my wife and I and I basically gave her my Emirates ID. So with the ID in the building here you've got an app on your phone or your Emirates ID that's what gets you in. So there's no just general Passcard so I am because we were out she's still on Kuwait time, which means that her weekends are different. So I'm at work so I gave her my Emirates ID to get in and out of the building. P6*

Another related an experience of when guests came to visit during the Covid pandemic when PCR test were required for a lot of travel.

> *Okay, but the SEHA app does not allow you cannot be registered without an Emirates ID. So what happened was we did the we did the test for this guy. If he had about 48 hours to travel, we couldn't download the results or get his PCR results because of the SEHA app, and the result used to come only on the app. And that's a Federal Ministry app. And you cannot register the app without the Emirates ID. P7*

Non-citizens presented a problem for some researchers, Thomas *et al.* (2016) for example. When conducting research on smart city users they came across a number of non-citizens and struggled to suitably characterise them. Extensive field research by Taylor and Richter (2016) has examined a whole range of non-citizens, from city visitors, through to the underclasses. They highlight concerns that the more digitalisation goes on, the more cities run the risk of leaving members of the community and visitors to the city behind, exacerbating the digital divide, a point which is supported by the following quote.

> *In a way we are because as you mentioned, I guess a high percentage of the population in the UAE is over 50 If we include also UAE citizens, so they may not really be familiar with using technology or not comfortable using technology. We are we actually are but then we have also to advance with a time so I guess, perhaps trying to train people who are not aware of how to use technology could be an option. P19*

It is interesting that this respondent also raised the accessibility issue, given that P19 is in the 35–45-year-old bracket, suggesting that the concern for accessibility reaches beyond those within the older groups and is perhaps a consideration for the wider community. Building on the work of Skouby *et al.* (2014), Baltac (2019) echoes some of the concerns already raised, adding that the elderly as well as the less affluent could be excluded from smart cities.

Throughout the discussion of touchpoints, the linkage with the smart city and the private sector was mentioned by a number of interviewees. This is not unsurprising given that a large number of smart cities around the world have connections with the private sector to provide information or services to citizens (Samih, 2019).

> *I don't see anything bad about private sector services because I think they're anyways regulated. by the government. So they will probably offer better services. And they will still be the same safe as government services. P20*

Criado and Gil-Garcia (2019) suggest that satisfaction of citizens does occur in cities using public and private sector service provision. This echoed research by Marx (2019) who found positive relationships between citizens and private providers in the public sphere. Cabral *et al.* (2019) make the point that there is great scope to foster public value. This issue of the private sector role prompted some discussion from respondents. First is a respondent from Argentina, a country with high state involvement, who has lived extensively in Europe.

> *You know, the role of the government, the role of the private sector. I think it makes sense in this country [UAE], that I see how it would be massive. There would be a massive backlash in some of the countries maybe continental European Spain, Italy...I think he's great in this context. It might not work in other contexts. P4*

This is followed up by an Algerian, with experience of many other countries, with mixed views on the private sector involvement.

> *I know that this has been tried in different countries around the world where it was a hit and miss. And I think the UK tried to privatize some of the utilities sector. EDF was one of the players but then it's not going so well. As far as I know. They tried the same thing in France. It didn't work. But obviously the country is slightly different there. Because usually the state has more involvement. P19*

The point made about the needs of the customer is central to business consideration of service offering as well as a fundamental tenet of value co-creation. Andrews *et al.* (2020) suggest that European governments have increasingly looked to the private sector, rather than the not-for-profit sectors when looking for providers of services for citizens. Almarri (2019), who closely examined the factors for selecting private sectors in both the UK and UAE, states that the reasons were similar; value for money and expertise.

Often multiple touchpoints, rather than one single communication channel for city services is an area that sparked some discussion from respondents. This first participant illustrates benefits and drawback to multiple touchpoints.

> *Well, the issue that I would say that Dubai has is it has several apps that are one stop shops and not every app has the same thing. So you do end up using multiple apps. So for example, when Coronavirus came out they wanted me to use before UAE PASS came out there was log on to the DHA one there was log on to another one that came out and after a while I wasn't sure I wasn't completely confident what I was supposed to be doing. I would say the same the job right now at covers my Salik and it covers my fines which are the main two reasons why I use that app…. I'd expect that more to be under the RTA app. That being said, I'm sure there's other apps that I would actually rather do everything online through apps. P16*

Zahmatkesh and Al-Turjman (2020) caution about the challenges of multiple online touchpoints in terms of providing consistency of information. Gutierrez, Gutierrez and Del-Rio-Guerra (2019) highlight the importance of mapping touchpoints to understanding which touchpoints are beneficial to the user and which are not. Foth (2017) points out that too many touchpoints can lead to information overload, this seem to be recognised by some interviewees.

> *I reckon that there's too many separate I think you're right, there's just too many separate apps, because it just gets confusing. I can never find them on the phone. P15*

These next respondents outline the benefits of multiple channels and this has some link back to the earlier discussion on accessibility of information.

> *I cannot tell you for sure, but most of the time when I get a phone notification is on the text message on the email. So the traffic fines get sent to me. Both a DEWA bill gets a text message and an email. So everything gets done in a duplicate. So even if I didn't have a telephone number I could get it my email. Now. Yeah, I guess there*

> *are people with without telephones and email addresses but okay, well, yeah, that's beyond me. P4*

Other participants had mixed feeling on touchpoints, some using multiple touchpoints out of necessity, others out of habit.

> *I don't know. I was gonna say that I like different apps for different purposes. But that I got a feeling that that's just because that's what I'm doing. Yeah. If I could go to a single app and everything is there. I think that would be good. P15*

This chimes with research from Zhang *et al.* (2021) who looked at one-stop shops in relation to e-government. One-stop shops are centralised places where all services can be found; in Dubai services are centralized in the DubaiNow app. Zhang *et al.*'s work suggests that one-stop shops meet users' needs. Research from Maulana *et al.* (2020) suggest that benefits of one-stop shops could be perceived ease of use, perceived safety and trust, as well as satisfaction. Zhang *et al.* (2021) state the improvements in quality of these apps can develop continuous use from users. However, these central points did have some detractors.

> *…was a bit frustrating during that time, but now there's clarity at this point. In that we just rely on that Alhosn and app to have our records of vaccination and the government itself doesn't even refer to other apps anymore, although on testing, you still have to get on also a different application for that which I find funny. You need to go to say hi, I think for vaccination, so Alhosn to keep the records and SEHA how to get a vaccination, which is funny. P3*

Peng *et al.* (2021) suggest that these one-stop shops can be "too complicated" and perhaps even "confusing" for some users.

> *I think that by having multiple routes, it just lets people use whatever is more convenient for them. Especially because you know, maybe Careem if I pay my bills through courier, you might get points on my credit card or if I use this app I get air miles or if I use this app, it's just I just like it because it's more streamlined. I don't get anything out of it other than streamlining. So I think, you know, having choices just lets people choose what they like best, I guess. P2*

Incentivisation is nothing new in the field of smart cities (Lindsay, 2019) and research from Poslad *et al.* (2015) does have the power to change behaviour within the smart city context.

Discussion of different touchpoints also covered self-service kiosks. Self-service kiosks are placed around Dubai for people to use so they can access a range of services such as transportation, healthcare and bill payment (Khan *et al.*, 2017). Rodulfo (2020) states that kiosks are one of the many channels within a smart city that are designed to help improve quality of life, however the view from respondents was a little more mixed.

> *So even that really straightforward thing where you should just tap and get a ticket. Something wasn't working properly. There's so All right, the process. So yeah, so it's a great idea, in theory to have all these electronic services, self-service and whatnot. But then you also should make sure that they actually work properly that that they're easy to use. They're user friendly, and I think oftentimes they're not okay, P18*

They are also able to print physical documentation, which seemed to be less problematic and more welcomed by users:

> *…to make sure that the fines are paid, so I'd get the insurance and then to print the card? Yes, that works really well. That's really good. P11*

This was echoed with the use of top-up payments:

> *So I was doing that in the just in the tram station on the machine. I don't think I've ever used the app for that but more just because whenever I was using the NOL card I was passing those machines anyway. So it seemed easier just to kind of do it on that. P13*

Work from Aliu (2019) suggests that self-service kiosks (or e-kiosks) provide fast and effective access to information that citizens find satisfying. Findings from Said, Najdawi and Chabani (2021) state that a quarter of city payments were made through kiosks. Added to this, the results of Gómez-Carmona, Sádaba and Casado-Mansilla (2022) found very positive experiences with people using kiosks, as well as high levels of satisfaction. They go on to state that only interaction with personal mobile phones was found to be more desirable. It is worth noting that the more straightforward self-service transactions were more widely appreciated by user, whereas the more complex something got, the more room for error or confusion there appeared to be and this is where some dissatisfaction crept in. These experiences were not necessarily reflective of other research in this area. Not all respondents in this study were entirely satisfied, as the following quotes will demonstrate.

> *I don't think so. I think it was pretty straightforward. I mean, other than them, telling me you can go over to that booth. But you know, there's always that little bit of fluster like, am I going to be able to do this, which is why it's nice to have a human person there. It's a bit like the checking in at the airport, you know, the self-checking, it's still always nice to have somebody there to call on. P15*

While this response did recognise the usefulness of the self-service kiosk, it appears to have elicited a negative emotional experience, which could affect the value creation. This next respondent used the self-service access point for a police matter, something that in itself has the potential to be a stressful situation.

> *One experience where I had where it was completely self-service. This is aside from RTA there are smart police stations. There's one located in City Walk one in Palm Jumeirah so I had to go to one in City Walk where there was no employees no nothing in which is which is something I didn't expect because it's a police station, but there was a huge screen over there you put your Emirates ID and in that there were just registering you then you tell them what you're here to complain about. And then there's just one tiny room I think the size of like half of this office, and then there's a big screen webcam. There's so many facilities there that you get connected to police officers to a screen so you're not speaking with them. In person. It's on a screen. P5*

Lee, Fairhurst and Lee (2009) say that the problems of kiosks needing human support has been long documented in the service sector, as well as being recognised in the public sector by Slack and Rowley (2004) whose findings cite issues such as complexity of task, willingness to engage and lack of integration with other channels as errors that may harm adoption of kiosks. Work from Small *et al.* (2021) looking at self-service kiosks in the UK public sector found difficulties; often users would not interact with the kiosks. To try to combat some of the issues suggested by Lee, Fairhurst and Lee (2009) printed instructions would be placed alongside the kiosks. Small *et al.* also pointed out that peer support was always used to help people interact with the kiosks. Hagen and Sandnes (2010) also point out that people with disabilities can have problems using kiosks, which links back to the earlier discussion of accessibility.

Problems with the kiosks raise the broader topic of technological failures experienced by citizens. Mahajan (2019) states that humans can struggle when automated technologies fail, this can bring about value destruction. Building on earlier comments about complexity of the process Kitchin (2014) suggests that failures in smart cities are more likely as technologies are added. This is perhaps

illustrated well by the comment below, which is in reference to the set-up of the Emirates ID which is required for all expats as part of the work visa process.

> *Because at first it was it was quite an issue because when I first came here, I only had a temporary number. So I put on my temporary number in there. Yeah. So after I got my the Emirates ID, I got a new number and the birth order things actually, all the important information went to my temporary number because it was not easy for me to change. update my phone number there because everything goes to my the previous temporary number so Yeah, for now. P17*

This was also reflected in experiences with vaccination apps, which for some were administered outside the UAE but still required registration.

> *…but I didn't get my two vaccinations in Dubai, so I needed them register to the Alhosn app, which does not done in the Alhosn app, but I need to go the Ministry of Health [web] pages to do it and then they do it. It was a bit chaotic. P9*

Gomathi, Baskar and Shakeel (2021) state that an efficient smart city should 'reduce failures in city sharing'. Their work goes on to demonstrate that reduction of failure rate can improve service usage. Löfgren and Webster (2020) make the point that these kinds of service failure can erode value in the value chain in smart cities. Adding to this, Habibzadeh *et al.* (2019) suggest that while some service problems are inevitable, having one point of access for services can increase the scope for problems, whereas multiple contact points will ease the difficulties for users; this does link back to earlier discussion of multiple touchpoints.

Another emerging sub theme of touchpoints is that of 'transactions', the payment side of channels of communication within the city. Cost and payment came up in a number of areas; efficiencies and cost effectiveness are components of smart cities (Andrews and van de Walle, 2013) so this is perhaps no surprise. First, cost which came up a lot in relation to public transportation.

> *And then the fee for the public transportation system here is very cheap. P17*

Cost efficiencies have been identified in a number of smart city areas such as electricity (Latifah, 2020), transportation (Saharan, Bawa and Kumar, 2020; Umair *et al.*, 2021) and parking (Al-Turjman and Malekloo, 2019). Related to transportation was the issue of fines (mainly traffic fines), which sparked

a lot of discussion from participants. This first quote is related to an interviewee parking in a restricted area.

> *Unfortunately, my car got smart impounded. That's the name Smart Impound. So I did everything through the Dubai Police app, which is obviously has RTA integrated in it. P5*

Others pointed out the inconsistency of fines as some apps charge a handling fee.

> *I've seen different ones but it's more just annoying that like, just makes a fine what it is like if the fine is X amount, I'll pay X amount but then you're like, Oh, you have a fine for this amount and then you log on and then you pay more. It's like, I guess that's just life. P13*

While it is fair to say that the respondents did not really want to pay the fines, they did appreciate the process to settle those fines. A preference for electronic services for settling fines is noted in work from Ji *et al.* (2021), while research from Gupta, Abdelsalam and Mittal (2020), suggests that there are benefits to these kinds of systems such as cost as well as journey saving in that citizens do not need to travel to a police station or government office to pay the fines. Payment of fines was not the only aspect of payment that came up in relation to city services. Payments and auto top-ups for services such as the road toll (Salik) were often used through city touchpoints.

> *I think that you know, where they've got, you know, all of that all your transactions and everything can be done online, except for the International transaction or whatever. So I use the banking a lot RTA probably not so much but I think I did set up to DubaiNow for Salik it's probably the only thing. P15*

This goes back to Mobility as a Service (MaaS) and is recognised as convenient by the work of Wong, Hensher and Mulley (2020) and in terms of automatic top-up by Basu and Ferreira (2021). Utility payments such as DEWA were also settled through private sector changes, in a similar way to fines.

> *So anyway, there's just a lot of managing of that stuff. But yeah, I've sort of figured out or, you know, over time, just adjusted to the reality of like, paying utility, so I pay mostly through the internet, the web, you know, through my account, and it's pretty straightforward. Just using my Emirates NBD account. P12*

This reflects a number of benefits to online utilities payments identified by Haralayya (2021) such as one-click payment of bills (providing simplicity and convenience), 24/7 access and saving the user time, which links back to the earlier discussion on time wasting and saving.

This theme has centred around touchpoints, those channels through which citizens either receive or provide information to the city (covered by the sub theme channels) or they make payment for services (covered by the sub theme of transactions). It can be seen that channels of communication (touchpoints) have value in terms of convenience and ease of use, however views on touchpoints differed depending on elements such as complexity of the task being undertaken, overload of information and accessibility of the services to certain groups (such as the elderly, disabled and less affluent). Ease of use was highlighted, with respondents having some mixed experience with some online channels and self-service kiosks being useful, while more complicated actions caused dissatisfaction with the channel.

Moving onto the sub theme of transaction, most had encountered a positive experience when settling fines or paying for services, although different channels appear to come with different fees for the same fine. This perhaps leads back to Theme One which highlighted issues of misinformation across channels.

Both of these subthemes and the overall theme of touchpoints within the city are seen as valuable. The quality and clarity of the touchpoints conveying information has the ability to create or destroy aspects of value. Quality of experience is also a factor in creating or destroying value. These channels are also the lifeblood of information exchange which is so key for sharing.

5.7. Theme 4 - City Experience

The theme of ‘city experience’ looks at the value created by expatriate city users while they experience smart activities, these are built on information provided to and from the city and communicated and engaged with through channels as has been discussed earlier. These experiences break down broadly into two themes; that of Tangible Physical Service experience, (such as buses, training, medical

appointment, museums and libraries) and Intangible experiences (such as positive staff interaction, trust and security and service quality).

Firstly, focusing on physical or tangible elements discussed by interviewees. While this research is focused on the digital aspects of smart cities, respondents did not differentiate between digital and more traditional (or non-digital) services. They spoke about physical services, such as parks, schools, libraries and postal services interchangeably with digital services. This is perhaps not surprising given that Giffinger and Gudrun's (2010) discussion of the scope of a smart city, which is a mainstay of this study, discussed both physical and digital services.

Amongst discussion of physical services, bureaucracy in Dubai often came up. Mora and Deakin (2019) feel that bureaucracy which is rigid and inflexible is anathema to the concept of smart cities, however it was something that was raised by respondents. In part it has already been discussed earlier in relation to inconsistency of information across channels and will be touched on again when staff training is examined. One respondent summed up their feeling on this topic as follows when discussing library services:

> *But that was quite a difficult process. Process that actually I have to register myself there and then I have to pay for that. I don't mind paying you. But I, if I'm not mistaken, they asked me to like a for a year so it's a subscription. Okay. Yeah. Yeah. So at that time, I didn't want to do that. So I gave up renting a book. P17*

Pellicano *et al.* (2019) make the point that elements such as bureaucracy can lead to value co-destruction as citizens disengage with the process.

Medical services were often cited during the interviews. Umair *et al.* (2021) stated that the Covid pandemic was the catalyst for many cities to adopt smart technologies for a range of services including transportation, smart building and most notably healthcare. This is echoed by Al-Azzam and Alazzam (2019) who broaden the discussion to include m-health (mobile health) and s-health (smart health). Smart health looks at data from sensors that might be useful to citizens such as pollen count; mobile health looks at a model monitoring citizens' bodies. Respondents discussed m-health, but s-health was

not specifically identified. Discussion of crossing state borders came up during interviews and the value in ease of crossing the frontier.

> *I have used the DHA Dubai Health Authority app, I have used the SEHA app to book Covid appointments. I've used Alhosn, yep, I used to use it all the time using all those three four so Alhosn I would use to go to Abu Dhabi, for example on at the border. P18*

Although the adoption of some technologies to access physical healthcare such as appointments could be problematic for some.

> *Health care it's pretty good, but it's somewhat a bit frustrating still but yeah, but to have all of those things in one place. I still getting used to it. So I guess I'm a I'm a late adapter. I'm not an early adapter of these things. P15*

Again, it is worth noting that this respondent is from the older age range, suggesting that age might have an affect on adoption (Hou *et al.*, 2020). Cao, Zhang and Liu (2022) identify that m-health apps have been found to provide a range of values to citizens, such as functional value in the apps themselves, emotional value and social value as the bond with the caregiver increases, and increased satisfaction. Societal value was also found to have been created. Work from Su, Shen and Guo (2021) and Santos-Vijande *et al.* (2022) echoes this, while adding that m-health could be personalised and provide much more empowerment to the patient, this they say is evidence of value co-creation.

Transportation, mobility throughout the city, has often been seen as the lifeblood of cities, be that transportation public or private, transporting goods or people is essential. This is equally true in the story of smart cities (Vuchic, 2002; Naseer *et al.*, 2021). Wan, Ghazzai and Massoud (2019) recognise an increase in the use of taxis in smart cities. Coupled with that is expectation from customers of having a short waiting period and a clearly assigned taxi for them. This is highlighted in interviews, such as the quote below and touches on the ability to be assigned a taxi.

> *First of all, you're, you're sure that the taxi will be assigned for you….. But at least I know, especially morning that I have a plan A if this doesn't happen, I will find one on the street. Okay. But it's good to have a schedule to know that there is a taxi free. P22*

Research from Qi *et al.* (2013) on taxi waiting times suggests that smart city data can greatly improve waiting times. Findings from Wang *et al.* (2021) state that data from transportation systems can create value for the citizens. Standing, Standing and Biermann (2019) recognise this value creating in relation to the sharing economy, the power of data has provided many different options to the citizens for transportation including ride-sharing and car-pooling options. This next respondent sums up some positive feelings interviewees had about public transportation and laments the limitation of the rail and bus network.

> *When I lived in the Marina, I used the metro a bit more than I do now. I mean, I haven't used it in the last two years, so a lot more than I do. And I more often used the tram the tram that went to Knowledge Village Knowledge Park. That was super handy. I kind of miss it. I missed the convenience of that obviously. Now I don't live on a tram or metro line. So it takes away any benefit for me using it. So even though the city itself is still as well connected as it always has been. Where I'm living now I need to drive to park my car somewhere to get the maximum amount. P8*

Paiva *et al.'s* (2020) research recognises the convenience of mobility services like the metro. Building on this, the next respondent initially had a preference for private car travel, however the quality of the metro service assisted in a change in behaviour as well as aiding in reducing road traffic.

> *And I'm one of them people like I quite like taking a car to work because it's your 10-15 minutes to kind of like just gather your thoughts live in your own little world. And I just it was so stressful and so overwhelming that I started to do the gold[1] thing on the metro just so that you could have like that time to just have a bit of peace and sit. So we got rid of one car and I was taking the metro and then we've only kept one car since because when I changed jobs again and was driving again, we just thought we can make it work. P13*

Tripathy *et al.* (2020) recognize that different types of shared transportation can provide users with time to relax. The experience with parking services was often mediated through parking meters as this next quote demonstrates.

> *I use the metro. I use I, you know, obviously procure parking services like when I'm out and about I and then even just the booking through the parking system. P12*

[1] Dubai Metro offers a Gold Class, this is similar to first class on other type of transportation, offering a dedicated carriage, larger more comfortable seats, for which a premium is charged.

Sant *et al.* (2021) discuss the value of pay-as-you-go parking and the benefit in terms of cost to the user. Findings from Al-Turjman and Malekloo (2019) build on this, suggesting IoT parking services provide improvement in quality of service generally as well as efficiencies in the service. Nikitas *et al.'s* (2020) research shows the ability for transportation to add value, satisfying users' value and societal value, they also see it as a source of social inclusion. Nikitas *et al.* (2020) also refer to the concept of Mobility as a Service (MaaS). Moving on from public transport to other public amenities, parks and cycle tracks often appears in comments from respondents.

> *There you go for a walk around in the good weather like it's just a perfect place. To be. And Al Qudra in if you consider that. I mean, it's not a park, but it's a public service. That's something that I used to use a lot of until maybe a year and a half ago, when I stopped cycling as much but that's fantastic. To be able to cycle for 40 something kilometres in that one loop and you know there's the track is much longer than that. But for me that was my quota. But to be able to cycle through the desert on the proper road maintained very nicely. You know, it was clean there. P8*

Bamwesigye and Hlavackova (2019) highlight the value of cycle parks, cycle lanes and bike hire, not just for the benefit of traffic reduction but also the health benefits to citizens. Koshtura *et al.* (2020) see a great demand for bike sharing in their work. Cycle parks were not the only types of parks mentioned; public parks and beaches also came up in the discussion, public spaces being an element of Giffinger and Gudrun (2010). Parks and beaches were often commented upon for their cleanliness and access to facilities such as toilets, interestingly this next quote recognises the value not only for residents but for tourists as well.

> *I really love the beaches here. Because they're not overcrowded and they're very convenient. So you can find anything you want. I mean, like, if you need toilets, or if you need showers or just to wash your feet or even like I mean a lot of beaches, they have a lot of cafeterias so like basically you can find everything what you need and everything is white modern than and clean. And the beaches themselves they are good. I mean the normally all sand beaches, which is good for families for kids. So I think they have perfect conditions, for instance, and for tourists. P20*

Heikinheimo *et al.*'s (2020) work on urban spaces suggests that users find value in public spaces such as parks. This value can come in many forms such as physical exercise, jogging, walking pets and more social activities such as eating and socializing. Nitoslawski *et al.* (2019) support this saying that urban spaces can be of benefit to a range of stakeholders.

The Roads and Transport Authority (RTA) was another aspect of the smart city that respondents brought up; while many of their services are available on an app, cars have to be physically checked once a year at an RTA approved test centre.

> *Actually, I had to go to the RTA centre to have my car checked. And then once I got like an acceptance letter for my current and I can, they told me to go on this mobile application and we knew my registration there. Yeah, yeah. I could also pay with my re-registration fee on Mobile applications. P17*

Miyata's (2011) work on vehicle registration in smart cities found that these online services can greatly improve efficiencies for all stakeholders. RTA test centres lead into the area of physical services, those which are not entirely online. These often came up in the discussion, as illustrated by this next quote which focuses on the mail service.

> *I want to send something to family and friends in the US specifically, or to India or UK or any of the other places, I know people it's hard. It's really difficult to send mail and I have to go out of my way to go down to a post station and drop that off and make sure I've, I've posted it correctly. I had a instance early on when I moved here where even I didn't have a good experience at the post office. I put the stamp that was advised me to put on a letter and I had several letters I dropped them in and they never got to their intended destination. So yeah, it just seems like it's a hole in the system somehow. The mail system so yeah, I don't understand it. Exactly. P12*

Li *et al.* (2019) recognize the importance of the postal service in public value creation in their work, as do Church and Moloney (2012). But physical public value is not limited to the postal service. Cultural centres such as museums were also cited by interviewees.

> *On occasion museums on occasion okay, how would you find the libraries in the museums or kind of was a new one in Sharjah is astonishing. Yeah. Absolutely beautiful. And the new one that just opened here in Dubai. I went up to it yet but like to see that again, looks really stunning buildings. In museums, yeah, I've got quite a few here. And my favourite one is closed. And that's the old Dubai Museum. For renovations. I've been up to Etihad had where the Emirates the Trucial States became the Emirates. P11*

Borda and Bowen (2019) recognise the importance of museums and cultural activities within a smart city, both physical and digital. They touch on co-creation by stating that the role of the citizen is to engage in social and cultural activities connected to the museums, social value is created by this engagement, not just for the individual but for the community as a whole. This view of value is echoed

by work from Mubarak *et al.* (2021). Kumar *et al.* (2020) make the point that with the growth of digital cities, the physical elements (housing, water, sanitation, health and education) of cities should not be forgotten. Their findings go on to state that as cities develop there will be an increasing need to integrate physical and digital elements as this has been shown to create user value for citizens and other stakeholders. The ideas of recycling and sustainability also came out of the discussion of physical services. Respondents seem to be very proactive with green and energy saving aspects of the smart city. Citizens would use the data provided by DEWA to alter their behaviour.

> *I tried to analyze it and see how we can be greener how we can be more carbon footprint aware. And then see what can I reduce my water consumption, my electricity consumption? P19*

Mutule *et al.* (2021) state that smart energy services can provide value to citizens through efficiency of use and financial savings. However, they do point out that developing user behaviour is important for this value creation, this should be done through providing actionable information. This is reflected in work from Al Nuaimi *et al.* (2015), Kim *et al.* (2021) and Zhang, Manogaran and Muthu (2021).

Moving onto the area of physical experience, cleanliness has been discussed in a range of areas in relation to smart cities, including streets (Li, Bhushan and Gao, 2018; Zhang *et al.*, 2019), public spaces (Basu, 2019) or refuse (Khedikar *et al.*, 2017).

> *Bathrooms are very clean. The parks are also clean and think, whether it's that people know not to leave their rubbish around or they pretty much good at picking up, whichever. I'm happy with the end result. P21*

It has long been understood in the service sector that cleanliness is important for value creation (Huckestein and Duboff, 1999), while research from Hasting (2009) recognises this in the city context. Many interviewees described Dubai in a very positive way, as an innovative environment. This was perhaps recognised more by expatriates who had a wide experience of other places in the world to draw on.

> *So normally, because I've been around many different countries, but even though they have this kind of services, they are not actually for expats or foreigners down for like their citizens. Okay, from our residents, but in here Yeah, it is this very expat*

> *friendly in Bern. So I'm really grateful. So they are opening all these services for expats as well. P17*

Alongside this gratitude toward Smart Dubai, another interviewee felt moved to use the term spoilt in relation to the city, suggesting some kind of privilege over and above what is received in other cities.

> *I don't know whether you've been spoiled here in Dubai. Use the word Dubai spoiled as I feel I will not survive back in my home country and that's the biggest fear I have. So all in all, yeah, but in terms of cost of living if at all I want to add one thing. Yeah. It's a bit expensive, you know recently. P7*

There were also positive feelings toward future development and innovation, as well as the opportunity to visit elsewhere.

> *I'm so very impressed with what we have here in Dubai, we're so spoiled in in the services in the speed of innovation here the decisiveness of government to implement something to improve on that if it wasn't going well and you know, at the start my wife and I always have that conversation where we're so lucky we're here because we get to travel a lot also, you know, we're Dubai is a great location to travel to other areas. P3*

Many of these responses relate to pride. Morrison (2016) discusses pride as the belief that the individual has had some role in generating the phenomena. Scholars have also taken this as a link to co-creation (Foster, 2022). This value is understood to be irrational, however it is apparent that in many city inhabitants it provides an emotional value to the city (Collins, 2016; Morrison, 2016).

However, value can be destroyed by poor experience and there were a number of comments from respondents in relation to the poor training or lack knowledge of staff and the effect that had on the service experience. This first experience was in relation to a visa application, which some respondents recognised could be a stressful experience at the best of times and has recently been allowed to be facilitated by the private sector.

> *I think the typing centre staff knew that, for example, any visa application you would need a photo. But I think that the staff there are not well trained to deal with even very simple and common queries. There was a language barrier as well. And I do believe that they had that information from the government but they themselves are not put together enough and organised enough to give that information to their customers. And they're probably quite used to. They use WhatsApp for these communications. So they use WhatsApp and they do it in a very sort of casual way. Like they treat it like a social chat. P18*

While the respondent did admit the visa application itself was successful, the experience was not and trust had been eroded purely through the experience. This next respondent was going through an application for a driving licence at one of the RTA Happiness Centres.

> *I remember once being almost in tears because one person sent me to another person to another person to another person. And it took me hours and hours and seeing loads of people and everyone gave me different information. P1*

It would appear that not only had lack of trained and informed staff led to a breakdown in the service delivery but also a very negative emotional experience for the customer. Aspects of this experience seem to typify the services gap identified in the SERVQUAL model (Parasuraman, Zeithaml and Berry, 1985). This has potential impact on both emotional value and functional value creation and destruction. Research from Smith (2013) has demonstrated that the lack of training and information provided to customer service staff can significantly affect value creation, leading to value destruction. Engen *et al.* (2021), who focus on the public sector, outline factors such as bureaucratic incompetence and failure to deploy public resources as being at the root of service destruction in public sectors such as smart cities. This is echoed by work from Sønderskov and Rønning (2021). Despite the negative comments around interaction with staff, there were by contrast, positive staff experiences raised by the interviews. This first response is from an interviewee requiring vaccination information.

> *I would say though, when I've needed to speak to a human being, for example, Dubai Health Authority when I needed to ask them questions about eligibility PCRs I spoke to a human being. I called a number and they were fantastic, good. P16*

Medical services have been discussed earlier and many had found benefits to the online services that were offered, however the ability to contact a service representative for discussion appears to be a major benefit. This next interviewee, when arranging his rental agreement (Ejari) just went straight to the human representative, perhaps this is not in the spirit of the smart city environment, but he found it valuable.

> *Sometimes I go straight to the human being to avoid problems. So when I have to do my Ejari, I always went to the Al Manara Centre because they felt even though you can do it online. I thought it's easier to go there and to sort things out, just because I am. I've been told and maybe a little bit more conservative. P4*

It should be noted that this participant did identify other areas of the smart city where he did not use human based services throughout the course of his interview. Findings from Huang (2018) state that staff can make a valuable contribution to an individual service experience. Giesbrecht, Schwabe and Schenk (2017) make the point that involvement from citizens can help co-creation service improvements. Adding to this, Muschkiet *et al.* (2022) suggest that good service encounters or experiences create value for citizens. Some respondents felt they 'lacked technical proficiency' or were at least uncomfortable with using some of the digital services. This lack of ICT skills within smart cities has been recognised by other studies and has the potential to negatively impact adoption of smart city services and continual use (Stratigea, Papadopoulou and Panagiotopoulou, 2015; Liu *et al.*, 2021). This lack of skills is often within some of the more vulnerable groups as has been touched on earlier (Skouby *et al.*, 2014) in terms of accessibility and again this runs the risk of widening the digital divide. That being said, this next quote comes from a respondent who is not in the oldest age grouping.

> *…definitely don't like that term, digital native I think, on our experience, as educators has borne out the fact that it's short of meaning, in my mind, it's a meaningless term. We have some very young students who are supposed to be very tech savvy, who struggle with the most basic of interactions with technology and we have much older students who wouldn't fit into a digital native category by definition and who are super with netiquette super with using platforms using different software. P8*

The next respondent was discussing a range of online services that she did not use, but her anecdote focused on the petrol delivery service CAFU.

> *Particularly, for example, going to the bank or something like that. And using an app like CAFU[2] , you know, I don't use it because I'd rather go to the petrol station, which is really old fashioned, but hey, oh, no, I'm not taking I'm not technical and I don't like apps unless I've really got to use them. P1*

The quote highlights resistance to some technologies and a perceived lack of technical skills, as well as a reluctance to adopt technologies unless compelled to, while by contrast other respondents recognised a lack of knowledge or skills was not a barrier, but they felt they had to take a leap of faith.

[2] CAFU is a service that provides services such as refuel, tyres and battery replacement to your car wherever you are.

> *I'm not sure that lack of knowledge would stop me using it because I think it's, it's outside my area of knowledge…I've just got to trust. P15*

This desire to move outside their comfort zone is apparent in a number of respondents. This next quote recounts a travel experience, where the participant was travelling with a friend who was using the app to show vaccination, while the participant stuck to paper vaccination certificates.

> *I carry paper copies of everything my best friend when we travelled together and she had her phone out with the app what you call it like the QR code [Reference to Alhosn app]? Bing, bing bing, bing, bing, [Imitating the sound the Alhosn app makes], and I was sad with my paper copies of everything. I don't know. It's just me. I just need to be I am transitioning very slowly. P16*

This demonstrates the recognition that change is necessary within the individual, in order that they engage more in the benefits of the city. She could see the benefit that her friend experienced, this could be seen as Word of Mouth (WOM) communication, which has been discussed before as an important way to inform citizens of the value offerings. Discomfort at using smart citizen technologies has been recognised by Mora *et al.* (2019) and fear of automation by Allam and Dhunny (2019). Findings from El Barachi *et al.* (2022) state that discomfort with smart city sector technologies can have an impact on both continuous use and satisfaction.

The quality of service provided was also touched upon by respondents, although this seemed to be expressed in terms of quality of life. This is perhaps to be expected, given that this is a key aspect of smart cities (Giffinger *et al.*, 2007; Giffinger and Gudrun, 2010). For some this quality of life was those intangible elements that occasionally were experienced in tangible services such as parks.

> *Because, you know, quality of life. Means a lot of things to lots of different people. But for, for me, it's just the ability to detach and on why and to get yourself into a frame of mind where it's not about work or obligations or something like that where you're just enjoying the moment. And I think the surfaces like the parks like the Quadra cycle track, you know, these are things that add value. They add value to your psychological well-being they add value to your health, and I from a holistic perspective, I think they're so important. You know, obviously, life in general, has its challenges life over the last couple of years particularly so for many people. These small pleasures, they, they make everything so much better. P8*

The idea of a separate mental space away from work seemed to be beneficial and the route to that space appeared to be physical services such as the parks and cycle tracks. This space appears to be something

that was considered important for physical and medical health as well. Again, the idea of privilege came up in relation to the quality of life discussion as the next quote highlights.

> *Like the sort of more privileged expats who are kind of here not just for because they need to be here, but because they actually like adds a lot of value to their life and they get a lot out of it, whereas obviously there's like a large community of people here who it might be a sort of better opportunity, but they're still not living the life that some of us are lucky enough to live. P13*

Research from De Guimarães *et al.* (2020) shows that well implemented smart cities have the potential to improve quality of life and improve well-being, this is echoed by Karatzimas (2021). While Paskaleva, Evans and Watson (2021) state that ICT is the primary driver for both quality of life and economic excellence with smart cities; Patrão, Moura and de Almeida (2020) make the point that indicators of quality of life should be at the centre of any assessment of the performance of a smart city.

While many felt that quality of life was an important part of their smart city experience, no one felt that having a smart city would be the main factor in their decision to move to another location.

> *And I think it would, it would play a role in my decision making process. But I also think it would play a bigger role depending on when. So let's say while I'm still working, I still have to do a lot of stuff. If I'm let's say it depends on the country. P8*

Work from Harvey, Groutsis and van den Broek (2018) suggests that a positive reputation of a city might influence an expatriate's decision to move to that city. Glassock and Fee (2015) reflect this, stating that a range of different factors are considered beyond the city itself, such as career development, quality of life and family adjustment.

Issues of safety, security and trust were raised by interviewees. Ristvej, Lacinák and Ondrejka (2020) make the point that safety in the smart city context has not been widely explored in academic literature.

> *of course. I feel safe anyway. Here. It's not like Greece or other places, but it's good to know it even for me because sometimes I look the road that the taxi driver takes and give my guidance sometimes but yes, if you know the name, you know, the number if something happens, you can call it's good. P22*

Moch and Wereda (2020) make the point that personal security in cities has been overlooked. They go on to say that smart technologies can help redress the balance through mechanisms such as CCTV.

Sham *et al.* (2019), focusing on taxi travel safety, state that ICT has had a positive impact on usage and feelings of safety. Looking at public transport, Friman, Lättman and Olsson (2020) highlight the importance of citizens' perception of safety, stating that it is a key function of the service and of continual use. Linked to safety was the issue of trust.

> *So I kind of just go well, I've just got to trust that they can do something that they do this. But yeah, I think it's a single Okay, well, it would certainly get all the apps off my phone. P15*

Writing of trust in smart cities Cao *et al.* (2016) say that trust is key for sharing IoT data between stakeholders. Building on this Neupane *et al.'s* (2021) findings suggest that perceived usefulness and perceived security of information will both build trust, while trust in the smart city itself will foster intention to adopt in citizens.

5.8. Conclusions of Qualitative Research

Analysis of the findings of the qualitative stage of this research has led this research to examine four overarching emerging themes. These were information exchange within the city, convenience of city services, touchpoints within the city and the city experience. These elements also appear to have a strong linkage to one or more of the four dimensions of value creation; emotional value, social value, functional value (price/value for money) and functional value (performance/quality) (Sweeney and Soutar, 2001).

The theme of information exchange within the city has shown that respondents see the value in sharing and exchanging data as well as some of the drawbacks and concerns about data security, not to mention concerns about accessibility and the digital divide. The connectedness of data was seen to have value in the form of the Emirates ID and UAE PASS to access services such as medical, transportation and visas. This theme has also demonstrated aspects of confusion around what the city is actually responsible for and the damage to value creation that can occur with inconsistent information across platforms, between staff and between different states (Emirates). These findings have tended to focus on two main dimensions of value; that of social value and functional value (performance/quality).

The theme of convenience of city services sparked a great deal of discussion around the convenience of access and use of smart city services, how convenient and useful they were. This convenience was not confined to one particular aspect of city services and the process for all sectors was generally found to be convenient. This also related to time and journey saving that could be made through the convenience of these apps. While there were instances where convenience was not all that it could be and time and journey were wasted, which could lead to value destruction, the responses were overwhelmingly positive about the smart city services. These findings suggest dimensions of value were being employed, in the form of value, functional value (price/value for money) and functional value (performance/quality), with potentially some aspect of emotional value in the form of satisfaction with the convenience.

The theme of touchpoints within the city is probably the most readily acknowledged theme, with respondents citing a wide range of channels they use to access and engage with the city services. The issue of convenience of channels came up as well as the use of multiple channels, which leads back to the discussion of interconnectedness of data. These points were not without their detractors as multiple channels could create confusion, particularly when data was inconsistent between those channels. Costs of services also came up during the discussion as these touchpoints are often the point for paying for services or settling fines. In addition to cost and payment considerations, softer aspects arose out of the discussion, in the form of social and emotional value. Social and emotional aspects, or lack thereof, in relation to channels to report services, such as crime through the police kiosks, came out in the research. These were often found to be impersonal, leading to co-destruction of value. This theme very much links into all four value dimensions that have been discussed; emotional value, social value, functional value (price/value for money) and functional value (performance/quality).

The final theme is that of city experience, encompassing tangible and intangible factors around expatriates' engagements with the city. Expatriate residents' positive and negative experiences of parks and museums came to light here, showing value in terms of quality of life and health. Environmental benefits were also highlighted here such as water and electricity usage. Experience within services

experiences have been covered in this theme, showing where value has been or could be created. These experiences have come from a wide range of services, from medical through to transportation and they highlight areas such as cleanliness, customer service and trust as being connected to value. This theme relates to dimensions of value such as emotional value, social value, and functional value (performance/quality).

Having examined these themes carefully and looked at them in relation to other published research, there is a better understanding of the value related themes experienced by expatriates engaging in Smart Dubai. Based on these themes it is possible to develop a conceptual framework which can be tested via quantitative means with a larger sample to provide greater insight into the themes and their role in creating value in Smart Dubai.

5.9. Identification of Variables for Quantitative Pilot

Having drawn together conclusions from the qualitative data collection and found greater clarity on the themes at play in the smart city context, it is important to consider how to operationalise these themes for examination in the quantitative part of this study. Accordingly, the following sections demonstrate how these themes align with the conceptual framework and further support why they should be tested in the quantitative stage of data collection. This will support a more detailed discussion of operationalisation later in the chapter.

5.9.1. Information Exchange Within the City

Smart cities are built on information exchange via ICT (Ranchordás, 2020), so it is perhaps unsurprising to see this emerge as a topic and value co-created is in part brought about by information within cities (Allen *et al.*, 2020). This information exchange was highlighted by a number of interviewees across a wide range of service sectors, such as healthcare, transportation and law enforcement. This is perhaps best articulated by the quote below;

> *I've had to go to various different hospitals within Dubai, to get treatment and it's quite easy to have it all linked through my Emirates ID so that, you know, right*

away, they can see all my insurance information. I don't have to like pay co pays or whatever, and then get reimbursed like it's all figured out. P12

This next respondent has had a car accident, something he would not have been aware of was it not for digital CCTV as he would not have been able to report to the police as quickly were it not for the Dubai Police app.

A few years ago when the app first started that happened to my wife and it wasn't impossible to use. It was just it was ridiculous. It didn't work it didn't upload it didn't. This time I went out with the girl. So the background was is that my I wasn't even in the car. My car was parked. Someone ran into my car. I got security look at the video camera. Security then identify the vehicle that that person was driving. She then came with the security came to see me we went out to the car. She did it on her app. She took a photo of my car uploaded that took scan my licence plate scan my driver's license, scanned her license plate scanned her driver's licence, so there was no physical input and then uploaded it within. I want to say 30 minutes the police called her and said were you at fault she said yes. And I had a police report within an hour. P6

Finally, in relation to security of data, this interviewee summed up what many had stated.

…never worried about my data. P8

Recognising this, Barnes and Vidgen (2003) use a variable to measure the quality of the information in this exchange, which encompasses factors such as accuracy, relevancy and believability of information as well as the information being easy to understand. These elements also have a connection to the work of Lim *et al.* (2019) who state that customer data can provide service improvements, and Romanelli (2018) who highlights the importance of access to and sharing of information as they empower city stakeholders in creating value.

5.9.2. Convenience

Convenience was the next variable that came out of the data collection, this is demonstrated by the quotes below. Firstly, in relation to the Emirates ID card which interfaces with most city services:

Yeah, it is convenient. Absolutely. The fact that I've never had to show my passport anywhere it that's not a thing in other countries. So I do think that it is convenient. I understand why some people may be would have privacy concerns. But for me, I think I value is convenience. P18

Then in relation to the vaccination app offered by the city healthcare department.

> *And it's also very convenient to use it on airports because you can pull up the thing and say, Yes, I am that [vaccinated] and you can put it up at museums or galleries that require kind of proof vaccination. That's I'm okay with that. P11*

Also, in relation to motor services.

> *I'm using RTA mobile application to renew my driver's licence and to re-register my car is so convenient. P17*

Building on the travel aspect, this respondent discussed paying for parking.

> *Convenience, I just walk away from it and it's easier to do it on my phone plus, plus doing it on the phone was that not that NOL card if I do it for an hour, then if I'm over an hour, it'll send me a reminder because I don't want to pay the fine for being over the hour. P6*

Finally, this respondent talked about the time saved by using self-service kiosks to access services.

> *Yeah, because you're not wasting your time trying to explain something to human being you just click on an option. And then you can do the transaction. P19*

Convenience is a factor that is important to cities and value creation, as can be seen in work from Wang *et al.* (2019), Dreyer *et al.* (2017), Turkinevych and Badánik (2022) and Barrutia, Paredes and Echebarria (2016). In terms of measurable variables for this, the work of Chang and Chen (2008) provides a suitable way to measure as it links to both the points that have been raised by interviewees and the work of scholars in this area.

5.9.3. Touchpoints with the City

Touchpoints were widely discussed as part of the customer journey. This links to work from Iglesias *et al.* (2018) and Kabadayi *et al.* (2019) that examines the importance of touchpoints within value creation and the city service experience. These touchpoints are by their very nature the connection points between the citizen and the city, so are widely experienced and commented on by the interviewees. The first quote outlines the multiple touchpoints for accessing services.

> *Well, the issue that I would say that Dubai has is it has several apps that are one stop shops and not every app has the same thing. So you do end up using multiple apps. So for example, when Coronavirus came out they wanted me to use before UAE PASS came out there was log on to the DHA one there was log on to another one that came out and after a while I wasn't sure I wasn't completely confident what*

I was supposed to be doing. I would say the same the job right now at covers my Salik and it covers my fines which are the main two reasons why I use that app…. I'd expect that more to be under the RTA app. That being said, I'm sure there's other apps that I would actually rather do everything online through apps. P16

This next respondent highlighted the value of choice.

I think that by having multiple routes, it just lets people use whatever is more convenient for them. Especially because you know, maybe Careem if I pay my bills through courier, you might get points on my credit card or if I use this app I get air miles or if I use this app, it's just I just like it because it's more streamlined. I don't get anything out of it other than streamlining. So I think, you know, having choices just lets people choose what they like best, I guess. P2

While this respondent outlines the point that some of the touchpoints can be physical rather than digital and that personalisation is important.

So I was doing that in the just in the tram station on the machine. I don't think I've ever used the app for that but more just because whenever I was using the NOL card I was passing those machines anyway. So it seemed easier just to kind of do it on that. P13

The integrated nature of the touchpoints and the value within this was discussed by the following respondents in relation to fines and impoundment of vehicles.

Unfortunately my car got Smart impounded. That's the name Smart impound. So I did everything through the Dubai police app, which is obviously has RTA integrated in it. P5

For this variable, work from Jaakkola and Terho (2021) is suitable; their measurement tools look at the encounters people have with touchpoints and the ability to access the service through them.

5.9.4. City Experience

The evidence seems to suggest that the experience is valuable to citizens. The experience is deemed to be fundamental in service value creation (Vargo and Lusch, 2008).

This interviewee discussed the benefit of an upgraded service on the metro and how that helped not only with the travel but their well-being.

And I'm one of them people like I quite like taking a car to work because it's your 10-15 minutes to kind of like just gather your thoughts live in your own little world.

And I just it was so stressful and so overwhelming that I started to do the gold thing on the metro just so that you could have like that time to just have a bit of peace and sit. Yeah. Yeah. So we got rid of one car and I was taking the metro and then we've only kept one car since because when I changed jobs again and was driving again, we just thought we can make it work. P13

Continuing the well-being idea this next respondent talked more broadly about a range of services.

There you go for a walk around in the good weather like it's just a perfect place. To be. And Al Qudra in if you consider that. I mean, it's not a park, but it's a public service. That's something that I used to use a lot of until maybe a year and a half ago, when I stopped cycling as much but that's fantastic. To be able to cycle for 40 something kilometres in that one loop and you know there's the track is much longer than that. But for me that was my quota. But to be able to cycle through the desert on the proper road maintained very nicely. You know, it was clean there. P8

She also went on to discuss how the city services adapt to fit her needs.

…that's something that I find very good. Like there were there were ways that things happen here in this city that make your life a lot easier than they otherwise might be. P8

These experiences highlight the value created through experience within the city.

5.9.5. Four Dimensions of Value

Moving into the dimensions of value (Sweeney and Soutar, 2001), which are characterized as emotional value, social value, functional value (price/value for money) and functional value (performance/ quality).

Firstly, looking at quality, which is characterized by Sweeney and Soutar (2001) as one of the two functional values, evidence suggests that quality is an important aspect of value creation. This is supported by data from the interviews. As one respondent put it in relation to settling fines:

…experience of sorting out fines is fantastic. I actually don't use their app. I use the DubaiNow app, which is connected to a bunch of different services. That the government has, which I find very effective. P16

She went on to discuss the quality of other services.

Dubai Health Authority when I needed to ask them questions about eligibility PCRs I spoke to a human being. I called a number and they were fantastic. P16

This discussion of quality extended into physical facilities as highlighted by this next respondent.

> *Bathrooms are very clean. The parks are also clean and think, whether it's that people know not to leave their rubbish around or they're pretty much good at picking up, whichever. I'm happy with the end result. P21*

Quality was also discussed in relation to quality of life, which is one of the pillars of smart cities (Giffinger and Gudrun, 2010). This next respondent highlighted quality of life and added value in a very clear way.

> *Because, you know, quality of life. Means a lot of things to lots of different people. But for, for me, it's just the ability to detach and on why and to get yourself into a frame of mind where it's not about work or obligations or something like that where you're just enjoying the moment. And I think the surfaces like the parks like the qudra cycle track, you know, these are things that add value. They add value to your psychological well-being they add value to your health, and I from a holistic perspective, I think they're so important. You know, obviously, life in general, has its challenges life over the last couple of years particularly so for many people. These small pleasures, they, they make everything so much better. Yeah. P8*

Quality, along with price, is one of the two key elements of value creation identified by Zeithaml (1988), therefore, given the responses from the interviews and the linkage to other literature, the variable from Sweeney and Soutar (2001) will be used to test this aspect.

Emotional value has also been evident during the interview process. Many positive emotional terms were used to describe a range of services that the city offers.

> *I don't know whether you've been spoiled here in Dubai. Use the word Dubai spoiled as I feel I will not survive back in my home country and that's the biggest fear I have. So all in all, yeah, but in terms of cost of living if at all I want to add one thing. Yeah. It's a bit expensive, you know recently. P7*

Another interviewee highlighted some specific city services which brought them joy.

> *That's really fantastic. Yeah. Great. Multimedia section downstairs we would for graphics multimedia was terrific. Great story to read. I've been to a lot of museums and Sharjah museum was one. The Islamic culture was terrific. And Sharjah Art Foundation is terrific. P11*

However, the emotional effects of the city could also be negative as this quote demonstrates.

> *I remember once being almost in tears because one person sent me to another person to another person to another person. And it took me hours and hours and seeing loads of people and everyone gave me different information. P1*

Emotional factors play a key role in value co-creation (Holbrook, 2006; Saha, Mani and Goyal, 2020), as well as the sharing economy (Buhalis, Andreu and Gnoth, 2020) and a strong linkage to city living (El Barachi *et al.*, 2022). In addition, emotional factors have been identified as particularly important in relation to expatriates' experience (Dang, Rammal and Michailova, 2022). This variable will also be tested through the work laid down by Sweeney and Soutar (2001).

Looking at price/value for money, there is a large amount of evidence to suggest that this element is important to respondents and a key aspect of value creation and therefore a variable to be examined. As this respondent put it, when referring to the daily price of city taxi services.

> *So it does make a difference when it's like five dirham it's only five dirham's, but if you do it every day, or it adds up, so I think it was mostly about the price. P18*

Looking more widely this next respondent discussed public transportation (rail, metro and bus) more generally.

> *And then the fee for the public transportation system here is very cheap compared to other countries. P17*

In addition to the actual cost of services, the value for money aspects come in. The information element of apps and websites can track usage to enable informed use of valuable resources such as electricity and water as made evident by this respondent.

> *…actually it does have features or I would say it informs me how I can control my electricity expenditure. Very small thing but it does make a difference. If I'm not at home for nine hours, I put the plugs off even though you don't need to do it. But it does have an impact. I'm watching so it's a very good app. I actually watch my electricity and water consumption. P14*

This also links to sustainability which is one of the key aspects of the smart city concept (Giffinger and Gudrun, 2010). Price is seen as a key component of value co-creation and it is highlighted by many scholars such as Payne *et al.* (2020) and Zeithaml (1988). Given the importance of price in both the

academic literature and the findings from the data collection, the variable from Sweeney and Soutar (2001) will be used to examine this component in a quantitative way.

The social value of cities is another aspect that has been documented in the literature (Holbrook, 2006; De Falco, 2019) and the respondents raise some points on the social value they felt as a result of living in the city. This respondent recognised the value in terms of community.

> *Like the sort of more privileged expats who are kind of here not just for because they need to be here, but because they actually like adds a lot of value to their life and they get a lot out of it, whereas obviously there's like a large community of people here who it might be a sort of better opportunity, but they're still not living the life that some of us are lucky enough to live. P13*

This next respondent saw value in the social status that was received as an expatriate.

> *So normally, because I've been around many different countries, but even though they have this kind of services, they are not actually for expats or foreigners down for like their citizens. Okay, from our residents, but in here Yeah, it is this very expat friendly in Bern. So I'm really grateful. So they are opening all these services for expats as well. P17*

This was echoed by this respondent who felt 'spoiled' as an expatriate resident here.

> *I'm so very impressed with what we have here in Dubai, we're so spoiled in in the services in the speed of innovation here the decisiveness of government to implement something to improve on that if it wasn't going well and you know, at the start my wife and I always have that conversation where we're so lucky we're here. P3*

In addition to the importance of social value, social factors also have an important impact on expatriate assimilation (Kunz, 2020). To capture this important variable Sweeney and Soutar (2001) will be used.

5.9.6. Perceived Service Value

Finally, there is the perceived service value, which examines the totality of the value that citizens perceive within the city. This overall service value perception is an important factor and has been examined by numerous authors such as Hafer and Ran (2022) and El Barachi *et al.* (2022). In summing up, many of the respondents drew upon experiences from outside Dubai by way of comparison.

> *I'm so very impressed with what we have here in Dubai, we're so spoiled in in the services in the speed of innovation here the decisiveness of government to implement something to improve on that if it wasn't going well and you know, at the start my*

> *wife and I always have that conversation where we're so lucky we're here because we get to travel a lot also, you know, we're Dubai is a great location to travel in, in in other areas. P3*

From a US perspective.

> *So I mean, that's pretty it's far and away better than my experiences in the US and other countries too. So yeah, and speaking on largely more about smart cities and stuff. It's interesting to see the ways in which Dubai is sort of leagues ahead of other cities, in certain respects. And then, and then other things that seem like they're still in the stone ages. P12*

This final quote looked particularly at services from non-Western countries.

> *I really do think that if you compare Dubai to China and Russia that the quality of services here is just so much better. I'm sure I could come up with a couple of examples. If I really had the time to think about it. But off the top of my head. I really can't think of anything because when I think about Russia is just painful. Using government services. I've never even tried to use any to do anything digitally, but I haven't lived there in a while as well. And in China, some things also tend to be quite, quite difficult. P18*

In this case the variables from the work of Li and Shang (2020) are to be used to capture quantitative data.

5.9.7. Development of Variables and Constructs

The data collection has shown a strong linkage to finds from other authors looking at aspects of value creation, which is encouraging. This provides a solid basis to the claim that this research is able to provide insights into value creation within smart cities, which is not widely researched, as well as the experience of expatriates within this context, which again is not well researched, all of which links back to the study's initial research objectives.

RO1 – To investigate the perception of expatriate residents in terms of value from co-created services developed in Smart Dubai.

RO2 – To evaluate the extent to which the sharing economy determines value to expatriates in smart city services in Dubai.

RO3 – To investigate the role of value-in-use as expatriates engage with smart city co-created services and the shared economy.

In addition, the variables that have been identified above all have a linkage to one or more of the research objectives ensuring that not only does the quantitative data collection design have alignment with the qualitative data collection findings, but both elements of this mixed method approach will also help to inform the overall conclusions of the research in relation to the objectives that were set out.

To aid the understanding of all the constructs being used within the quantitative data collection design Table 5.3 below gives a clear definition of what each construct is and how it will be measured. The themes of information exchange, convenience, touchpoints and experience within the city are those which have emerged from the interviews and align with the conceptual model developed in this work. The dimensions of value, functional value (performance/quality), emotional value, functional value (price/value for money) and social value come from existing work designed to examine types of value. Perceived service value is also drawn from existing work and has been used to examine perception of overall service value.

Table 5.3 - Definitions of the constructs used in the study with sources – Source Author.

Construct	Definition	Measurement	Definition reference source	Construct source
Information exchange	The quality of the content of the site: the suitability of the information for the user's purposes, e.g. accuracy, format and relevancy.	7-point Likert Scale	(Barnes and Vidgen, 2003)	(Barnes and Vidgen, 2003)
Convenience	Srinivasan *et al.* (2002) refer to convenience as the extent to which customers see a website as simple, intuitive, and user friendly.	7-point Likert Scale	(Srinivasan, Anderson and Ponnavolu, 2002)	(Srinivasan, Anderson and Ponnavolu, 2002)
Touchpoints	Touchpoints occur whenever a customer interacts with the service provider across multiple channels and, therefore, are similar to service encounters.	7-point Likert Scale	(Bitner, Brown and Meuter, 2000)	(Jaakkola and Terho, 2021)
City experience	Overall satisfaction is an overall evaluation based on the total purchase and consumption	7-point Likert Scale	(Anderson, Fornell and	(Verhoef, Franses and

	experience with a good or service over time.		Lehmann, 1994)	Hoekstra, 2002)
Value dimensions - Functional value (performance/quality)	Quality can be defined broadly as superiority or excellence. By extension, perceived quality can be defined as the consumer's judgment about a product's overall excellence or superiority.	7-point Likert Scale	(Zeithaml, 1988)	(Sweeney and Soutar, 2001)
Value dimensions – Emotional	The perceived utility acquired from an alternative's capacity to arouse feelings or affective states. An alternative acquires emotional value when associated with specific feelings or when precipitating or perpetuating those feelings. Emotional value is measured on a profile of feelings associated with the alternative.	7-point Likert Scale	(Sheth, Newman and Gross, 1991)	(Sweeney and Soutar, 2001)
Value dimensions – Functional value (price/value for money)	The perceived utility acquired from an alternative's capacity for functional, utilitarian, or physical performance. An alternative acquires functional value through the possession of salient functional, utilitarian, or physical attributes. Functional value is measured on a profile of choice attributes.	7-point Likert Scale	(Sheth, Newman and Gross, 1991)	(Sweeney and Soutar, 2001)
Value dimensions – Social	This construct is derived from McGuire's (1968) concept of influenceability and is consistent with early research, which demonstrated that individuals differ in their responses to social influence.	7-point Likert Scale	(McGuire, 1968)	(Sweeney and Soutar, 2001)
Perceived service value	Perceived service value is a powerful mediator between service quality and citizens' continuous-use intention. The intention to use is a consequence of service quality, service value, and satisfaction.	7-point Likert Scale	(Li and Shang, 2020)	(Li and Shang, 2020)

Within each of these constructs are distinct items that will be used to elicit answers from participants which can be seen in Table 5.4 below. The majority of these items have come from existing work; the rationale for this is twofold. Firstly, the use of existing scales allows the research to have some degree of validity and replicability, knowing that the work has already successfully been used to provide

reliable responses in its respective topic areas. Hewlett, Hehir and Kirwan (2007) warn against the use of un-validated scales as the results could be unreliable. Secondly, as mentioned earlier, this mixed method approach 'QUAL+quant' is used (Morgan and Hoffman, 2021) with the qualitative element being dominant and the quantitative element attempting to confirm with a larger group the validity of the insights drawn from the qualitative stage as suggested by Harrison, Reilly and Creswell (2020) and Churchill (1979). With this in mind, the existing items from the authors cited provide suitable benchmarks for the concepts as they have been used in broader contexts, allowing this study to use them to measure these constructs in relation to the specific group of expatriates within the context of smart cities.

However, the bulk of the items to be used in the questionnaire have come from existing sources for the reasons outlined above. The work of Dellinger and Leech (2007) makes the point that construction of quantitative elements within mixed method research is an iterative process, therefore this study will introduce a small number of new items to the questionnaire, which are based on the findings from the qualitative part of the data collection. Pesudovs *et al.* (2007) provide guidance for the creation of items, stating that they should be simple, clear and to avoid addressing multiple concepts. These are firstly, IE7 city services keep data securely, as the collection and security of data was raised by several respondents. Secondly, C4 city services save me time, the issue of time saving, often in connection to convenience. Thirdly, T5 the city provides a wide range of connection points for me to access services, this is related to comments made by interviewees in regard to the multitude of ways to access government services in Dubai. Finally, E5 city services are responsive to my needs, this last item covers points made by respondents in connection with how the city responds to an individual's wants and needs.

The constructs of Sweeney and Soutar (2001) were not changed as these represent overall constructs of value creation that are applicable across a wide range of contexts. Similarly, the constructs from Li and Shang (2020) are already designed for use in e-government contexts.

Table 5.4 - Items used in the data collection – Source Author

Information exchange (IE)	IE1	City services provide believable information	(Barnes and Vidgen, 2003)
	IE2	City services provide timely information	
	IE3	City services provide relevant information	
	IE4	City services provide easy-to-understand information	
	IE5	City services provide information at the right level of detail	
	IE6	City services present the information in an appropriate format	
	IE7	City services keep data securely	Qualitative findings of this study
Convenience (C)	C1	A first-time user can purchase city services without much help	(Chang and Chen, 2008)
	C2	City services are user-friendly	
	C3	The city services are very convenient to use	
	C4	City services save me time	Qualitative findings of this study
Touchpoints (T)	T1	All my encounters with city services instil the feeling that they understand my unique situation	(Jaakkola and Terho, 2021)
	T2	Dealing with Smart Dubai in different channels feels personal	
	T3	I can deal with Smart Dubai in a manner that suits my situation	
	T4	Smart Dubai's service process is designed to	

		consider my specific situation	
	T5	The city provides a wide range of connection points for me to access services	Qualitative findings of this study
City Experience (E)	E1	Personal attention is given to me when I use city services	(Verhoef, Franses and Hoekstra, 2002)
	E2	City services Staff are willingness to explain procedures	
	E3	The quality of city service quality is high	
	E4	City services are speedy in responding to requests	
	E5	City services are responsive to my needs	Qualitative findings of this study
Functional value (Performance/Quality) (PQ)	PQ1	City services have consistent quality	(Sweeney and Soutar, 2001)
	PQ2	City services are well constructed	
	PQ3	City services have an acceptable standard of quality	
	PQ4	City services perform consistently	
Emotional Value (EV)	EV1	Using city services is something I enjoy	(Sweeney and Soutar, 2001)
	EV2	Using city services makes me relaxed	
	EV3	Using city services makes me feel good	
	EV4	Using city services would give me pleasure	
Functional value (Price/Value for Money) (PV)	PV1	City services are reasonably priced	(Sweeney and Soutar, 2001)
	PV2	City services offer value for money	

	PV3	City services are good for the price	
	PV4	City services are economical	
Social Value (SV)	SV1	Using city services helps me to feel acceptable	(Sweeney and Soutar, 2001)
	SV2	Using city services improves the way I am perceived	
	SV3	Using city services makes a good impression on other people	
	SV4	Using city services gives me social approval	
Perceived Service Value (PSV)	PSV1	Overall, I believe that using government sites to access public services provides public value	(Li and Shang, 2020)
	PSV2	The value I receive from government sites is worth the time, effort, and money I have invested	
	PSV3	The value derived from services on government sites is worth the time, effort, and money the government has invested	
	PSV4	I intend to increase the use of government services in the future	
	PSV5	I will recommend others to use government services	
	PSV6	In the future, I will consider e-government sites to be my first choice to engage with the city	

5.10. Quantitative Pilot Study

To ensure the suitability of the questionnaire to collect relevant data a pilot was undertaken. This pilot used the questionnaire and was shared with four PhD holding academics to ensure that it was suitable. Despite minor adjustments in grammar the questionnaire was deemed suitable by these experts and the pilot was put into the field.

5.10.1. Sampling and Sample Profiling

Using the questionnaire constructed earlier in this chapter a pilot study was conducted to test the validity of the questionnaire. This was done after fifty respondents were reached (N=51) between 8th September 2023 and 11th September 2023. A breakdown of the demographic data can be seen in Tables 5.5 and 5.6. Convenience sampling was used to collect the pilot data.

Table 5.5 – Demographic breakdown of pilot study participants – Source Author

Item	Response	Frequency	Percentage
Gender	Female	28	52.8
	Male	22	41.5
	Prefer not to say	1	1.9
Age	18-24	9	17.0
	25-34	15	28.3
	35-44	12	22.6
	45-54	10	18.9
	55-64	5	9.4
	65+	0	0
Time as Expatriate	0-3 years	10	18.9
	4-7 years	9	17.0
	8-10 years	3	5.7
	10 years +	29	54.7
Highest Education Level	Bachelor	15	28.3
	High school	0	0

	Middle school	0	0
	Postgraduate	36	67.9
Employment	Full-Time	39	73.6
	Homemaker	1	1.9
	Part-time	3	5.7
	Self Employed	1	1.9
	Student	5	9.4
	Unemployed	2	3.8
Income	Less than 20,000 AED	23	43.4
	20,001 to 25,000 AED	9	17.0
	25,001 to 30,000 AED	8	15.1
	30,001 to 35,000 AED	5	9.4
	35,001 to 40,000 AED	3	5.7
	40,001 to 45,000 AED	0	0
	45,001 to 50,000 AED	1	1.9
	Above 50,000 AED	2	3.8

In addition to the demographic data above, Table 5.6 below shows the regions of the world that expatriate respondents originate from.

Table 5.6 Regional breakdown of pilot study participants – source Author

Region	**Frequency**	**Percentage**
Africa	2	3.92%
Americas	2	3.92%
Asia	2	3.92%
Europe	18	35.29%
Middle East	4	7.84%
Sub-Continent	23	45.10%
Grand Total	**51**	**100.00%**

The sample shows an even mix of both male and female respondents, as well as a good spread through the age groups, the exception being the oldest age group of 65+ which had no respondents. The majority

of respondents had been expatriates for over 10 years (54%), while 0-3 years and 4-7 years has similar response rates of 18.9% and 17% respectively. The educational level of respondents was skewed more towards the higher end of the spectrum, with 67% of respondents holding postgraduate education and the remainder holding a bachelor's degree. The vast majority of respondents (73%) were in full-time employment. The largest income group was less than 20,000 AED per month, the following two most common income groups were 20,001-25,000 AED and 25,001-30,000 with 17% and 15% respectively. Finally, the largest groups by region of origin are the Indian sub-continent 45%, followed by Europe at 35%.

5.10.2. Validity of Pilot Study Data

Having examined the profile of the sample, it is time to turn to the validity of the items and constructs being used. Table 5.7 below shows the validity of items and constructs within the pilot.

Table 5.7 – Validity data for pilot questionnaire – source Author

Construct	Item	Mean by Construct	Mean	Standard Deviation	Cronbach's Alpha for construct	Corrected Item-Total Correlation	Cronbach's Alpha if item removed
Information exchange (IE)	IE1	5.399	5.679	1.252	.923	.799	.907
	IE2		5.566	1.233		.832	.904
	IE3		5.415	1.278		.840	.903
	IE4		5.528	1.187		.817	.906
	IE5		5.019	1.394		.818	.905
	IE6		5.340	1.270		.734	.914
	IE7		5.245	1.413		.516	.937
Convenience of city services (C)	C1	5.519	5.173	1.396	.948	.810	.952
	C2		5.481	1.350		.911	.921
	C3		5.673	1.424		.916	.919
	C4		5.750	1.399		.865	.935
Touchpoints within the city (T)	T1	4.615	4.577	1.500	.933	.792	.923
	T2		4.192	1.704		.854	.911
	T3		4.981	1.515		.840	.914
	T4		4.212	1.601		.875	.907

	T5		5.115	1.567		.753	.930
City experience (E)	E1	4.937	4.510	1.759	.949	.753	.958
	E2		5.059	1.690		.874	.935
	E3		5.255	1.412		.856	.940
	E4		4.882	1.693		.902	.930
	E5		4.980	1.655		.941	.923
Emotional value (EV)	EV1	4.466	5.020	1.619	.970	.918	.964
	EV2		5.157	1.502		.943	.956
	EV3		5.412	1.359		.943	.956
	EV4		5.078	1.412		.902	.967
Functional value (performance/quality) (PQ)	PQ1	5.167	4.784	1.677	.950	.866	.941
	PQ2		4.451	1.616		.895	.929
	PQ3		4.490	1.554		.877	.936
	PQ4		4.137	1.523		.890	.931
Functional value (price/value for money) (PV)	PV1	4.397	4.373	1.523	.946	.912	.916
	PV2		4.392	1.415		.908	.918
	PV3		4.529	1.362		.913	.918
	PV4		4.294	1.527		.761	.964
Social value (SV)	SV1	4.196	4.333	1.178	.916	.783	.899
	SV2		4.216	1.205		.807	.890
	SV3		4.118	1.211		.863	.871
	SV4		4.118	1.366		.785	.901
Perceived service value (PSV)	PSV1	5.255	5.490	1.502	.948	.844	.937
	PSV2		5.098	1.540		.901	.930
	PSV3		5.314	1.435		.729	.950
	PSV4		5.098	1.640		.833	.939
	PSV5		5.294	1.390		.888	.933
	PSV6		5.235	1.570		.851	.936

5.10.3. Conclusion of Quantitative Pilot Study

Given the high Cronbach Alpha scores that were found within this pilot, the results were deemed suitable to continue without change to obtain a larger sample size. This large sample size would be suitable for more detailed validity analysis and Structural equation modelling.

5.11. Summary

This chapter has documented the analysis of the qualitative stage of this research, detailing the themes that have been identified, these being information exchange, convenience, touchpoints and the city experience. With these themes clearly identified the chapter has gone on to operationalise themes for quantitative data collection, using both existing constructs, while adding items to these constructs to aid a more detailed analysis. The chapter also outlines the testing of the questionnaire with a pilot study (N=51), results of which were deemed suitable to undertake the questionnaire with a much wider audience without the need to alter the questionnaire. This broader study will be the focus of Chapter Six.

6. Chapter Six - Quantitative Data Analysis

6.1. Introduction

This chapter examines the quantitative data collection that was obtained as part of the QUAL+quant mixed method approach (QUAL being dominant). This collection element is intended to provide insight into the themes that have emerged from the literature review and have also come out in qualitative data collection from the perspective of a large group of respondents. The chapter begins with an examination of the sample that was collected, before moving on to validating the quality of the data and finally drawing out key insights as to the relationship between constructs and the conceptual model.

6.2. Profile of the Quantitative Sample

The questionnaire data was collected, using a convenience sample, between 11th September 2023 to 6th October 2023, during that time 482 respondents were recorded (N=482). This figure is larger than the 385 respondents suggested as a sample size by the sample size calculator (RoaSoft, 2004). A detailed breakdown of the demographic data can be seen in Tables 6.1 and 6.2 below.

The same characteristics are as follows, 37% Male, 61% Female, with 2% preferring not to say. While the sample does favour female respondents, it is common for females to engage in online surveys more than men (Smith, 2008). In terms of Age, 55% were aged 18-24, 14% were aged 25-34, a further 14% were aged 35-45, 10% aged 45-54, with the remainder being older than 55. In terms of the geographical origin of the sample, this broadly reflects the overall makeup of Dubai (see Chapter One), with 59% coming from the Indian Subcontinent, 10% from Africa, Asia was a little lower at only 4%, with the remainder coming from the rest of the world. Looking at time as an expatriate, 63% of respondents have been an expatriate over 10 years, suggesting some considerable experience with the city, in contrast 22% had been an expatriate for less than 3 years. The remaining 16% had been expatriates between 4 to 9 years.

While there is a large number of respondents in the 18-24 bracket, this perhaps can be explained by a number of factors. Firstly, this group is well disposed to undertaking online surveys over older age groups (Larson *et al.*, 2011; Mulder and de Bruijne, 2019) and secondly the UAE has put great emphasis on growing the HE sector internationally (Shwedeh, 2024) and finally 60% of the population being under 30 (Ashour, 2020).

Table 6.1 – Demographic breakdown of study participants – Source Author

Item	Response	Frequency	Percentage
Gender	Female	269	55.8
	Male	167	34.6
	Prefer not to say	9	1.9
Age	18-24	245	50.8
	25-34	65	13.5
	35-44	64	13.3
	45-54	46	9.5
	55-64	20	4.1
	65+	5	1.0
Time as Expatriate	0-3 years	97	20.1
	4-7 years	41	8.5
	8-10 years	27	5.6
	10 years +	280	58.1
Highest Education Level	Bachelor	212	44.0
	High school	78	16.2
	Middle school	3	0.6
	Postgraduate	152	31.5
Employment	Full-Time	173	35.9
	Homemaker	10	2.1
	Part-time	34	7.1
	Self Employed	20	4.1
	Student	195	40.5

	Unemployed	13	2.7
Income	Less than 20,000 AED	268	55.6
	20,001 to 25,000 AED	43	8.9
	25,001 to 30,000 AED	31	6.4
	30,001 to 35,000 AED	25	5.2
	35,001 to 40,000 AED	19	3.9
	40,001 to 45,000 AED	7	1.5
	45,001 to 50,000 AED	10	2.1
	Above 50,000 AED	42	8.7

Table 6.2 Regional breakdown of questionnaire participants – Source Author

Row Labels	Count of Continent	Count of Continent2
Africa	44	10%
Americas	19	4%
Asia	16	4%
Europe	74	17%
Middle East	20	4%
Oceania	9	2%
Subcontinent	263	59%
Grand Total	**445**	**100.00%**

6.3. Reliability of Data

To examine the data in terms of reliability each construct was subjected to a Cronbach's Alpha test, as well as Skewness and Kurtosis tests, the results of which are detailed in Table 6.3 below.

Table 6.3 – Reliability of data from questionnaire – Source Author

Construct	Item	Mean by Construct	Mean	Standard Deviation	Cronbach's Alpha	Corrected Item-Total Correlation	Cronbach's Alpha if item removed	Skewness	Kurtosis
Information exchange (IE)	IE1	5.606	5.838	1.015	.872	.616	.858	-1.481	4.003
	IE2		5.753	1.049		.654	.853	-1.542	3.796
	IE3		5.751	0.972		.716	.847	-1.573	4.285

	IE4		5.627	1.152		.718	.844	-1.461	2.770
	IE5		5.365	1.204		.754	.839	-1.125	1.302
	IE6		5.641	1.112		.651	.853	-1.451	2.668
	IE7		5.268	1.353		.496	.880	-0.697	0.120
Convenience of city services (C)	C1		5.322	1.372		.610	.825	-1.051	0.813
	C2	5.638	5.795	1.111	.837	.728	.773	-1.678	4.337
	C3		5.826	1.153		.768	.753	-1.486	2.931
	C4		5.608	1.326		.602	.826	-1.309	1.721
Touchpoints within the city (T)	T1		4.933	1.332		.745	.859	-0.621	0.160
	T2		4.731	1.387		.746	.859	-0.586	-0.081
	T3	5.062	5.306	1.167	.887	.770	.855	-1.016	1.301
	T4		4.866	1.345		.750	.857	-0.632	-0.041
	T5		5.474	1.210		.634	.883	-1.156	1.652
City experience (E)	E1		4.804	1.465		.691	.868	-0.727	0.017
	E2		5.367	1.297		.695	.865	-1.280	1.847
	E3	5.214	5.533	1.257	.884	.730	.857	-1.329	2.115
	E4		5.118	1.392		.712	.861	-0.828	0.381
	E5		5.251	1.184		.797	.844	-0.831	1.182
Emotional value (EV)	EV1		5.05	1.43		.835	.926	-0.843	0.530
	EV2	4.824	4.85	1.46	.939	.865	.916	-0.645	0.030
	EV3		4.85	1.39		.896	.907	-0.579	0.215
	EV4		4.55	1.47		.823	.930	-0.397	0.022
Functional value (performance/quality) (PQ)	PQ1		5.44	1.32		.752	.863	-1.188	1.280
	PQ2	5.568	5.62	1.20	0.890	.762	.857	-1.298	2.332
	PQ3		5.75	1.13		.779	.853	-1.436	2.962
	PQ4		5.45	1.23		.749	.862	-1.197	1.772
Functional value (price/value for money) (PV)	PV1		4.451	1.630		.833	.919	-0.391	-0.666
	PV2	4.586	4.631	1.481	.934	.888	.899	-0.452	-0.352
	PV3		4.687	1.421		.870	.906	-0.487	-0.244
	PV4		4.576	1.486		.794	.929	-0.428	-0450
Social value (SV)	SV1		4.743	1.315		.765	.909	-0.444	0.158
	SV2	4.591	4.586	1.346	.918	.846	.882	-0.278	-0.067
	SV3		4.555	1.358		.838	.885	-0.224	-0.069

	SV4		4.479	1.406		.800	.898	-0.134	-0.163
Perceived service value (PSV)	PSV1	5.395	5.542	1.153	.919	.746	.907	-1.014	1.492
	PSV2		5.279	1.252		.778	.903	-0.823	0.763
	PSV3		5.351	1.173		.781	.903	-0.852	1.076
	PSV4		5.247	1.316		.749	.907	-0.767	0.373
	PSV5		5.488	1.235		.821	.897	-1.049	1.438
	PSV6		5.465	1.309		.746	.908	-1.010	0.933

A Cronbach's Alpha result of .7 is considered to be good, .8 is very good and above .9 is very strong (Taber, 2018). Looking to the normality of the data itself, tests for Skewness value and Kurtosis value have been undertaken. Skewness examines the symmetry of distribution within a dataset, ensuring that even distribution of data, suitable values should be between -2 and +2, whereas Kurtosis looks at the flatness of the data, showing consistency rather than peaks and troughs, suitable values here should be -7 and +7 (Byrne, 2010; Hair *et al.*, 2010).

When examined in a little more depth while some items had not scored highly in themselves, the Cronbach's analysis showed that their removal would not significantly change the overall Alpha score, therefore it was deemed suitable to leave the items in the study. While some scholars do warn against relying too heavily on Cronbach's Alpha analysis to remove items (Vaske, Beaman and Sponarski, 2017), however best practice still appears to favour removal of underperforming items (Beavers *et al.*, 2013; Boateng *et al.*, 2018) and this was an approach taken by Sweeney and Soutar (2001) when they originally created the mediated constructs being used in this study. The Cronbach's Alpha results also start to demonstrate that the items that were created for this study C4, T5 & E5 and incorporated into existing constructs are valid and would be beneficial to future studies.

6.4. Common Method Bias

The data was also subjected to a common bias method test, which is recommended when looking at data with dependent and independent variables coming from the same sources, the result of this data is

46.523% below the threshold of 50% (Aguirre-Urreta and Hu, 2019). Results from this study all fall within the parameters laid down confirming that the data is free from bias.

6.5. Confirmatory Factor Analysis (CFA)

All items have a loading factor of .6 or more; with the exception of IE7, all items are above .6. As such IE7 was removed from the study, all other items remain, with the construction of information exchange being tested with 6 items. After the removal of IE7, the analysis was run again and can be seen in Table 6.5 below. The rest of the scores provide initial confirmation that the data is robust.

Looking beyond the items and constructs to the Confirmatory Factor Analysis (CFA). This allows an examination of the model fit. CFA was undertaken using AMOS software and the results can been seen in Table 6.4 below. Each measurement type showed that the model fit was either good or acceptable.

Table 6.4 Model fit results for CPA from AMOS Software – Compiled by Author

Category of Measure	**Type of Measure**	**CFA Result**	**Threshold**
Absolute	CMIN/DF	2.573	Less than 5
Absolute	RMSEA	0.057	Less than 0.08
Incremental	TLI	0.918	Greater than 0.9, but values above 0.8 acceptable
Incremental	IFI	0.925	Greater than 0.9, but values above 0.8 acceptable
Incremental	NFI	0.884	Greater than 0.9, but values above 0.8 acceptable
Incremental	CFI	0.925	Greater than 0.9, but values above 0.8 acceptable
Parsimonious	PGFI	0.720	Greater than 0.5
Parsimonious	PNFI	0.803	Greater than 0.5
Parsimonious	PCFI	0.840	Greater than 0.5

(Browne and Cudeck, 1992; McDonald and Ho, 2002; Hair *et al.*, 2010; Schumacker and Lomax, 2010)

Table 6.5 Standardised Regression Weights from AMOS software – Source Author

			Estimate
IE6_1	<---	INFO	.696
IE5_1	<---	INFO	.827
IE4_1	<---	INFO	.806
IE3_1	<---	INFO	.770
IE2_1	<---	INFO	.710
IE1_1	<---	INFO	.654
C4_1	<---	CON	.714
C3_1	<---	CON	.854
C2_1	<---	CON	.809
C1_1	<---	CON	.674
T5_1	<---	TOU	.693
T4_1	<---	TOU	.799
T3_1	<---	TOU	.820
T2_1	<---	TOU	.798
T1_1	<---	TOU	.814
E5_1	<---	EX	.855
E4_1	<---	EX	.769
E3_1	<---	EX	.796
E2_1	<---	EX	.742
E1_1	<---	EX	.749
EV4_1	<---	EMOT	.862
EV3_1	<---	EMOT	.930
EV2_1	<---	EMOT	.897
EV1_1	<---	EMOT	.881
PV4_1	<---	PRICE	.821
PV3_1	<---	PRICE	.920
PV2_1	<---	PRICE	.938
PV1_1	<---	PRICE	.859
SV4_1	<---	SOCIAL	.837
SV3_1	<---	SOCIAL	.884
SV2_1	<---	SOCIAL	.894
SV1_1	<---	SOCIAL	.825
PSV6_1	<---	SERVAL	.774
PSV5_1	<---	SERVAL	.854
PSV4_1	<---	SERVAL	.787
PSV3_1	<---	SERVAL	.834
PSV2_1	<---	SERVAL	.832
PSV1_1	<---	SERVAL	.776
PQ1_1	<---	PERF	.811
PQ2_1	<---	PERF	.828
PQ3_1	<---	PERF	.829
PQ4_1	<---	PERF	.815

Table 6.6 – T value and P value sourced from AMOS software – Source Author

			T Value	P Value
IE6_1	<---	INFO		
IE5_1	<---	INFO	16.565	**
IE4_1	<---	INFO	16.179	**
IE3_1	<---	INFO	15.528	**
IE2_1	<---	INFO	14.392	**
IE1_1	<---	INFO	13.322	**
C4_1	<---	CON		
C3_1	<---	CON	17.299	**
C2_1	<---	CON	16.512	**
C1_1	<---	CON	13.854	**
T5_1	<---	TOU		
T4_1	<---	TOU	16.181	**
T3_1	<---	TOU	16.571	**
T2_1	<---	TOU	16.171	**
T1_1	<---	TOU	16.454	**
E5_1	<---	EX		
E4_1	<---	EX	20.029	**
E3_1	<---	EX	21.096	**
E2_1	<---	EX	18.989	**
E1_1	<---	EX	19.248	**
EV4_1	<---	EMOT		
EV3_1	<---	EMOT	29.574	**
EV2_1	<---	EMOT	27.468	**
EV1_1	<---	EMOT	26.504	**
PV4_1	<---	PRICE		
PV3_1	<---	PRICE	25.784	**
PV2_1	<---	PRICE	26.512	**
PV1_1	<---	PRICE	23.070	**
SV4_1	<---	SOCIAL		
SV3_1	<---	SOCIAL	24.519	**
SV2_1	<---	SOCIAL	24.944	**
SV1_1	<---	SOCIAL	21.961	**
PSV6_1	<---	SERVAL		
PSV5_1	<---	SERVAL	20.438	**
PSV4_1	<---	SERVAL	18.466	**
PSV3_1	<---	SERVAL	19.848	**
PSV2_1	<---	SERVAL	19.787	**
PSV1_1	<---	SERVAL	18.157	**
PQ1_1	<---	PERF		
PQ2_1	<---	PERF	20.840	**
PQ3_1	<---	PERF	20.897	**
PQ4_1	<---	PERF	20.417	**

Key *p<.05, **p<.01

Table 6.6 displays P and T values. It is generally considered that P value should be less than 0.05 (Dahiru, 2008) and T value should be more than 2; 20-80 is considered very good.

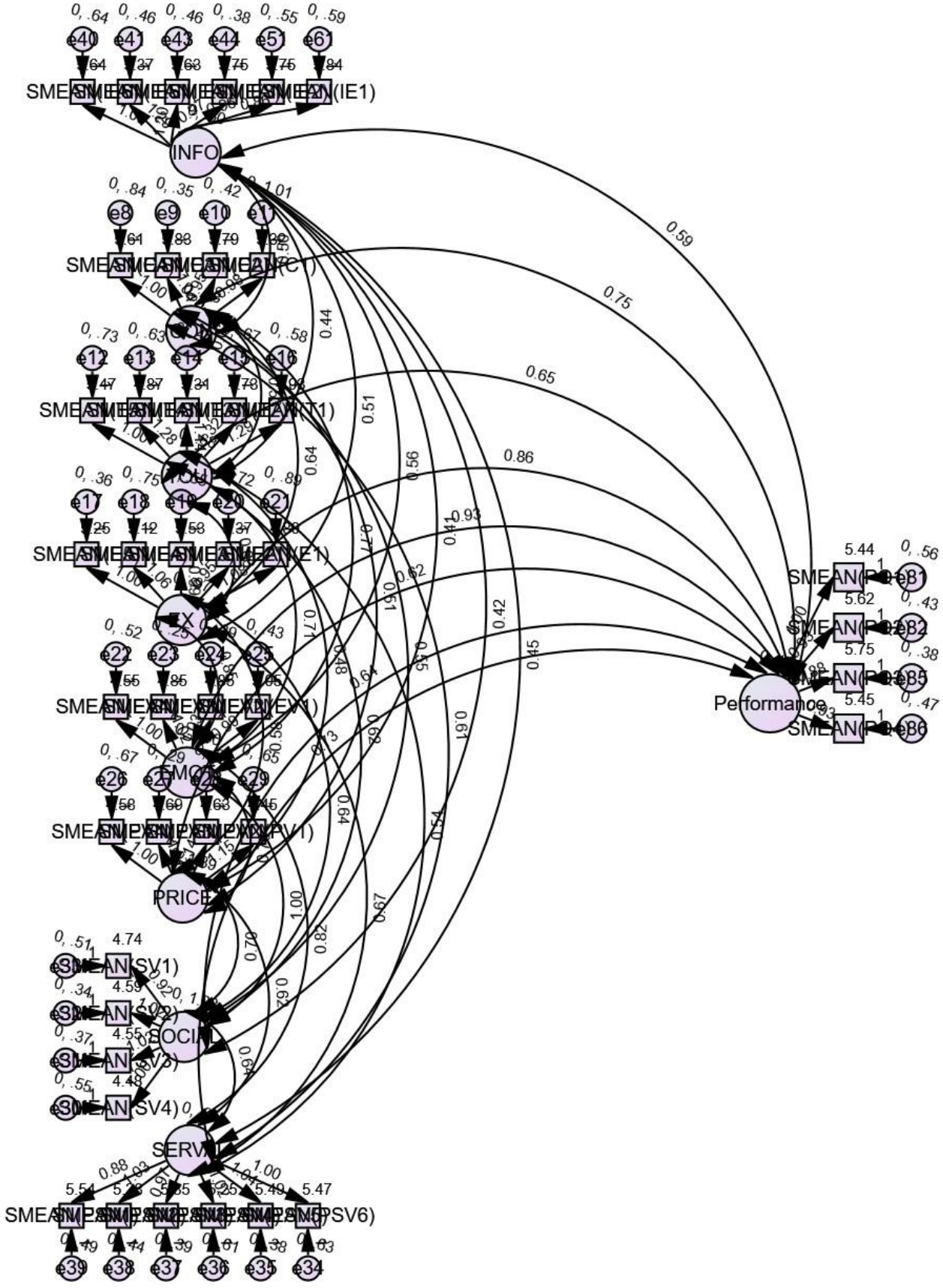
Table 6.7 – Correlation Analysis, AVE and Composite Reliability Test results – Source Author

	CR	AVE	Cronbach's Alpha	PERF (PQ)	INFO (IE)	CON (C)	TOU (T)	EX (E)	EMOT (EV)	PRICE (PV)	SOCIAL (SV)	SERVAL (PSV)
PERF (PQ)	0.892	0.674	0.890	**0.821**								
INFO (IE)	0.882	0.557	0.881	0.667	**0.746**							
CON (C)	0.849	0.587	0.837	0.670	0.606	**0.766**						
TOU (T)	0.890	0.618	0.887	0.450	0.626	0.618	**0.786**					
EX (E)	0.888	0.614	0.884	0.745	0.611	0.609	0.738	**0.783**				
EMOT (EV)	0.940	0.797	0.939	0.672	0.545	0.608	0.651	0.641	**0.893**			
PRICE (PV)	0.936	0.785	0.934	0.455	0.413	0.405	0.450	0.455	0.491	**0.886**		
SOCIAL (SV)	0.919	0.740	0.918	0.501	0.431	0.451	0.604	0525	0.677	0.496	**0.861**	
SERVAL (PSV)	0.920	0.656	0.919	0.653	0.549	0.582	0.608	0.631	0.639	0.483	0.541	**0.810**

* Values in diagonal (marked in bold) are the square roof of AVE.

Examining Table 6.7 the correlation between constructs can be seen as well as the AVE and Composite Reliability (CR). All the constructs have an AVE score exceeding .5 which is required to ensure that the items within the construct are suitable for examining said construct (Shrestha, 2021). Additionally, Composite Reliability scores should exceed .7 (Fornell and Larcker, 1981). This is exceeded with scores of .8 and in some areas .9 showing that convergent validity has been achieved. The square root of the AVE is greater than inter-correlations (marked in bold on Table 6.7), therefore discriminant validity has been achieved. The CFA model can be seen below in Figure 6.1.

Figure 6.1 CFA Model with measures – Source Author



6.6. Structural Equational Modelling and Hypothesis Test

The testing of hypothesis was done using SPSS AMOS software through Structural equation modelling (SEM). Structural equation modelling examines the impact of constructs on one another, this is indicated with results between -1 and + 1 (Kupek, 2006). Once again, a full range of model fits were examined (see Table 6.8) including CMIN/DF & RMSEA to examine absolute fit (the fit of the model itself), TLI, IFI, NFI and CFI to examine incremental fit (unlikely absolute fit, increment fit looking at discrepancy between the model and the data relative to another model) and PGFI, PNFI & PCFI which look at parsimony (which are adjusted models related to their respective increment indices). The results here show that all the measures in the table below are either good or acceptable, providing confidence that the model is suitable for testing data and supporting the conceptual model and the hypothesis of this study.

Table 6.8 Model fit results for SEM from AMOS Software – Compiled by Author

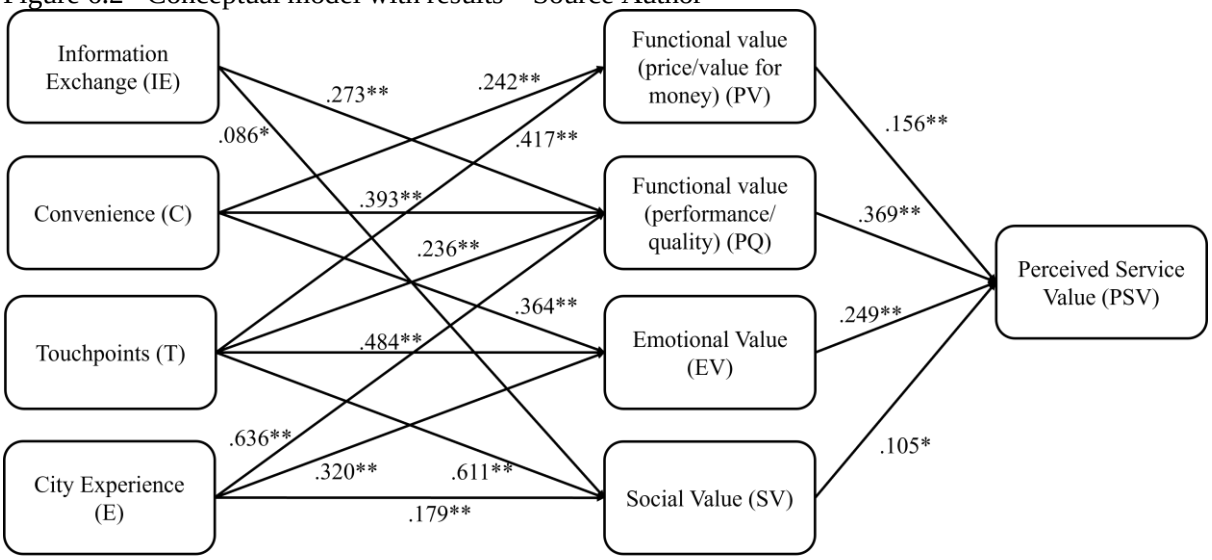
Category of Measure	**Type of Measure**	**SEM Result**	**Threshold**
Absolute	CMIN/DF	3.358	Less than 5
Absolute	RMSEA	0.070	Less than 0.08
Incremental	TLI	0.876	Greater than 0.9, but values above 0.8 acceptable
Incremental	IFI	0.890	Greater than 0.9, but values above 0.8 acceptable
Incremental	NFI	0.850	Greater than 0.9, but values above 0.8 acceptable
Incremental	CFI	0.889	Greater than 0.9, but values above 0.8 acceptable
Parsimonious	PGFI	0.676	Greater than 0.5
Parsimonious	PNFI	0.763	Greater than 0.5
Parsimonious	PCFI	0.798	Greater than 0.5

(Browne and Cudeck, 1992; McDonald and Ho, 2002; Hair *et al.*, 2010; Schumacker and Lomax, 2010)

It should be noted that these respective tests should be viewed holistically to build up a picture of the suitability of a model (Schermelleh-Engel, Moosbrugger and Müller, 2003; Rose, Markman and Sawilowsky, 2017) and that "fit indices can be considered as 'rules-of-thumb' as opposed to 'golden rules'" (Kline, 2011, p197). This is underlined by Hair *et al.* (2010) who state that complex models with large sample sizes and numerous variables, such as this study, should not be expected to meet all strict standards for good fit models.

Adding to the validity of the data it can be seen that all relationships were found to be positive and significant, with standardised regression weight in excess of .05 as outlined in the conceptual model, see Figure 6.2 and the measures from the AMOS software which can be seen in Figure 6.3.

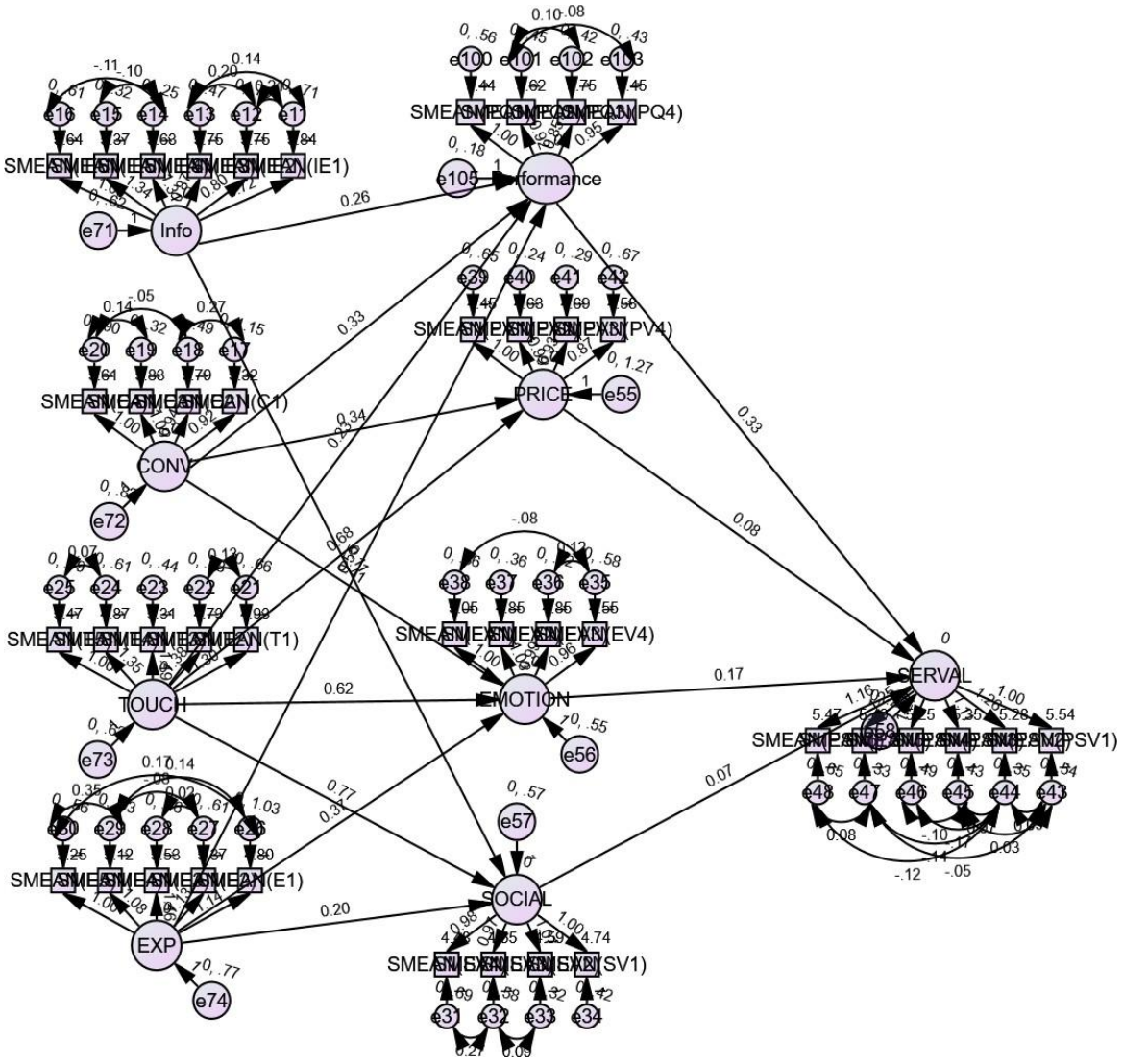
Figure 6.2 - Conceptual model with results – Source Author



Structural model results (*p<0.05 **p<0.01)

Upon examination of the squared multiple correlations from the AMOS software, the impact of perceived service value can be looked at. The value of this construct is 0.411, meaning that this perceived service value is accounted for 41.1% by the predictors in this model.

Figure 6.3 – Structural Equation Model with Measurement exported from AMOS – Source Author



Finally, in terms of the original hypotheses set out by this research based on the analysis of qualitative data, as can be seen below in Table 6.9, all hypotheses have been confirmed.

Table 6.9 – Hypotheses results – Source Author

H1 – Information exchange within the city is perceived to have a positive impact on functional value (performance/ quality) for expatriates	Confirmed
H2 – Information exchange within the city is perceived to have a positive impact on social value for expatriates	Confirmed

H3 – Convenience of city services is perceived to have a positive impact on functional value (price/value for money) for expatriates	Confirmed
H4 – Convenience of city services is perceived to have a positive impact on functional value (performance/ quality) for expatriates	Confirmed
H5 – Convenience of city services is perceived to have a positive impact on emotional value for expatriates	Confirmed
H6 – Touchpoints within the city are perceived to have a positive impact on functional value (price/value for money) for expatriates	Confirmed
H7 – Touchpoints within the city are perceived to have a positive impact on functional value (performance/ quality) for expatriates	Confirmed
H8 – Touchpoints within the city are perceived to have a positive impact on emotional value for expatriates	Confirmed
H9 – Touchpoints within the city are perceived to have a positive impact on social value for expatriates	Confirmed
H10 – Smart city experience is perceived to have a positive impact on functional value (performance/ quality) for expatriates	Confirmed
H11 – Smart city experience is perceived to have a positive impact on emotional value for expatriates	Confirmed
H12 – Smart city experience is perceived to have a positive impact on social value for expatriates	Confirmed
H13 Perceived functional value (price/value for money) has a positive impact on perceived service value for expatriates	Confirmed
H14 Perceived functional value (performance/quality) has a positive impact on perceived service value for expatriates	Confirmed
H15 Perceived emotional value has a positive impact on perceived service value for expatriates	Confirmed
H16 Perceived social value has a positive impact on perceived service value for expatriates	Confirmed

6.7. Direct and Indirect Effects

Having examined the relationship between constructing in some depth through the Structural equation modelling analysis, it is possible to examine the relationship between the dependent variables and independent variables both directly and indirectly. This can help better understand what role the mediating variables are having on the value creation in this context (Baron and Kenny, 1986). Using the work of Uzir *et al.* (2021) as a basis for study and presentation of data, the table below (Table 6.10), shows the results for direct and indirect paths.

The purpose of the mediated variable is to provide deeper understanding of the causal relationship between the independent and dependent variables (Wu and Zumbo, 2008). Mediation helps explain cause and effect within a conceptual model. In this study the existing concept of the four dimensions of value, which is a widely researched concept, has been seen to mediate between the independent variables and the dependent. Work from Storbacka *et al.* (2016) suggests that both human interaction and interaction via platforms impact on value creation. Humans and platforms are at the heart of the independent variables in this study so it seems logical that they will mediate through dimensions of value.

Table 6.10 Direct and Indirect results – Source Author.

Path	Direct Effect	Indirect Effect	Mediation
Path 1 Info➔Performance ➔ Perceived Service Value	0.153*	0.452**	Partial
Path 2 Info➔Social ➔ Perceived Service Value	0.423**	0.181**	Partial
Path 3 Con➔Performance ➔ Perceived Service Value	0.264**	0.402**	Partial
Path 4 Con➔Price ➔ Perceived Service Value	0.529**	0.135**	Partial
Path 5 Con➔Emotion ➔ Perceived Service Value	0.366**	0.298**	Partial
Path 6 Con➔Performance ➔ Perceived Service Value	0.280**	0.391**	Partial
Path 7 Con➔Price ➔ Perceived Service Value	0.546**	0.132**	Partial
Path 8 Touch➔Emotion ➔ Perceived Service Value	0.364**	0.306**	Partial
Path 9 Touch➔Social ➔ Perceived Service Value	0.508**	0.163**	Partial
Path 10 Experience➔Performance ➔ Perceived Service Value	0.322**	0.382**	Partial

Path 11 Experience➔Emotion ➔ Perceived Service Value	0.429**	0 .272**	Partial
Path 12 Experience➔Social ➔ Perceived Service Value	0.547**	0.154**	Partial

Notes N = 482, Bootstrap Sample size 5000. * P<.05, **P<.01.

The results clearly show that in all cases both the direct and indirect paths are positive and significant and that all paths show partial mediation. This means that while the independent variables identified in the qualitative data collection have an impact on the dependent variable of perceived service quality, the mediated variables drawn from the four dimensions of value have a significant mediating impact on value creation.

This approach has been replicated in work from scholars such as Nuryakin, Aryanto and Setiawan (2018) who use aspects of value creation as a mediator, Zhang *et al.* (2017) who examine value dimensions such as function value and social value with very positive results, and Mutum, Ghazali and Wei-Pin (2021) who have used functional value, social value and emotional value to mediate purchase behaviour. Whereas information exchange has been mediated through value in studies from Lenart-Gansiniec and Sułkowski (2020) and Shamim *et al.* (2020). Price has been used as a mediator by Uripi *et al.* (2021) while work from Cui, Li and Zhang (2022) uses functional value to mediate value creation. Research into touchpoints is extensive and many studies use touchpoints mediated with value dimensions to examine value creation and behaviour, such as López-Sánchez, Santos-Vijande and Trespalacios-Gutiérrez (2010) and Al-Faouri *et al.* (2023). Research from Johns and Davey (2019) uses value as a mediator in the service provision context. Özkan *et al.* (2020) successfully used aspects of quality as a mediator toward the independent variable of perceived service quality. The outcome of the examination of direct and indirect relationships helps add validity to the results found in the conceptual model.

6.8. Summary

The data collection has been shown to be robust and suitable for examining the constructs. The independent variables that were drawn from the qualitative data collection stage have been shown to be relevant to a wider audience, providing some confidence in the suitability of the thematic analysis.

While the qualitative element is dominant in this research, having confirmation from the quantitative data collection is helpful in terms of final discussion of the results of this study.

Items within the constructs have been shown to be valid for exploring value created phenomena, with new items being added to the constructs which will be helpful for further studies. The structural equation model has been shown to have a good fit, which shows a clear relationship between constructs coming through. This has enabled the testing of the hypotheses which were outlined in Chapter Three. All hypotheses were shown to have been confirmed. The results also clearly show that the dependent variables that emerged in the qualitative analysis section of this study are positive determinants on the mediated variables and in turn these are positive determinants on the independent variable of public service value. The examination of direct and indirect effects has shown the positive effect of mediating constructs.

Results from this quantitative analysis can now be used alongside the qualitative analysis results to examine this study in relation to the research aims, research objectives and research questions.

7. Chapter Seven – Discussion

7.1. Introduction

This chapter will discuss the findings of both the qualitative and quantitative data analysis stages. This allows triangulation of data findings to better understand the insights the data is providing (Bell, Bryman and Harley, 2019). Initially, the quantitative analysis stage was able to confirm that themes that emerged from the small sample of 22 expatriates in the qualitative data collection stage were reflected in the larger group in the form of the quantitative sample. This added robustness to the findings from the thematic analysis. The addition of three new items, C4, T5 and E5, one to each of the emerging independent variables, added not only to the validity of the constructs, but also provides future research with expanded constructs to test aspects of value creation.

Bringing the analysis of the data together enables an examination of the conclusions of the research in relation to the research questions which were set out in Chapter One.

RQ1 – What do expatriate residents perceive to be valuable in co-created smart city services in Dubai?

The results have shown a variety of aspects of the city services that are viewed by expatriates as valuable; the exchange of data, making access to information easier and more useful, enabling ease of use when applying for things or accessing services. Value is seen in convenience in the accessing of services and the use of those services. Looking more deeply at the access points of service, referred to as touchpoints, apps, websites, customer service centres and social media were all seen as valuable for interaction with city services as well as other actors within the city, as well as the city experience being seen as valuable with respondents citing parks and cycle tracks as areas that were valuable to them. These points of value creation were also examined in relation to the four dimensions of value and perceived service value and found to be positive and significant for value creation.

RQ2 – How does the sharing economy relate to the expatriate residents' service experience?

Respondents also highlighted aspects of the sharing economy, such as ride sharing in terms of services such as transportation, package sharing in relation peer to peer sharing activities and data sharing which appears in elements such as traffic avoidance. Sharing is implicit in much of the smart city literature and is often considered an aspect of co-creation so is related to many of the experiences outlined above in relation to RQ1 with findings showing linkage to sharing and exchange of information, convenience, touchpoints and experience within the city.

RQ3 – What role does value-in-use play in the shared economy and smart city co-creation services?

The role of value-in-use is seen as key to the service through much of the data collection. Interviewees highlighted their experience of value creation through the use and experience of services. Information exchange was experienced as being valuable while using apps (such as the vaccination app), through convenience when time is saved via city services (topping up a metro card via kiosk), touchpoints when communication is made easier to a process is made more straightforward (such as paying for parking via phone) and finally the experience in the city was value in terms of use of parks and cycle tracks and time with family. These value-in-use experiences can be seen as being valuable in relation to price, performance, social and emotional to varying degrees and providing perceived service value.

Having reviewed the findings in relation to the overall research questions, it is possible to go into more detail below in regard to each hypothesis.

7.2. Discussion of Hypotheses Test

Below is a discussion of each relationship interaction being examined by this study and how it relates to both qualitative and quantitative analysis and existing studies in the topic area.

7.2.1. Hypothesis H1

The first hypothesis (H1) examines the relationship between information sharing and value in relation to performance. Quantitative data analysis via Structural equation modelling shows that this relationship, like all the hypotheses within this study, was both positive and significant with a beta

estimate of 0.273; p-value was less than 0.01. The qualitative data collection also highlighted a positive relationship as the quote below demonstrates.

> *And we got notifications from DEWA about that. And it was helpful because we're able to go and say, oh, yeah, there we're kind of leaking water here on this drip system, and change if some of our water usages, and I think it was just a simple text, but it was powerfully worded because it says something like you've used like 150% of your water that that you use from a previous month. Already in the first two weeks or something. It was some statistic that was like really stuck out to me. Like yeah, that doesn't make sense because we should be using the same usage. P12*

Research from Nicolaou, Ibrahim and Van Heck (2013) shows a clear positive relationship between information exchange and performance in the online commerce context. This is in contrast to work from Rahurkar, Vest and Menachemi (2015) who suggest that this is not the case in the healthcare sector. Their work is also in contrast to qualitative findings of this study where information exchange was positive in healthcare. Information exchange within smart cities can improve services quality and provide greater efficiencies (Belli *et al.*, 2020). This is echoed by Oliveira, Oliver and Ramalhinho (2020) who recognise the ability of information exchange within cities to improve performance and quality of services. Research from De Guimarães *et al.* (2020) shows a positive relationship between communications and quality of life for citizens within a smart city. However, none of the studies look specifically at expatriates. The findings of this research suggest that expatriates find that the exchange of information is very important in the creation of value in relation to the quality and performance of services. This is insightful as it indicates that development of services for expatriates needs to provide clear opportunities for exchange of information as necessary for the services as this will improve the quality of the services experience. For expatriates within the city context, city managers need to ensure that information is readily available as this aids in co-created value in relation to the performance of the service.

7.2.2. Hypothesis H2

Hypothesis 2 (H2) proposed that the information exchange concept that was uncovered during thematic analysis had a positive impact on social value for expatriates. The beta estimate for relationship is .086 and p-value was less than 0.05. While this was the weakest relationship in the model it was still found

to be both positive and significant. It is recognised that in city environments ICT has the power and potential to help integrate communities (Harrison and Donnelly, 2011), whereas other scholars are more cautious, warning against the risk of ICT undermining social networks within cities (Deakin, 2014). It is suggested that only a minority of smart city citizens feel social connectedness and any sense of civic participation (Androniceanu, 2019), while others are more positive in their research, suggesting that information is important to improving cities' social and community offerings (Kar *et al.*, 2019).

In relation to the qualitative findings, respondents did discuss information exchange from a social perspective.

> *But then they're talking about other stuff as well. So it was maybe more a social aspect of these community groups, whereas now you know, someone who takes the initiative will set up a WhatsApp group, and we'll add a bunch of people and and from time to time they'll share something or post something. But there isn't that connection. P8*

These findings tend to align with work from Kar *et al.* (2019) and Li, Zhang and Guo (2021), while refuting the concerns of Deakin (2014). While these authors have looked at the city environment, none of them focus directly on expatriates. Findings in this research from both qualitative and quantitative stages appear to align and suggest strongly that information exchange has a positive effect on social value for the expatriate community in Dubai. This finding is new to the literature, but it would appear that in this instance the expatriate shares a similar experience to non-expatriates that have been examined in other studies. These findings also emphasise the social aspect of value creation. Sharing and exchanging information would appear to be important to expatriates in relation to value co-creation. This links back to definitions of smart cities outlined by other authors who considered the social aspects of the city as central to the cities' purpose with value for society and social collaboration being important facets (Sun and Zhang, 2020), with information exchange via ICT as valuable to individuals and community (Pašalić, Ćukušić and Jadrić, 2021) often referred to as 'e-communities' (Fagadar *et al.*, 2021). The findings in this study reflect the importance placed on information exchange and social value within smart cities in the expatriate context providing further insight to the research objectives set out in Chapter One.

7.2.3. Hypothesis H3

Convenience and its relationship to price has been widely discussed in the qualitative stage of this research. One respondent discussed convenience and price in relation to the transport app which helps avoid traffic and pays for toll roads.

> *I think the good things it saves time, and it definitely saves fuel. And apart from time and fuel. I mean, yeah, I mean, like, I could see a lot of things but all this comes to fuel and time like, for example, I'm gonna make a trip to university so I have a lecture and about the following day, I could like pay my I could recharge my card, using my banking app. Using my banking app, and the next day, when I'm tapping in my car, it has been recharged and I'm just going in, I there's no queue for me [at the machines]. P10*

This is very much echoed in the quantitative analysis where this hypothesis was supported. The SEM shows a positive and significant relationship, with a beta estimate of 0.242 and p-value was less than 0.01. These points of value creation are highlighted for smart cities via the Business Model Canvas (a tool designed to identify value) (Giourka *et al.*, 2019). The mixed method results do seem to align with other research looking at these two constructs, which show that both price and convenience are drivers of value in relation to commercial apps (Azizul *et al.*, 2019). Findings by Azizul *et al.* (2019) do show that both price and convenience are drivers of value in relation to commercial apps and are similar forces in relation to e-fulfilment and convenience (Gawor and Hoberg, 2019). These findings have also been found in relation to price and convenience in the sharing economy (Arias-Molinares and Carlos García-Palomares, 2020; Hsiao, Wu and Li, 2021). Both studies find a strong relationship between price and convenience, as this study does, although neither study focuses on smart cities.

Service convenience has been shown to have the effect of lowering cost but in the context of fitness centres (García-Fernández *et al.*, 2018) convenience also influences cost (but not price) in reference to smart cities (Arman, Supangkat and Hurriyati, 2023) however their study does not focus on expatriates. It has been recognised that convenience is inherent in the smart city idea with price having an impact on behavioural intent (Habib, Alsmadi and Prybutok, 2020); their work looks at city inhabitants generally, but it does not make the distinction between nationals and expatriates.

The results of this hypothesis do support the findings of many others, but this study provides some further insight into the expatriate community in the smart city context. The construct of convenience clearly has a determining effect on price and the wide discussion of convenience within the interview stage of this study overwhelmingly highlighted the importance of convenience when looking at smart city services. This finding links back to the research objective providing insight into expatriates' perceptions of what constitutes value and begins to look at what price individuals place on the convenience of service when accessing what the smart city has to offer.

7.2.4. Hypothesis H4

Hypothesis 4 (H4) examines the relationship that convenience of services has on performance/quality. Quantitative results show that this relationship is both significant and positive with a beta estimate of 0.393 and a p-value less than 0.01. This is replicated in the qualitative data findings as highlighted in the quote below.

> *UAE PASS, which allows you to like for example with it whenever you log into any of these assets that are making a login details, they say do you want to sign in through using the UAE PASS? Yeah, so that's something I find very convenient, because when it comes to remembering passwords for so many different accounts, it can be a bit tricky. So that you pass is very convenient. P5*

Other research aligns with this finding, showing that for airline travellers, convenience is an important factor in creating a quality service provision (Hong, Choi and Chae, 2020), and there is a significant and positive relationship between convenience and service quality in relation to mobile shopping applications (Kim, Wang and Roh, 2021). It is recognised that convenience is of importance in constructing well performing services (Goyal *et al.*, 2020), this is also relevant in the city context where convenience of smart cities has an important effect on quality of life for residents (Oh, 2020) however their work does not focus on expatriates.

In terms of this study, it can clearly be seen that not only is convenience important in terms of value-for-money (price) as demonstrated in H3, but also in terms of the performance or quality of services. Expatriate residents within a smart city environment such as Dubai feel that the convenience of that service provision is reflected in how well the service performs. To put it another way, a service that

provides convenience is performing well for its users and thus creating value. Convenience and performance can manifest in different ways depending on the individual, it could be convenience in terms of time saving or ease of use, for example. This finding in relation to expatriates is new to the literature and adds to the understanding of value creation in this context.

7.2.5. Hypothesis H5

The analysis of Hypothesis 5 (H5) shows that the relationship between convenience and emotional value was positive and significant, the p-value was less than 0.01 and the beta estimate was 0.364. This does relate to similar findings in other areas, identifying roles for both convenience and social interaction in creating a valuable customer experience in the retail sector (Srivastava and Kaul, 2014), however they do not test the impact of both of these two constructs in relation to each other. Convenience and social interaction were found to be important determinants in the retail sector (Nguyen, DeWitt and Russell-Bennett, 2012). Both studies noted the importance of social aspects on emotional value in relation to service satisfaction. In the service sector there is a clear link between convenience and emotional value (Ahn and Lee, 2015). Their work is also based on Sweeney and Soutar (2001) as this study is in some areas even using the same items in the questionnaire. The convenience of service for smart city residents in relation to well-being has been recognised as having an emotional component, suggesting that convenience is a determinant of well-being (Lin *et al.*, 2019). These findings do focus on city residents in Hangzhou, China, but there is no focus on expatriates. Evidence of the value of convenience in relation to emotional value was also apparent in the qualitative data collection of this study.

> *Yes, yes, I'm very, very satisfied. Yeah. And coming from UK, which was very organised also. Again, I feel happy I didn't see something that bothered me when I came I was paying bills in UK electronically. They HMRC everything with a tax came automatically. I didn't have any problem there. But for example, the application for the health here we have the GP application in UK, but here was central. I mean, you can ask whatever you want for any clinic, which is good. P22*

So, data from both qualitative and quantitative collection appears to indicate that convenience is a determinant of positive emotional value with smart city expatriates. These findings suggest that a convenient service can have a positive effect on citizens' emotions, a good service essentially could

make someone happy, while a poor service could do the opposite, which links back to earlier discussions on value destruction. This shows an emotional link to city services rather than a purely practical one, which is not widely examined in the current literature and builds on this study's aim to understand the nature of value creation within smart cities. The finding may also open up a new avenue for further study in terms of emotional value in city services.

7.2.6. Hypothesis H6

Hypothesis 6 (H6) shows that the touchpoints construct proved to have among the strongest relationships to other constructs. Looking first to touchpoints and price this was found to be both a positive and significant relationship, with a beta estimate of .417 and p-value was less than 0.01. Digital touchpoints in banking services represent positive drivers for both cost saving and value for money (Kuganathan and Wikramanayake, 2014), while cost saving in terms of information through touchpoints does have an impact on individuals' perception of cost savings overall (Al-Ali, 2021). Access to touchpoints within the city context is value in relation to services such as mobility and sharing (Savastano *et al.*, 2023). There is value in multiple touchpoints of communication in terms of a wide range of benefits, such as ease of use, access to service, co-creation, e-participation and cost-effectiveness (Kumar *et al.*, 2020). This use of ICT touchpoints and cost savings is seen in many cities around the world (Pérez-González and Díaz-Díaz, 2015; Najdawi, Chabani and Said, 2021), although these works do not single out expatriates.

> *I use the DubaiNow app, which is connected to a multi.. a bunch of different services. That the government has, which I find very effective, but they do have an additional fee. I think they charge me extra 20 dirhams on top of everything I pay but I log in with my fingerprint and and it sorts it all out. I get paid fines about twice a year. P16*

These findings do suggest that the use of touchpoints within the smart city context is a strong determinant of value creation in terms of price and value for money. While this finding is not entirely new to the literature it is new in the context of expatriates. The findings also suggest that a suitable mix of customer touchpoints is financially valuable to expatriate citizens, this links to the existing concept of customer journey mapping which is widely discussed in commercial digital marketing literature. The

customer journey mapping concept suggests that organisations make the journey from awareness through to purchase with as little friction as possible across touchpoints, the findings here suggest that city managers should make similar provision when examining touchpoints within smart cities.

7.2.7. Hypothesis H7

Hypothesis 7 (H7) looks at the relationship between touchpoints and quality/performance. This was found to be both positive and significant with a beta estimate of 0.276 and a p-value less than 0.01. The interviewees also found this to be a positive relationship as the following quote demonstrates when discussing healthcare touchpoints.

> *So they told me a call they sent the message to the DHA. I said to myself, messages in Greece do not work with you just send it and you lose it. I opened the app, I saw the chat. I don't even I didn't even enter my details because I thought that will not work. So I called them back please can you help me can you tell me where to go for the exams? I told you please send a chat message. Yeah, I did it and in seconds. The reply, they booked me appointment, gave me alternatives and it was something like a personal healthcare. P22*

There is a strong linkage between touchpoints and quality (Hung, Lee and Hu, 2023). When examining touchpoints on a commercial customer journey research shows that a range of touchpoints can provide a quality experience (Zimmermann, Weitzl and Auinger, 2021). Online shopping for example can be seen using the four dimensions of quality, with a positive impact of touchpoints on quality and performance (Mansourimoayyed, Hoseini and Sabahi, 2020), with similar findings being seen in the education sector (Tualaulelei *et al.*, 2022), the healthcare sector (van Boerdonk, Krikke and Lambrechts, 2021), as well as smart cities where touchpoints have also been recognised to create performance value (Muschkiet *et al.*, 2022).

This finding has some linkage to the results of H6. Not only is the price of touchpoints valuable to expatriates, but the quality or performance of these touchpoints affects value creation in expatriates. Again, this has some connection to the customer journey concept as the performance of touchpoints affects the seamless move along the journey. If the performance is one of quality, i.e. the touchpoint achieves its goal well for the individual, then that will provide value to the journey and value to the

individual. Customer journey in relation to cities has been touched on in other literature, however it has not been widely applied to expatriates, so these results add to that body of knowledge.

7.2.8. Hypothesis H8

In examining Hypothesis 8 (H8) once again touchpoints were found to elicit a strong relationship, this time to emotional value, with a beta estimate of .484 and p-value was less than 0.01. This relationship was both positive and significant. A clear linkage between touchpoints and emotional value in the commercial sector has been shown (Chatzopoulos and Weber, 2018), however, this current study shows the relationship in the smart city sector. While the holistic model for the smart city experience proposed includes consideration of factors such as price, touchpoint, emotional and social factors (Muschkiet and Wulfert, 2022), it has yet to be tested empirically. Data from this study goes some way to examining aspects of this model. The value of different touchpoints in relation to satisfaction, which participants recognise as emotional, found that touchpoints had a significant positive impact on satisfaction (Boisvert and Khan, 2023). Touchpoints have been shown to have a strong impact on emotional value when examining the hospitality sectors (Zhang, Zhang and Lu, 2020), this work also used Sweeney and Soutar (2001) as a basis. Touchpoints can influence online and offline purchasing as well as positivity toward the experience (Baxendale, Macdonald and Wilson, 2015). This is reflected in the interviews conducted for this study.

> *SeeSaw. Brilliant, is actually installed it as an app, but I use it through the browser because my app has been literally from the get go, but the browser is pretty good. And the teacher in my daughter's nursery, she had post pictures from throughout the day so we get an idea of what's going on inside the classroom. This is brilliant, because, you know, especially as someone who hasn't gone through this before, I haven't had the experience of having a child in nursery or in school before. It's a bit anxiety provoking. You know, where's my little person going during the day? What's she doing? ….. So, it's really nice to be able to see the photos and the videos of what's going on inside the nursery classroom .....So, for me, there's comfort in that as well. That like something that was relatively easy and helpful to me is a nursery. P8*

The research has identified the importance of touchpoints within the city and their positive effect. The emotional impact of touchpoints has been widely examined in commercial contexts and many on and offline touchpoints provide positive and negative emotional experiences to use. In that sense the

findings of this hypotheses are not new, however within the city context this examination is rarer and in terms of expatriates this finding is new. Linking back to the objectives of this study, the finding regarding touchpoints goes to the nature of co-creation as touchpoints are two-way further enabling co-creation, it also goes to the nature of value-in-use as the services are often experienced via touchpoints. Finally, touchpoints enable sharing, and this has been identified by interviewees.

7.2.9. Hypothesis H9

Hypothesis 9 (H9) shows the relationship between touchpoints and social value which was found to be the strongest of any relationship tested in this study, with a beta estimate of .611 and p-value less than 0.01. The relationship between these two constructs is found to be positive and significant, similar connections have been found between touchpoints and social value in banking (Sithole, Sullivan Mort and D'Souza, 2021). Multiple touchpoints have been found to develop loyalty in a retail context (Herhausen *et al.*, 2019), while good communication touchpoints have been shown to have a positive effect on well-being and community within smart cities in Malaysia (Horng *et al.*, 2021), however this work makes no reference to expatriates.

> *But as an expatriate I think many of us rely on the social network as well for information. There's a lot of posting happening in different forums in different platforms online and conversations offline to how to go about some of these things. P3*

The positive effect of touchpoints on social value is clearly a powerful one, as both qualitative and quantitative data collection demonstrates, and its alignment with other findings in other contexts supports this assertion. This link however is not widely explored in the literature, although the idea of smart cities being social as well as technological has been explored in Chapter Two, with authors such as Romanelli (2018) and Szarek-Iwaniuk and Senetra (2020) suggesting smart cities are social in nature, moving away from the Global North perspective which focuses largely on the service delivery aspect of smart cities. Linking to information exchange and building social capital this happens through touchpoints and as discussed above it plays a role in creating social capital. This finding provides much greater understanding of the expatriate experience in relation to touchpoints and social value in the

smart city context, while addressing the nature of sharing and co-created value outlined in the research objectives.

7.2.10. Hypothesis H10

Hypothesis 10 (H10) examines the relationship between the city experience and its impact on quality/performance. Quantitative findings showed this relationship to be both positive and significant with a beta estimate of 0.636 and p-value of less than 0.01. The positive nature of this relationship was also highlighted in the interview findings as the quote below demonstrates, when discussing obtaining a certificate for her husband.

> *…he needed from the police a Certificate of Good Conduct. Yes, something like that in order to start the position in a hotel. So we applied through the portal for the certificate. We paid the fee and imagine that the police called us about the photo even at night because we asked him something about the photo and they called us okay, we took the photo and they reply straight away. Everything is really good in this Yeah, excellent. P22*

These findings align with other work on social commerce, which shows a strong and positive relationship between the experience and value in relation to elements such as service excellence (Rahardja *et al.*, 2021). This is also the case in relation to AI services where customers do experience higher performance from their service provision (Prentice, Weaven and Wong, 2020) and the hotel sector where there is a clear relationship between the service experience and value perception (Nunkoo *et al.*, 2020). Within smart cities some findings suggest that citizens' experience and engagement in city services does create value for those citizens (Allen *et al.*, 2020) and it has been shown that ICT can play a role in improving the quality of the urban experience (Wang and Huang, 2014), however further investigation into the benefits that urban services can play in improving quality and performance via ICT is needed. Unlike some of the other hypotheses, the services experience has been examined in connection to smart cities and the finding here appears to support much of what has been examined before; however, it does look to expatriates which has not been addressed before. Additionally, the finding adds to the understand of co-created value and value-in-use.

7.2.11. Hypothesis H11

Hypothesis 11 (H11) investigates the city experience and its ability to predict emotional value creation. The structural equation model shows a positive and significant relationship, with a beta estimate of .320 and p-value was less than 0.01. It was also well discussed during the interview stages of data collection, with respondents making many emotionally positive comments about smart services such as parking (accessed through app) and refuse (which is monitored electronically).

> *The parks are pleasant. They're there. They're good. well maintained. Very much. So good, kind of, you know, they've got the parks that I've been to. Bathrooms are very clean. The parks are also clean and think, whether it's that people know not to leave their rubbish around or they pretty much good at picking up, whichever. I'm happy with the end result. Yeah, the proximity. And their parking is also really good. Every park I've been to there's always been sufficient parking. P21*

Other work aligned with this, showing a clear positive relationship between experience and emotional value in Middle Eastern retail consumers but not citizens (Helmi, Rini and Muda, 2017), whereas Chinese smart cities showed that residents do see positive emotional wellbeing from the service experiences they receive (Yu *et al.*, 2020). While the context of smart cities is helpful for this study, the fact that they do not examine expatriates limits its usefulness. This study however does add to their findings by looking at a Middle Eastern perspective and an expatriate one showing that the smart city experience is influential in relation to emotional value, thus adding to the literature in this area.

There is scope to measure emotional value through other means, Net Emotional Value (NEV) can be used to examine service (Helmi, Rini and Muda, 2017); customers' achievement toward their desired lifestyle can be examined this way (Situmorang, 2017). Emotional links in cities could relate to such elements as heritage, identity and sense of belonging (Al-Kamoosi and Al-Ani, 2019) therefore, these findings suggest that a greater use of events, such as marathons, street performances and festivals is valued. This is something that could be developed by city managers to enhance the emotional aspect of value creation.

7.2.12. Hypothesis H12

Hypothesis 12 (H12) examines the relationship between the city experience and the creation of social value. The quantitative results show a positive and significant relationship, with a beta estimate of .179 and p-value was less than 0.01. This was also reflected in findings from the qualitative data collection, with respondents making social value related comments about a range of services as well as the city itself and in relation to family activities:

> *I've been I've been to a public library was with my family. It was it was really, really good. Yeah. So library set was brilliant and very clean and lots of books and yeah, lots of places to study and then read. P17*

Physical spaces within the city have an impact on social value creation (Wearing and Foley, 2017) and the experience of the city has also been known to have an affect on the creation of social value (Carvache-Franco *et al.*, 2022), however, both these studies focus on international tourists rather than domestic residents. Turning to the city of Doha, it is recognised that social value is of worth within the community, and they do see that this differs between Qatari nationals and expatriates in terms of social value (Diop *et al.*, 2020). Both groups recognise value, however their study does not directly look at the experience of the city on this value creation.

The results from this study clearly demonstrate that the experience itself is a strong determinant factor on the creation of social value. Despite some work on smart cities suggesting that cities should be social as well as commercial, the social aspect is not extensively explored in the literature, so these findings help to provide insight not only into the experience and its impact on social value creation, but also with the expatriate community.

7.2.13. Hypothesis H13

Moving finally to examining the mediated constructs and the impact on the final dependent variable of perceived service value. Firstly, Hypothesis 13 (H13), functional value in relation to price and value for money as a determinant of service value; the results show that this is a significant relationship and it is a positive one, with a beta estimate of .156 and p-value was less than 0.01. This is echoed in the

interviews too. This next respondent was discussing the service she received from DEWA (smart city utility provider).

> *I'm quite happy with the bills. I see that in general, the amount I pay, it's kind of fair. I know what I use a lot. And at the moment, I don't want to change my habits maybe later but right now. P20*

Research into banking has shown strong relationships between perceived price, value and service (Zietsman, Mostert and Svensson, 2019). Customers of the UAE telecom company Etisalat (a key intermediary in smart city touchpoints) have been examined by other studies in relation to the constructs of price and service quality, not in relation to one another but as determinants on price and perceived value, rather on their positive impact on customer satisfaction (Alzoubi *et al.*, 2020). This suggests both that these factors have a positive impact on satisfaction, however they do not distinguish between expatriates and Emirati nationals.

Findings from this study show a clear link between functional value (price/value for money) and perceived service value. This suggests it is important to understand the right price point for a service, this is something widely explored for commercial service, but these findings suggest that city managers pay the same kind of attention to those working in the commercial sector. However, it is worth bearing in mind that while some smart cities services incur some charges, such as driving licence renewal and rental Ejari, others such as play areas and beaches have no direct charge. So, the views on value for money are subjective and this could be worth further investigation to see how views on value for money change based on the amount of payment for that service. Once again this adds to the literature overall, while also providing greater insight into expatriate value creation perception in smart cities.

7.2.14. Hypothesis H14

Hypothesis 14 (H14) examines the relationship between performance/quality on perceived service value. This relationship was found to be positive and significant with a beta estimate of 0.369 and p-value less than 0.01. Turning to the qualitative findings, this is supported by the following quote from a participant.

> *I'll just tell you about my overall experience. So I have been to the courtroom. And I found the whole experience was really smooth, really easy. There wasn't another person who arranged the appointments and payments etc. But I know that they also found it to be the surprisingly smooth process. So I went to the court and it was all very straightforward. It wasn't a lot of waiting in that the staff were really friendly. The judge was very friendly. So overall, again, very positive experience. It was easy to arrange those appointments. It was very quick. So I had that expectation that it was going to be something that would take maybe many months and the whole thing was just finished in one week. Okay. P18*

Positive relationships between service quality and the customers' satisfaction and perceived value have been observed in the commercial service context (Hu, Kandampully and Juwaheer, 2009), as well as telecommunications services (Alzoubi *et al.*, 2020), the hotel sector (Alii *et al.*, 2021) and the home delivery sector (Uzir *et al.*, 2021). Smart cities have not been widely examined in relation to performance/quality and service value, however the importance of service quality in the smart city experience has been recognised (Argento *et al.*, 2020). Service excellence in relation to reputation in the public sector in Jordan has been identified as having a positive effect on service excellence (Aladwan and Alshami, 2021) and there is evidence to suggest that improvements in service quality affect overall service value in Taiwanese smart cities (Ji *et al.*, 2021), but not in relation to expatriates.

This hypothesis demonstrates the attention that should be paid to the quality of the service being provided and this should be understood by city managers. The SERVQUAL model (Parasuraman, Zeithaml and Berry, 1988) may be relevant here as a tool to develop the quality of services. Service quality and value have been examined in previous studies; however, this study adds to the research by looking at the expatriates within the city context. The increase in the movement of global talent and the desire by many cities to attract expatriates has led to calls for greater research in the areas of expatriates and smart cities.

7.2.15. Hypothesis H15

Hypothesis 15 (H15) focuses on the emotional value construct and its impact on perceived service value. The quantitative results show a positive and significant relationship, with a beta estimate of .249 and p-value was less than 0.01. A positive emotional experience is also found in the interviews.

> *Like I love the sort of technological advancements that they're bringing to bear in the everyday lives of citizens in an urban environment. P12*

Research focusing on the commercial sector shows a significant link between service and its impact on emotional value, but not emotional value to service (Asmayadi and Hartini, 2015). In the service industry it was found that positive emotional value on the part of service employees has a positive affect on service performance rating (Gabriel, Acosta and Grandey, 2015) and that customers expect a positive emotional experience from their service experience, and this can foster greater loyalty and higher levels of trust (Boxer and Rekett, 2011).

Findings from this research in both the qualitative and quantitative analysis show that emotional value can be a positive determinant on service value, which has not been widely examined in the context of UAE, smart cities and expatriates. These findings are new to the literature and suggest that city managers should make every effort to develop an emotional attachment to their city services. Emotion touchpoints can be optimised further as has been discussed in other hypotheses, city managers can capitalise on events and citizens' ability to share their feelings via touchpoints as highlighted in H8.

7.2.16. Hypothesis H16

Finally, Hypothesis 16 (H16), the relationship between social value and service value; this was shown to be both a positive and significant relationship, with a beta estimate of .105 and p-value was less than 0.05. This aligns with other research that demonstrates a link between social value and satisfaction of services in the commercial sector (Choi and Kim, 2013; Alshibly, 2014) and in the e-government sector social value was seen to be a determinant of user satisfaction and intention to use, but not perceived service value (Hsu and Chen, 2007). This is underpinned by findings from the interview stage of this study.

> *I love living in Dubai too. And I just, I love the community. I love the closeness i love the the diversity that is afforded in urban environments. But I do feel like it's not a but but Dubai, to me is striving to be a smart city. P12*

This final relationship again is new to the context of smart cities and the expatriate community, once more adding to the current literature. Added to this discussion of individual hypotheses and their

quantitative and qualitative results is the consideration that the results from the analysis of direct and indirect relationships show that not only was there a good relationship between dependent and independent variables but strong and significant results were seen in the mediated relationships.

The findings here have some linkage to H9 and the discussion of social value. The findings in H2 appear to underpin the idea that smart cities can be social as well as service based. This has been examined in work from Jirón *et al.*, (2021) who look at a non-neoliberal smart city in the Global South. This approach focuses more on use of space for the community, building on social capital, restoring social imbalance and arresting urban decay. While Smart Dubai's model does not follow this approach, the findings in this current research suggest that there are some social aspects in affect in the city that are creating value. This could be worthy of further examination.

7.3. Summary

This chapter has provided insight into how the qualitative and quantitative data has come together to provide details on value creation for expatriates in Smart Dubai enabling the author to draw conclusions in relation to the research objectives and questions set out in Chapter One.

Given that so many of the findings from this study align with other works examining similar constructs, albeit in other industry sectors or groups of respondents, this discussion chapter does provide robustness in terms of what the data has told as well as generalisation across other fields for future research.

8. Chapter Eight – Conclusions

8.1. Introduction

Having examined the data closely and discussed its implications in relation to existing published works, this chapter attempts to draw some conclusions from the data in relation to the aim, objectives and research questions laid out in Chapter One. This chapter also highlights the theoretical contribution this study makes to the areas of value creation and smart cities for the expatriate community, including a conceptual framework for examining this phenomenon more closely. It also provides some insight for managers of smart cities themselves to enable them to make continual improvements to their city's smart provision. This chapter also identifies its own limitations and suggests areas for further study.

8.2. Conclusions

This research set out to examine what expatriate smart city residents regard as value and explores what is missing from a smart city offering that may be of greater value and to examine it in the context of Dubai, which is an area that is underrepresented in current literature on the subject. More specifically, this study laid out the following objectives.

RO1 – To investigate the perception of expatriate residents in terms of value from co-created services developed in Smart Dubai.

RO2 – To evaluate the extent to which the sharing economy determines value to expatriates in smart city services in Dubai.

RO3 – To investigate the role of value-in-use as expatriates engage with smart city co-created services and the shared economy.

This research has achieved its objectives by using a mixed method including both qualitative and quantitative data which was collected from many expatriate residents in Dubai. This data enables respondents to provide information as to their perceptions and experiences in use in relation to a wide

range of smart city activities and in relation to the sharing economy. To ensure a focused examination of the research, questions were laid out as follows:

RQ1 – What do expatriate residents perceive to be valuable in co-created smart city services in Dubai?

To address this research question the data collected from this mixed method study has identified some key aspects of the co-creation experience with the smart city. The key findings that were identified were that the smart cities create four main areas in terms of value. These are information exchange, convenience, touchpoints and the city experience itself. These points were initially drawn from the literature and informed by 22 interviews with Dubai expatriates and confirmed with a quantitative method with a further 482 respondents. While concepts such as convenience, touchpoints and experience are not new research, their examination in the context of smart cities and expatriates are new to the literature; given the increased need for global talent this study is beneficial and timely. Not only was the validity of these four emergent themes determined by the results of the questionnaire, but the relationship of these four themes to the more generalised value concepts from Sweeney and Soutar (2001), these being functional value (price/value for money), social value and emotional value were also validated. These findings also align with research from Lytras *et al.* (2021) who make the point that smart cities need to be human cities, the resident is central. The themes from the research have a significant and positive relationship (see Figure 6.2) on these general concepts of value, essentially what has been deemed to be valuable by smart cities expatriates determines social, emotional and functional value. These three areas in turn have clear, positive and significant relationships in generating perceived service value (Li and Shang, 2020) which is a concept that looks at the value created within city services. These findings provide a much better understanding of co-created value in Middle Eastern smart cities, as well as the experiences of expatriates in this public service environment.

RQ2 – How does the sharing economy relate to the expatriate residents' service experience?

While rarely explicitly mentioned by interviewees as 'sharing economy' much was highlighted in terms of sharing. Transportation was widely discussed by interviewees as valuable, with aspects such as in co-created taxi services, however other elements of sharing such as peer-to-peer delivery also being

voiced. However, it is in the first theme that sharing is perhaps most widely covered, the theme of information exchange. The exchange of information is one of the key aspects that make a city (Giffinger and Gudrun, 2010) and it is at the centre of most definitions of smart cities (see Table 2.4). Not only was the exchange of information valuable to expatriates in terms of city service provision, it also led into discussion of other themes, such as convenience in that the more information that had been exchanged the more convenient services were to use, but also convenient in the services experience. For example data exchanged on apps regarding vehicles meant that paying for parking was often very straightforward with no need to go to a machine. Touchpoints within the city were also seen as valuable not only for information exchange, but also as an access point for city services via channels such as apps and websites. Further value was highlighted when touchpoints were used in the service themselves as with the Alhosn app that showed vaccination status rather than carrying paper copies. The experience itself was also seen as valuable in terms of sharing through community experiences such as public spaces and the cycle parks. Aspects of the value dimensions are seen within sharing, such as performance/quality where sharing of traffic information improved journey times, as well as social and emotional value through community groups and events, which aligns with other scholars' definitions of smart cities (Ranchordás, 2020; Sun and Zhang, 2020; Pašalić, Ćukušić and Jadrić, 2021). Once again, the quantitative results appear to support what has been found in the qualitative results.

RQ3 – What role does value-in-use play in the shared economy and smart city co-creation services?

The role of value-in-use appears to be central to the sharing economy and city co-creation services, with interviewees spending a great deal of time discussing their experiences. It should be noted that value-in-use is value realised as the individual uses the service (Grönroos, 2011) and value-in-use is experiential in nature (Mathwick, Malhotra and Rigdon, 2001). Experience is seen in the exchange of information and the benefits seen through activities such as utility usage and improvements. Convenience is experienced (Gawor and Hoberg, 2019) and this was very apparent in the data, with respondents discussing how using the services had been convenient in terms of timesaving, cost savings and ease of use. Touchpoints were seen as experiential in terms of being able to communicate with

service providers and services, such as public spaces, were only valued through use. Dimension of values are also seen in value-in-use; the performance/quality of services is experienced through use, interviews raised a range of positive and negative experiences in relation to services, with negative experiences or value co-destruction perhaps being worthy of further study. Positive emotions around experience were often discussed and social benefits from the city were also touched on in relation to elements such as neighbour communities and sharing of information about children's school activities. The role of value-in-use appears to be central to perceptive service value.

All of this is new to the literature and enables exploration in terms of both the theoretical and managerial contribution that this study makes in the following sections.

8.3. Theoretical Contribution

Research from Barnaghi, Bermudez-Edo and Tönjes (2015) and Baran *et al.* (2022) point out that smart cities are complex structures and those who design and operate them need a clear framework. This study begins to address this, providing further insight into the co-created value-in-use. Looking deeper into the findings, not only does this study meet the objectives it set out to examine, but it also provides a number of other theoretical contributions.

Firstly, it has provided results that help academics to better understand and study further the phenomenon of value creation within smart cities as it affects expatriates, as called for by a number of authors (Kitchin, 2015; Scuotto, Ferraris and Bresciani, 2016; Joss, 2018; Ismagilova *et al.*, 2022). As well as providing greater insight into value-in-use to address concerns from Abid *et al.* (2022) that this concept is under researched.

Secondly, this work adds to the understanding of several concepts, namely information exchange, convenience, touchpoints and experience within the city, providing new evidence as to their effects on value co-creation, both within a city context and with the focus on expatriate co-creators.

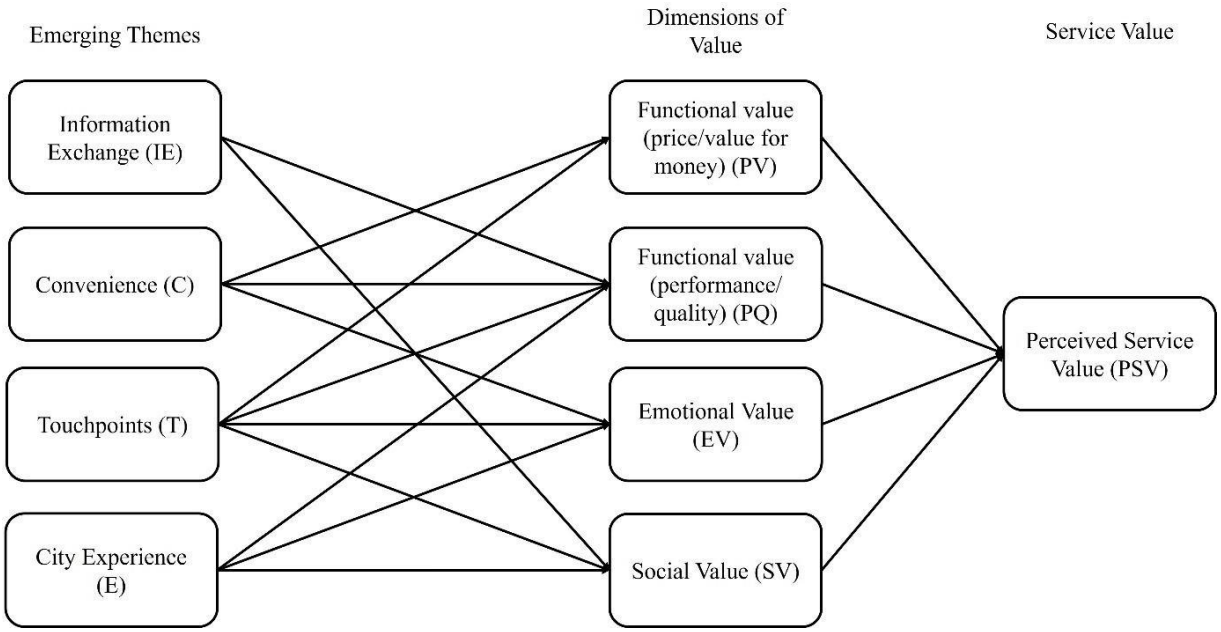
Thirdly, it has tested these experiences against some emerging themes and existing constructs and found positive and significant relationships. In addition, this study has added new items (C4, T5 and E5) to a

number of constructs of convenience, touchpoints and experience to reflect the nature of the smart city. These additional items have been found to have validity and have improved the constructs they are part of.

Fourthly, these findings add further validity to Sweeney and Soutar's (2001) dimensions of value and in relation to the context of smart cities and expatriates. It has also examined value creation through a number of service touchpoints, both on and offline, responding to calls from Morgan *et al.*, (2019) for further examination. This provides researchers with an improved construct to use in future studies. Additionally, the study provides further validity to the concept of perceived service value, the authors of which, Li and Shang (2020), had mainly focused on the Chinese cities, and which has now been expanded to examine an Arab built city, providing opportunities for other researchers in the region to employ this concept with further confidence.

Finally, all this work has culminated in a theoretical framework (see Figure 8.1 below) that helps understand smart city services, as called for by Katsikeas, Leonidou and Zeriti (2020) and value creation, and it is available to researchers as a basis to test further in different city locations and with different groups of citizens. The previous chapter discussed the results of the research in context, looking at the alignment to other studies and examining commonality. Comparison could be found to all the constructs tests, which suggests a degree of generalisation and confidence in the fact that the constructs apply in wider research contexts.

Figure 8.1 – Confirmed model of value creation dimensions in relation to smart city experience of expatriates – source Author.



The mixed-method approach used for this study also provides greater insight into the topics, as much of the work examined earlier tended to look from either a qualitative or quantitative perspective. It is hoped to offer validity in the findings and provide a greater body of academic knowledge in this area. This study has culminated in producing a conceptual framework (see Figure 8.1) for researchers to examine value creation within smart cities not only with expatriates but also with other audiences. This framework draws on a number of constructs that have been used in other disciplines and in some cases to examine smart cities themselves, but this is the first time these have been brought together in this way to study expatriates in Dubai. The fact that all the hypotheses within this framework were confirmed (see Table 6.9) and that all the relationships had positive and significant results (see Figure 6.2), should provide other researchers with confidence when applying this framework to other studies.

8.4. Managerial Implications

As Taweesaengsakulthai *et al.* (2019) suggest, bureaucrats and other stakeholders who are responsible for implementation of policy often lack understanding and lack a conceptual framework for smart city development and its provisions for users. Building on this, Ranchordás (2020) suggests that there are benefits to understanding the smart technologies, behaviour and value insights in the smart city context,

which may enable better policy decisions as well as a more effective allocation of public services. The rise in the development of smart cities around the world in countries such as India (Chatterjee, Kar and Gupta, 2018), Kenya (Odendaal, 2021), China (Lai *et al.*, 2020), South Africa (Ranchod, 2020) and Egypt (Efthymiopoulos, 2015), and the global demand for expatriate workforces (De Falco, 2019; Coelho, 2022) beyond the Western world (Ewers *et al.*, 2022) the need to understand value creation in this context is pressing. Given the diverse nature of the expatriate population in Dubai (Dubai-Online, 2020) and their nomadic nature (Thompson, 2019), this research is not only topical and valuable to academics but to smart city managers as well. As suggested earlier, there is transferability in this research, and it is therefore relevant to a wide range of smart city practitioners.

The conceptual framework developed in this study is a potential guide for practitioners. It details that any city manager looking to develop service value in their city, needs to look to traditional determinants of value creation (price, quality, emotion and social). These in turn are driven by themes of value creation identified in this study, namely information exchange (sharing) in the city, convenience of smart city services, touchpoints within the city and the city experience.

Firstly, the provision of and sharing of accurate and relevant information to citizens and customers generally has long been seen as an important part of their participation in the co-created value experience (Lusch and Vargo, 2004). Many city managers have it within their power to make data available to the citizens to enable more informed choice about the use of services. Respondents demonstrated the importance of information sharing in both the interviews and through the questionnaires. Realtime information gathering has been seen as major a problem for the 21st century (Mehedi Hasan Sad *et al.*, 2020). This could take the form of clear and transparent forms of data collection, while simplifying the process. This has proved beneficial in the private sector where collection of data has seen cost efficiencies and customer engagement improvements (Duan, Ge and Feng, 2022), additionally public sector organisations have seen benefits (Bonomi Savignon *et al.*, 2024). The UAE identity card which is much cited in this work and links to other government activities meaning data is readily available and easy to access without being repeated. This understanding of

linkage of data will be beneficial to the public sector in both the design and improvement of cities. For counties such as the UK that have readily embraced smart cities developments but are very resistant to the introduction of identify cards (Thomas, 1995) this study could provide further evidence that citizen ID and city development needs to go hand in hand.

Secondly, convenience, the ease of use, straightforwardness, and timesaving aspects of service was highlighted as prized by expatriate citizens. Again, city managers have scope here, partly by providing the right information at the right point, to make service encounters smoother and time effective during and after purchase, but also in terms of having suitable touchpoints and training of staff, to ensure the experience is trouble free. Payment kiosks were highlighted as a convenience function, convenience is a concept that both the public and private sectors value (Rowley and Slack, 2003; Balti, Lakhoua and Sayadi, 2024) however there are still many retailers and cities alike that have few or no kiosks. If they wish to foster greater convenience for their customers/citizens, this research will be of use. Kiosks are a gap that needs to be closed between citizen and government in city contexts throughout the world (Gómez-Carmona, Sádaba and Casado-Mansilla, 2022). So, these findings go somewhat to inform on the development of this convenient innovation. Linked to kiosks was printing machines that produce items such as driving licences and ID cards, these were cited in the research and are used in some cities (Falcon, Saligue and Saligue, 2024). There is scope for implementation of these devices in a range of environments, to improve convenience for users by providing somewhere for quick and easy collection that can be located in public areas such as malls and metro stations. Discussion of the UAE PASS, used as a single access entry point for all city services, would be of value not only to other cities looking for a simple access point, particularly those looking at ID cards which the UAE PASS is connected to via biometric reference points but also, to the private sector who currently use Gmail or Facebook as an access point for multiple services with just one password without the security that comes with the biometric reference points of the UAE PASS (Stibbe *et al.*, 2024). People's perceptions of time scarcity appears to suggest that they feel more time poor (Kaufman-Scarborough and Lindquist, 2003) and given that convenience is linked to time and effort (Farquhar and Rowley, 2009) convenience cannot be overlooked by managers. This is not limited to the public sector, convenience can be of benefit not

just to smart city practitioners, but any organisation that is looking to provide services to individuals. Convenience forms the basis for the SERVCON concept discussed in Chapter Two.

Thirdly, touchpoints; these had the strongest relationship to value in the results. This is perhaps not surprising given that this is the point at which the majority of citizens most regularly engage with many of the citizen services, from paying bills, to registering for licences. These touchpoints are varied within the city, they can be online in the form of apps and websites as well as offline in terms of call centres and customer happiness centres. These touchpoints need to be readily available to citizens in accessible locations on and offline. Again, staff training may be needed to ensure suitable support to the customer.

Payment is an aspect of not just marketing, but any organisation looking to collect fees for their goods and services. With the costs of collecting fees from customers set to increase (Junius *et al.*, 2022), effective and efficient ways of collecting money are key to any business whether for profit or not-for-profit.

Touchpoints are widely used throughout the public and private sectors around the world, they encompass both the physical and digital and are used through all stages of the customer journey (Chaffey and Ellis-Chadwick, 2022). Touchpoint experiences can be both emotional and social (Weidig, Weippert and Kuehnl, 2024) both of which were highlighted in terms of neighbour community building and service provision, not to mention drivers of greater engagement, which is a cornerstone of value co-creation. This study provides much in the way of touchpoint experience and value, which would be useful to any organisation attempting to foster stronger links with their customers, users or citizens.

Finally, the city experience. Despite all the discussion of smart and digital technologies, city services still in full or in part take place within the physical space, these could be parks and recycling centres around the city. The staff interaction is once again important in areas such as the Dubai customer happiness centres where trained staff were able to assist with applications and problems, as well as RTA staff assisting at Dubai Metro stations and more broadly in terms of such aspects as cleanliness and accessibility of public facilities, such as the beach and museums. These were also seen as drivers of

social and emotional value. Incidentally these factors are seen has an important factor in a good customer service centre (Rose and Wright, 2005). Recent years have seen a shift away from physical customer service centres and call centres toward digital (Jagodziński and Archer, 2018). Perhaps counter intuitively this research into smart cities has shown a need for physical customer service centres. City managers should provide clear and transparent processes for activities, this is beneficial firstly, for the efficiency of the process for all stakeholders, secondly to avoid waste, confusion and value destruction. Managers should take note that staff training in these processes is also important to ensure staff provide correct and consistent information. Even in a digital environment the physical side must not be forgotten, breakdowns in technology can cause frustration and value destruction; having staff on hand to support users is an important lesson for managers.

The experience of the city as a whole should not be forgotten in the planning and ongoing management of cities, this research has shown that these experiences can be physical, digital, emotional and social. The factors all affect the experiential value created within a smart city environment and can greatly improve participation which in turn can help to co-create value (Cao and Kang, 2024). City managers should take a holistic approach to the running of the cities in relation to this. Building on the physical managers should not overlook more traditional services such as parks and cycle lanes. Insights from this work can also aid in the planning of recycling centres, which in Dubai are located primarily in close proximity to public parks. Understanding citizens' behaviour around leisure and recreation can help with increasing public participation in activities such as recycling (Zaharudin *et al.*, 2021).

Updating existing cities with these physical capabilities as well as greater integration of data can once again save money and promote efficiency while providing ways for citizens to access and use their data easily will increase efficiency and help to create value.

Experience is key to value creation, this is equally true in the public sector as it is in the private sector, building public value is dependent on positive experiences (Røhnebæk *et al.*, 2024), something all managers should build into their services.

In examining smart cities findings from Brege and Kindström (2021), they highlight the need for activities to reflect consistent value creation logic to create coherent market strategies. Many of the managerial implications identified above fall into the marketing mix framework, which answers the call from Mandler *et al.* (2021) who suggest that the marketing mix needs to be researched further in different contexts, as well as suggestions from Datta and Odendaal (2019) who feel the marketing mix element of process in value creation needs better understanding. Process is very much at the heart of information exchange, convenience and touchpoints in generating value and is very much within the remit of managers to address.

The examination of the dimensions of value is also important for managers for generating emotional value with cities (Wnuk and Oleksy, 2021), as well as social value (Anthopoulos, Ziozias and Siokis, 2021) and service quality/performance and price/value for money (Habib, Alsmadi and Prybutok, 2020). All of these factors can drive service value.

While this work is transferable to cities around the world, the research can also help with progress on the UAE's Vision 2030 (National Committee on Sustainable Development Goals, 2018) which is designed to deliver a more sustainable development of the nation, whilst improving the economy and making it more environmentally friendly. More specifically Vision 2030 highlights both the importance of human capital in the development of the UAE and smart government as a mechanism to support that. Haak-Saheem (2020) makes the point that Dubai's need for foreign talent is not likely to abate any time soon, while citing the potential harm that could befall Dubai if it is unable to attract international talent, given Dubai's need for foreign talent, its linkage to the UAE's Vision 2030, and the value that expatriate and digital nomads have on the city environment (Minasyan, 2020), quality of life (Lepawsky, Phan and Greenwood, 2010), and city services (Rodrigues, Sarabdeen and Balasubramanian, 2016). The finding also addresses policy gaps in the sharing economy which were identified by Davlembayeva *et al.*, (2024), these are trust and privacy around data, community engagement and the link between on and offline. This study has highlighted that people want to know their data is secure and many trusted the city with the data that was captured or given to the city by residents. Data from this research has

also examined engagement with the community through activities such as neighbourhood groups online. This research has also looked at the on and offline linkage in relation to touchpoints, where respondents discuss when a physical contact point within the city is needed and when online is more welcomed.

Finally, these points are designed to provide managers with areas for continual improvement as called for by Menychtas *et al.* (2013), continual improvement being an element that is important for value creation (Lusch and Vargo, 2004).

8.5. Limitations

While this work has addressed some of the gaps in the research (see Chapter One), it is not without its limitations. The sample consists almost entirely of professional or 'white collar' workers, future studies could examine blue collar workers on lower incomes (Al Thani, 2021). Additionally, the sample is skewed toward the younger age bracket and while UAE does have a younger population than other nations, there may be a need to examine older expatriates. Similarly, the sample shows a high proportion of people who have been in the UAE either less than three years or more than ten years, with these two groups accounting for 78% of the sample, with the middle grouping potentially underrepresented, however the profile for interviewees does show a more even spread in many of the demographic areas. In relation to the quantitative data collection, while a sample size of 482 is more than suitable and has shown validity, this was taken using a convenience sample. This convenience is a non-probability sample by nature and while analysis of the demographics of the sample show that it broadly reflects the population of Dubai, a probability sample might uncover more focused results.

The study has focused on Dubai and while the ability to generalise has been identified, it is only one city within the UAE with the highest expatriate population; other cities with the UAE and around the GCC have different expatriate demographics. While this study set out to examine the expatriate population specifically, Emirati nationals who make up approximately 10% of the population have not been included in this study; it is this group that have created and implemented the city and manage it, further studies could consider these.

These findings are a snapshot in time and in regard to the interview stage taken not long after the restrictions implemented for Covid prevention had been eased, with many respondents mentioning Covid related services as part of their interview. A more longitudinal study may provide greater insight into value co-creation over time. Given the experiential nature of value-in-use perhaps other research methods such as observations may yield further insight into that experience when expatriates interact with the services.

8.6. Generalisability

In order to help demonstrate the value of this research, it is important to discuss generalisability of the findings and the benefits it would bring. External validity (Ferguson, 2004) is in part built on generalisation. Generalisability provides guidance for decision makers in other locations or similar scenarios based on other research, providing insight for potential interventions (Øvretveit, Leviton and Parry, 2011). Statistical generalisability is widely discussed and accepted in quantitative research enabling predictions of behaviour of large groups based on a sample size of a few hundred, in part this study has demonstrated this. Theoretical generalisability, often referred to as transferability, concerns itself with the same activity as statistical generalisability, but the focus here is on qualitative data (Takahashi, 1996). Transferability requires details of methodology, research design and rich detailed participant information, which has been provided in earlier chapters.

By selecting a purposeful sample for interviews this research was able to access a wide range of individuals from different backgrounds and experiences to assist with generalisation to other locations and cultures. This has been triangulated with quantitative data, again the convenience sample has provided a diverse range of participants to aid with generalisation and provide transferable, actionable results from this study (Finfgeld-Connett, 2010). While Baldridge, Floyd and Markóczy (2004) make the point that research should be beneficial to both academics and practitioners.

In terms of generalisability Øvretveit, Leviton and Parry (2011) point out that findings can be used piecemeal, meaning aspects of the finding of this research may be useful to different stakeholders, it would not be necessary to take it all holistically.

With these points in mind, the generalisation of this work is as follows.

The constructs such as information exchange, convenience, touchpoints and experience have been demonstrated to be relevant in examining expatriate interactions with cities. The four dimensions of value (Sweeney and Soutar, 2001) have also been shown to be relevant in this context. These factors have all been seen to have an impact on perceived service value (Li and Shang, 2020). These constructs have been largely taken from commercial contexts; this study has shown that they are applicable to the public sector as well, providing research with further tools to examine the public sector. Additionally, these constructs have been used originally in context outside the UAE, this provides some evidence that they can be used in other markets around the world with some confidence in their reliability.

While expatriates have been the focus of this research, it is clear from the participants of both the qualitative and quantitative data collection stages that a wide range of different nationalities have been studied. This provides some evidence that this work can be applied to a wider group of nationals within their respective native countries, enabling this research to be the basis for studying smart city value creation in countries in Europe, Africa and the Indian sub-continent.

This work also provides insight into expatriates' behaviour patterns in relation to services, these findings will aid those looking to understand this group in relation to behaviour much more. More generally the service context has been examined in this work, which would be of use to both public sector and private sector alike.

8.7. Value of the study

The value of this study is twofold, firstly in the forms of the specific managerial and theoretical contributions the study has made which are detailed above, but also in its generalisability to not only other smart city environments, but also some aspects of the commercial world.

Recognizing what aspects are valuable in smart cities can have huge benefits. Firstly, in terms of planning the city. New smart cities are planned all over the world, such as India where 100 smart cities were promised (Hoelscher, 2016), providing smart infrastructure such as cabling and sensors to ensure

that the basis for service provision is there, along with ensuring access to smart kiosks and customer service centres are built into the plan. Doing this early can provide greater cost savings and improve efficiency. New smart cities are expected to grow in North America (Sancino and Hudson, 2020), South America (Fernandes *et al.*, 2019) and Africa (Tonnarelli and Mora, 2024). These are all areas covered by respondents in this research and their qualitative excerpts can be of value outside this context as well as the quantitative data.

Very little is written about expatriates beyond the performance measurement factors around relocation and their assimilation to the new country. This work takes this study further into their online behaviour in a public sector context. This work would be of value to HR professionals looking at improving their assimilation rates. For those governments looking to attract greater international talent improvement in city service can make an impact.

Its value lies in providing confirmation of how four constructs, touchpoints, experience, data and convenience all build on at least one of the four dimensions of value to ultimately build perceived service value, this has not been done in a study before and provides insight to anyone looking to co-create value. These constructs and dimensions originate from a non-city context and therefore this work can be applied back to other non-city contexts.

8.8. Contribution to Wider Discussions

While theoretical contributions, generalisation and value of the study have been discussed, it is important not to overlook this study's contribution to the wider discussion in relation to value co-creation, smart cities and expatriates, wherein evidence has been provided to aid in the ongoing debate around these topics.

Looking at smart cities this study feeds into emerging discussions about the use of Internet of Things within smart cities (Omrany *et al.*, 2024) as well as data collection technologies and greater public engagement within the city context (Mazzetto, 2024). This study also provides insight into the 6 dimensions of a smart city, which are still the foundation of the smart city discussion today and into the

future (Wahba *et al.*, 2024). Debate around participation, collection and use of data and the interaction of communication networks is also emerging in the discussion (Bregoli *et al.*, 2024), again this study has much to say in these areas to inform the topic.

In terms of value creation this research adds to the discussion around emerging themes related to value creation, that of value co-creation within the service ecosystems and sharing economy co-creation (Saxena *et al.*, 2024) as well as continued discussion on customer dominant logic. It also feeds into current discussion about how best to refine value co-creation processes and optimise the means by which value is created (Dai *et al.*, 2024). Related to the value creation process this study also provides a contribution toward the ongoing discussions of engagement, participation and interaction through multisided networks (Wang, 2024). This work has also provided insight into public service value or public service logic, something that is often overlooked in discussion of value co-creation (Osborne, Radnor and Nasi, 2013; Osborne, 2018).

Finally, this study adds to the current conversation around expatriates and their adoption of new behaviours and information (Mumtaz and Nadeem, 2024) and their interaction with social networks. The study also provides much to the academic discussion around expatriates and their interaction with apps, websites and other digital platforms (Wang, Lockett and Zhou, 2024), while feeding into the ongoing discussion of factors that assist in expatriates settling into their new countries (Selmer *et al.*, 2025).

8.9. Further Study

This study has focused on the city of Dubai, however other cities within the UAE and the wider Gulf region could be examined to determine how representative Dubai is of the expatriate experience within the smart city context.

The conceptual framework that this work has produced could be applied to research in other parts of the GCC and around the world, wherever there are expatriate communities. Equally there is scope for this also be to be tested within countries or regions, to see the effects of smart city value creation with

natural born citizens. Further research into value co-destruction within the city context may also be valuable, given both the limited exploration in the current literature and the points raised by some of the respondents in this study.

As highlighted in Chapter Seven there may be merit in further investigation in a couple of areas, such as further examination of both emotional value and social value in relation to smart city services and what practical activities can be developed to make greater improvements to value co-creation. In terms of the value dimension of price, which was shown to be of value in the smart city context, a more detailed examination of price in relation to free-at-the-point-of-use and chargeable services could be done to have a better understanding of pricing points within a city.

While value creation has been at the centre of this work and the findings demonstrate clearly how value is created, it does not look at what happens after that value is created. What impact does this value have on intention to continue to use? Studies could examine continuous use in this area for expatriates.

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Appendix 1 – NVivo Coding

Name	Description	Files	References
Access to information	Getting access to or knowledge of government service information	6	8
Accessibility to services	Accessibility through phone or other systems. Also perhaps those who are not good at engaging with tech. Those with barriers, like tourists. Disability could also be included here	12	26
Bureaucracy	Perceived Bureaucracy and unnecessary paperwork	3	4
Cleanliness	Cleanliness of physical services	3	3
Confusion as to what City provides	People not understanding what city provides. Banking discussed.	15	22
Connectedness of information	This can cover DubaiNow, medical information etc. The benefits thereof	17	43
Convenience	The convenience of services etc.	20	83
Cost	Savings or otherwise	6	10
COVID Or Medical Support	Medical support, Alhosn, DHA app etc	16	40
Data Collection (negative)	Personal information collection	10	17
Data Collection (positive)	Personal information collection	16	30
Ease of Use	How easy is it to use the services. Positive and Negative	9	15
Efficiency	How efficient are the smart services	11	22
Engaging with the City	Getting involved with the city Feeding back - citizen activities, citizenship	19	38
Fines	Settling fines and related issues	9	17
Inconsistency across Emirates	Different state following different process or technology etc.	6	12
Inconsistency of information across channels	Contradictory information on web, app, physical etc Or lack of information	14	33
Innovative environment	Innovative, forward looking etc Progress (or at least moving forward)	13	28
Intrusiveness	link to data collection	4	4
Journey Saving	Saving unnecessary journey	5	6
Lack of training (Staff)	Staff lacking training on procedure and policies etc.	12	25
Lacking technical proficiency	Citizens not able to use the tech. Adapting to tech	8	12
Link to private sector	Involvement of the private sector in city services.	13	22
Mobility	Transportation, parking, driving metro etc.	19	56
Multiple Touchpoints	Different ways to access the services Centralisation of information or data - or multiple apps when one is needed	16	56
Payment	Issues around payment. Control over payment	15	30

Physical Services	Psychical elements can be parks and libraries. Also customer happiness centres	16	41
Positive Staff	Good Customer Experience Preference toward speaking to someone	11	16
Recycling - Sustainability	Green issues, sustainability, DEWA usage	12	23
Self-service Kiosks	Use of self-service points.	14	27
Services Quality	Being happy with the service Good or BAD Quality of life	7	9
Sharing	Peer to Peer Information Sharing	13	24
SMART City influencing choice of new destinations	City influencing people to move to other Smart cities	3	3
Time Saving	When services save time	13	18
Time wasting	When services waste time	9	13
Trust-Security-Safety	Taxi Security. Trust in the city, Feelings of safety	12	28
Usefulness	When a service is described as useful.	10	25
When technology falls down	Technical problems experience during the use of services	17	38

Appendix 2 – Ethics Approval

Middlesex University London

Marketing, Branding & Tourism REC

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21/03/2023

APPLICATION NUMBER: 25322

Dear Matthew Stuart Brown and all collaborators/co-investigators

Re: Your ethics application 25322**:** Mixed Methods - Value in Smart city

Supervisor: Marianna Komilaki, Dimitrios Stylidis, Constantinos-Vasilios Priporas

Co-investigators/collaborators:

Thank you for submitting your application. I can confirm that your application has been given APPROVAL from the date of this letter by the Marketing, Branding & Tourism REC.

The following documents have been reviewed and approved as part of this research ethics application:

Document Type	File Name	Date	Version
In-Person Face to Face Research Template	In Person Face-to-Face Research Template - Completed	06/03/2023	1
Participant Recruitment Information	Invite-Interview - Complete	06/03/2023	1
Materials	Consent Form - Interviews	06/03/2023	1
Data Protection Declaration	Data Protection Checklist and Declaration Form	06/03/2023	1
Participant Recruitment Information	Invite-Questionnaire-Complete	06/03/2023	1
Materials	Interview questions - completed	06/03/2023	1
Materials	Questionnaire	06/03/2023	1
Methods and data	Research Procedure - Matt Brown	06/03/2023	1
Materials	Participant Information Sheet - Complete - Interviews	06/03/2023	1
Materials	Participant Information Sheet - Complete - Questionnaire	06/03/2023	1

Although your application has been approved, the reviewers of your application may have made some useful comments on your application. Please look at your online application again to check whether the reviewers have added any comments for you to look at.

Also, please note the following:

1. Please ensure that you contact your supervisor/research ethics committee (REC) if any changes are made to the research project which could

affect your ethics approval. There is an Amendment sub-form on MORE that can be completed and submitted to your REC for further review.

2. You must notify your supervisor/REC if there is a breach in data protection management or any issues that arise that may lead to a health and safety concern or conflict of interests.

3. If you require more time to complete your research, i.e., beyond the date specified in your application, please complete the Extension sub-form on MORE and submit it your REC for review.

4. Please quote the application number in any correspondence.

5. It is important that you retain this document as evidence of research ethics approval, as it may be required for submission to external bodies (e.g., NHS, grant awarding bodies) or as part of your research report, dissemination (e.g., journal articles) and data management plan.

6. Also, please forward any other information that would be helpful in enhancing our application form and procedures - please contact MOREsupport@mdx.ac.uk to provide feedback.

Good luck with your research.

Yours sincerely,

Prof Charles Dennis and Dr Costas Priporas

Chair Marketing, Branding & Tourism REC

Appendix 3 – Questionnaire Design

Questionnaire Design

Sex	Male – Female – Prefer not to say	
Age	(18-25 years old) (26-35 years old) (36-45 years old) (46-55 years old) (56-65 years old) (65+ years old)	
Time as expatriate in total	1-3 years – 4-7 year 8-10 years – 10 years +	
Education highest level	Middle school - High school - Bachelor - Postgraduate	
Employment	Full-Time – Part-time – Self Employed – Homemaker - Student – Unemployed	
Country of Origin – Free Text	Free Text	
Section	Scale	Adapted from
Section 1 – Theme 1 Information exchange within the City		
Thinking of the information you share with or obtain from City Services in Dubai, such as Emirates ID information, medical information, RTA, police etc., through websites, apps and customer happiness centres. Please evaluate the information-sharing experience you have with the city.		
City Services provide accurate information	1= strongly disagree and 7 = strongly agree	(Barnes and Vidgen, 2003)
City Services provide believable information		
City Services provide timely information		
City Services provide relevant information		
City Services provide easy-to-understand information		
City Services provide information at the right level of detail		
City Services present the information in an appropriate format		
Section 2 – Theme 2 Convenience of the City		
In relation to the City Services you use (these could be but not limited to DEWA, RTA, metro, bus).		

Please evaluate the convenience of using the services.		
A first-time user can purchase city Services without much help	1= strongly disagree and 7 = strongly agree	(Chang and Chen, 2008)
City services are user-friendly		
The city services are very convenient to use		
Section 3 – Touchpoints with the City		
Thinking of the contact points that you use in connection to city services, such as Apps, SMS text, websites, happiness centres, please state the extent to which you agree with the following statements.		
All my encounters with city services instil the feeling that they understand my unique situation	1= strongly disagree and 7 = strongly agree	(Jaakkola and Terho, 2021)
Dealing with SMART Dubai in different channels feels personal		
I can deal with SMART Dubai in a manner that suits my situation		
SMART Dubai's service process is designed to consider my specific situation		
Section 4 – Smart City Experience		
Think of the service experience you have had with SMART Dubai (such as Online, Apps, Happiness Centres). How satisfied are you about the following?		
Personal attention is given to me when I use city services	1= strongly disagree and 7 = strongly agree	(Verhoef, Franses and Hoekstra, 2002)
City Services Staff are willingness to explain procedures		
The quality of city service quality is high		
City Services are speedy in responding to requests		
Section 5 – Value Dimensions		
QUALITY		

Looking at SMART City Dubai as a whole (i.e., including all the services you have experienced), how would you evaluate the following statements?		
City services have consistent quality	1= strongly disagree and 7 = strongly agree	(Sweeney and Soutar, 2001)
City Services <u>are well constructed</u>		
City Services have an acceptable standard of quality		
City Services perform consistently		
EMOTIONAL		
Looking at SMART City Dubai as a whole (i.e., including all the services you have experienced), how would you evaluate the following statements?		
Using City Services is something I enjoy	1= strongly disagree and 7 = strongly agree	(Sweeney and Soutar, 2001)
Using City Services makes me relaxed		
Using City Services makes me feel good		
Using City Services would give me pleasure		
PRICE		
City Services are reasonably priced	1= strongly disagree and 7 = strongly agree	(Sweeney and Soutar, 2001)
City Services offer value for money		
City Services are good for the price		
City Services are economical		
SOCIAL		
Looking at SMART City Dubai as a whole (i.e., including all the services you have experienced), how would you evaluate the following statements? (E.g. community activities, social networks, neighbor groups)		
Using City Services helps me to feel acceptable	1= strongly disagree and 7 = strongly agree	(Sweeney and Soutar, 2001)
Using City Services improves the way I am perceived		

Using City Services makes a good impression on other people		
Using City Services gives me social approval		
Perceived Service Value		
Finally, looking at everything the Government of offers to you, how would you evaluate the following statements		
Overall, I believe that using government sites to access public services provides public value.	1= strongly disagree and 7 = strongly agree	(Li and Shang, 2020)
The value I receive from government sites is worth the time, effort, and money I have invested.		
The value derived from services on government sites is worth of the time, effort, and money the government have invested.		