



College of Business

**THE EFFECT OF SMART POLICING SERVICE QUALITY ON
TRUST, ATTITUDES AND SATISFACTION IN THE UAE**

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The Academic Faculty**

By

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(ID#: 1054859)**

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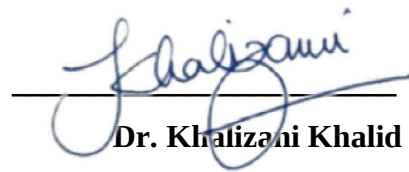
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The Effect of Smart Policing Service Quality on Trust, Attitudes and Satisfaction in the UAE



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THE EFFECT OF SMART POLICING SERVICE QUALITY ON TRUST, ATTITUDES AND SATISFACTION IN THE UAE

ABSTRACT

This study aims to identify the dimensions of smart policing service quality and to model the concomitant impact on trust, attitudes, and satisfaction, within the UAE. Although smart policing service quality is transforming public-police service relationships, there is growing concern about the perceived service quality of police services with regards to smart technology and its overall effects . The use of smart policing prompts a higher level of residents' awareness of their rights and duties as citizens. With smart policing services, the user is less likely to experience instances of police-resident tension. The successful implementation of smart policing services promotes sustainability and the utilisation of mutually beneficial relationships with any organization, individual and group with influence over the received services. FThis study evaluates a multi-dimensional hierarchical scale of smart policing service quality by framing its relationship in terms of trust, attitudes, and satisfaction. To validate the model, qualitative and quantitative analysis tools were used to develop a smart policing service quality scale based on an integrative psychometric scale. For the purposes of data collection users of smart policing services were randomly selected through the United Arab Emirates (UAE) research centre. Covariance-based structural equation modelling (SEM) was employed to verify the reliability and validity of the

construct and its corresponding nomological networks on public reception . The findings show that smart policing service quality is a second-order construct model with five primary dimensions, proving the five hypotheses as examined in this study. Further, the study confirms the impact of smart policing service quality on trust and attitudes and as a significant mediator in customer satisfaction. Theoretically, the study extends service quality research by modelling the concept as a hierarchical model and framing its impact within the context of smart policing in the UAE. Managerial implications of introducing a multi-dimensional hierarchical smart policing service include providing conceptual clarity and practical solutions to the service quality. This study also contributes to addressing the needs of an integrated quality assessment approach to empower safety and security domains in the smart government environment for smart policing service quality in the UAE.

Keywords: *Policing service quality, Satisfaction, Trust, Attitudes, Smart services, UAE*

LIST OF ABBREVIATIONS

ADPF	:	Abu Dhabi Police Force
AVE	:	Average Variance Extracted
CBSEM	:	Covariance-Based Structural Equation Modeling
CFA	:	Confirmatory Factor Analysis
CFI	:	Comparative Fit Index
DI	:	in-Depth Interviews
EFA	:	Exploratory Factor Analysis
FGD	:	Focus Group Discussions
ICT	:	Information, Communication & Technology
IoT	:	Internet of Things
KMO	:	Kaiser-Meyer-Olkin
MOI	:	Ministry of Interior
NGOs	:	Non-Government Organizations
PCA	:	Principal Component Analysis
QCA	:	Qualitative Content Analysis
RMSEA	:	Root Mean Square Error of Approximation
SEM	:	Structural Equation Modeling
SERVQUAL	:	Service Quality
SMART	:	Sensitive, Modern, Mobile, Alert, Accountable, Reliable, Responsive, Techno-Savvy & Trained
SPF	:	Singapore Police Force

SRMR	:	Standardized Root Mean Square Residual
TLI	:	Tucker Lewis Index
UAE	:	United Arab Emirates
USA	:	United States of America

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Smart devices have become one of the most popular interactive items in the new smart era that prioritises mobility. There is significant scholarly interest in not only promoting the successful diffusion of this technology but also in providing improved user experience: engaging and collaborating for the well-being of society in order to increase the expectation of relationship quality between the police and the public (Elnaghi et al., 2019; Kankanhalli et al., 2019; Lee et al., 2019). In line with this trend, this study investigates users' perceptions of smart policing service quality and introduces a comprehensive research model that employs coherent factors that are primarily based on the service quality theory.

A smart society successfully harnesses the potential of smart technology to improve living standards. Smart technology connects the human elements of engagement and collaboration within a community. These aspects of engaging and collaborating for the well-being of society have increased the expectation of relationship quality between the police and the public. Relationship quality denotes a higher-order construct representing cooperation, adaptation, and

atmosphere (Lee et al., 2019). The growing expectation from the public for the police force to better serve them is influenced by the dissemination of smart technology. This is why researchers have shown a keen interest in exploring police service quality in smart platforms (Elnaghi et al., 2019; Kankanhalli et al., 2019). Elnaghi et al. (2019) note that the police force is required to alter its services to be more facilitating of social connectedness. As a result, the present study attempts to investigate integrity, transparency, interactivity, responsiveness, and serviceability, as basic dimensions of police service quality on smart platforms user satisfaction.

The rapid advancements in smart technology have revolutionised global connectivity with seven billion smart device users worldwide. On average people look at their smart technology devices once every 6.5 minutes (Park, 2020). Seventy per cent of the world's population used smart technology devices in 2020; 80 per cent of smart technology device users are from the Middle Eastern Region due to greater affordability across developing markets (Williams, 2015). Smart technology device users in the United Arab Emirates (UAE) increased to 19.9 million in 2018 (Telecommunication Regulatory Authority UAE, 2018). The sophistication of smart technology has enabled citizens to access and use information, and to be part of the policing community through meaningful interactions and personal experiences (Eterno et al., 2017). Chen et al. (2020) concur that the effectiveness and efficiency of smart policing depends on the public perception of whether the services can meet their needs, now and the future.

1.2 RESEARCH PROBLEM

Smart cities rely on information collected from residents about people, places, and activities to build resilience against disasters, for regulatory oversight and social service outreach, and the placement of surveillance systems, as well as specifying the need for emergency services and for nonemergency issues (e.g., potholes, graffiti, etc). Civic technology develops stronger relationships among community-led initiatives, and between the community and local governments to prevent crime, and enable e-governmental services.

The world is becoming a service economy (Zuo et al., 2019). Competitiveness and the continued quest for public service excellence reinforce the importance of service quality to determine user satisfaction. Modern technology has changed the field of human interaction, with technology-enabled services gradually replacing human-based services (Chatterjee et al., 2018; Hofacker et al., 2016). Modern society prefers smart-technology enabled service interactions (El-Haddadeh et al., 2019; Tang & Ho, 2019). As such, modern society can be considered as a smart society that prefers ways to maximise opportunities for a better quality of service (Chen et al., 2020). This study considers how a smart society harnesses the potential of technology to improve the satisfaction levels of service quality in any environment.

Smart society expectations are diverse. They have a specific notion of relationship quality, with specific factors affecting trust levels to influence attitudes and affect satisfaction (Blythe et al., 2020; Hodgkinson et al., 2019;

Wuenderlich et al., 2015). Growing expectations for police forces to better serve the public involve pressure from the spread of smart technology. Smart technology devices boast artificial intelligence and the internet of things (IoT) capabilities for learning using the experience to improve performance, anticipation, and expectation, with the ability to self-generate and self-sustain (Blythe & Johnson, 2019; El-Haddadeh et al., 2019; Tang & Ho, 2019). Smart technology has enabled the police and the public to access, use, and feed information through meaningful interactions, offering more personal experiences (Chatfield & Reddick, 2019; Eterno et al., 2017; Wirtz et al., 2019). However, the robustness of smart policing service quality lies in its holistic capacity to benefit the public now and in the future (Kankanhalli et al., 2019). The presence of smart service channels, which use smart technology as a relationship network, has significantly increased in smart policing service providers, creating the need for further research on the effectiveness of such service channels.

An emerging challenge to policing is how to expand the migration of users from traditional systems (face-to-face or human-to-human) to online services employing smart technology, and to redefine the ways in which police use and receive information, and to be more effective in serving the public (Ferro De Guimarães et al., 2020). Undeniably, many police forces have chosen smart technology solutions to maximise their visibility, a strategic imperative for policing. However, the transition from traditional systems to smart policing can cause public frustration as not everyone feels confident in using an impersonal service, with a preference for interacting with humans

rather than smart technology. Along with the rise of smart policing, fresh insights are needed to fully understand the complex relationship between the public and the police.

Although residents are concerned about possible breaches in security and privacy in IT-based cities, smart policing strategies, such as project implementation, lessons learned during implementation, evidence-based policing, and sustainability of innovations, continue to grow. The public began to report offences, physical crimes and cybercrimes frequently after observing officers initiating nuisance abatement procedures for a problem area, or setting up roadblocks to apprehend drunk drivers (Blythe et al., 2020; Farrell et al., 2018; Lum & Koper, 2017), connectivity problems, and public anxiety over the threat of identity or information theft (Farrell et al., 2018; Mergel et al., 2018). There are also concerns over the lack of access, delays in response (Shin, 2017; Wirtz et al., 2019), and overwhelming bureaucracy (Osei-Kojo, 2017; Linders et al., 2018). Despite these challenges, earlier studies have demonstrated that electronic service quality provides improved flexibility and networking (Sharma et al., 2020). Smart service quality offers innovative features (such as alerts, push notifications, and geolocation) for customisation and for achieving the social potential of these platforms. With the advent of smart policing, fresh insight is required to fully understand the complex area of public-policing relationships. Measuring smart policing service quality has, therefore, been recognised as a prime objective for the public safety of law enforcement agencies in any country, especially in the UAE (Hofman et al., 2017).

Studies on policing service quality have demonstrated that research has focused mainly on factors that impact satisfaction, based on a service quality model (SERVQUAL) (Donnelly et al., 2006; Sarrico et al., 2013). Because satisfaction with smart policing service quality is rarely observed in policing discourse, this study looks into the impacts of smart policing service quality and levels of satisfaction.

Determining the efficiency and effectiveness of police services is crucial for the improvement of policing capabilities, and it is necessary to find smart-technologies which are intuitive to use and robust enough for the tasks required of them (El-Haddadeh et al., 2019; Tang & Ho, 2019;). In fulfilling the demands of a smart society, effective strategies are required to emphasise and promote the benefits and values of smart policing services (Anshari & Ariff Lim, 2017; Bullock, 2017; Chatfield & Reddick, 2019; Wirtz et al., 2019). Successful relationships between the public and police forces, including those via smart technology, are vital for research in general policing matters (Driss et al., 2019; Siyam et al., 2020). It is recognised that police services need to develop effective strategies to increase the visibility of the benefits and value of smart services in earning public trust (Crump, 2011; Lum & Koper, 2017). Thus, the police force is required to alter its service quality in order to boost the public's trust, since perceived quality influences public satisfaction (Blythe et al., 2020; Carter & Grommon, 2017; Hodgkinson et al., 2019; Wuenderlich et al., 2015). Smart policing is envisioned as an adaptive evolution of government, in response to rapid digital and technological change, to innovate how citizen engagement, accountability, and

interoperability can be best achieved (Ferro De Guimarães et al., 2020; Hodgkinson et al., 2019). Smart policing pertains to government attempts to cope with complex and uncertain environments, and to achieve resilience in service quality through the use of intelligent technologies. However, smart policing service quality is impaired by a number of functional and technical challenges.

Research examining smart policing service quality is underdeveloped relative to other areas of policing (Carter & Grommon, 2017; Ferro De Guimarães et al., 2020; Hodgkinson et al., 2019). Little is known about the service quality dimensions of smart policing and suitable measures for such dimensions. Adopting conventional SERVQUAL may limit the innovation, sustainability, and competitiveness of smart policing functions, limiting the benefits of service quality to the public. This is crucial as smart policing has become rigorous and person-centred to produce public value (Chatterjee et al., 2018; Eterno et al., 2017), and to become data-driven (Chatfield & Reddick, 2019; Tang & Ho, 2019). Thus, it relies more on new channels of interaction. This is consistent with the arguments in recent research stating that smart platforms are enabling the interaction between, and facilitating the development of, many new services for the public (Androutsopoulou et al., 2019; Kankanhalli et al., 2019). As a result, the conventional SERVQUAL used in policing discourse (e.g., Chen et al., 2014; Donnelly et al., 2003; Sarrico et al., 2013) has insufficiently measured the experience of users in policing service quality.

Furthermore, the traditional policing model has been criticised as ineffective and inflexible in addressing various residents' issues, thus increasing tensions and widening the distance between the civilian and the police (Liou, 2019). This is because the service experience of smart policing services occurring in this context is different from traditional policing settings. These gaps emphasise the importance of ensuring a clear user focus in this type of public service, making it crucial to know and understand user expectations and perceptions regarding the actual services delivered. As smart policing promotes sustainability and enables social and relational capital, modern and progressive policing services are expected (Hu & Lovrich, 2019; Liou, 2019).

Parasuraman et al. (1988) defined perceived service quality as “global judgment, or attitude, relating to the superiority of the service”. SERVQUAL combines ease of application and flexibility and helps to identify the direction in which the firm/service should move and the elements which the service and operations manager should include in any strategy. Despite criticising its use of difference scores, reliability of the model, its convergent, discriminant and predictive validity; being process-based (rather than outcome-oriented), the hierarchical nature of service-quality constructs, and using reflective (rather than formative) scales, SERVQUAL remains a useful instrument for service quality research as proof positive more than as a diagnostic tool (Ladhari, 2009; Reimer, & Kuehn, 2005; Seth, Deshmukh, & Vrat, 2005; Zhu, Wymer, & Chen, 2002). Furthermore, the adoption of SERVQUAL has focused on face-to-face traditional service channel systems (Chen et al., 2017).

With the consolidation of the smart technology platform as the relationship channel (Arcand et al., 2017) and significant growth in innovation, sustainability, competitiveness, and liveability, there has been little insight into smart policing service quality dimensions that directly influence the complex and uncertain environments in solving a problem and a process without human intervention. This resilient platform offers public services and values that affect public trust, attitudes, and satisfaction on innovative service quality of policing. This research seeks to explore this shortcoming by evaluating integrity, transparency, interactivity, responsivity, and serviceability of police service quality.

Policing service quality studies have clearly demonstrated that research has tended to focus mainly on factors which impact public satisfaction, based on a service quality model (SERVQUAL) (Akhtar et al., 2012; Bourne, 2016; Bouranta et al., 2015; Chen et al., 2014; Donnelly et al., 2003; Parasuraman et al. 1985; 1988).

The role of the public in evaluating the nature of quality becomes a critical competitive consideration because of the enormous impact on the outcome construct (Gruenewald et al., 2018; Janstrup et al., 2017; Lai & Zhao, 2018). As such, perceived service quality and its association with public trust, attitudes and satisfaction become critical dimensions to determine the success or failure of the smart policing services (McCarthy et al., 2019; Lemieux & Lemieux, 2018; Vuorensyrjä, 2018).

However, research using models to analyse these relationships is scant in this domain (Circo et al., 2019; Cooley et al., 2019; Liou, 2019). A review

of the literature reveals that most of the research in this domain (i.e., smart policing) still remains largely anecdotal, fragmented and theoretical (Kankanhalli et al., 2019; Kuo & Lord, 2019). The results of this research may also confirm the validity and applicability of the established framework for evaluating policing service quality.

1.3 RESEARCH OBJECTIVES

This study aims to extend e-service quality models by incorporating a simplified model of interaction for improving the policing service quality experience of the public. This is accomplished by empirically investigating the impact of smart policing service quality (i.e., integrity, transparency, interactivity, responsiveness, and serviceability) on attitudes, trust, and satisfaction. The intention is to understand better how the quality of smart policing made available through smart technology devices enhances the level of attitudes, trust, and satisfaction. The findings of the current study may generate an initial mapping of the United Arab Emirate's policing to identify unique demands, practices, organising approaches, and policing needs in comparison with the policing issues in other countries.

The main objective of this study is to develop a public perception-based service quality model that can reliably and validly measure the performance of smart policing services and its effects on trust, attitudes, and satisfaction in the UAE. The specific objectives are as the following:

1. To investigate service quality dimensions in the smart policing context

2. To measure the impact of overall smart policing service quality on public trust, attitudes and satisfaction

1.4 RESEARCH QUESTIONS

A growing number of countries in the developed world have adopted smart policing services to address the public needs (Gil-Garcia et al., 2019; Hofman et al., 2017; Papazoglou & Tuttle, 2018; Ranchordás & Goanta, 2019). Smart policing is being used to provide versatile police service solutions such as crime prevention advice, non-crime-related issues such as traffic issues and news, instructions on ongoing or forthcoming events, reports, and information about their departments. Besides, the police force would like to connect, interact, and exchange data with the public, as well as improving public engagement with policing services (El-Haddadeh et al., 2019). Although these services are experiencing high adoption due to their widespread access and cost-effective solutions to basic police services needs, they require an immediate assessment to ensure their viability in terms of service quality (Circo et al., 2019; Kuo & Lord, 2019; Liou, 2019). It is suggested that the conceptualisation and measurement of service quality model in smart policing will have a significant impact on the behavioural and social outcomes (i.e., trust, attitudes, and satisfaction) (e.g., Blythe et al., 2020; Carter & Grommon, 2017; Hodgkinson et al., 2019; Wuenderlich et al., 2015). A meaningful interaction via a smart platform can deliver the policies and services of public interest and value (Chatfield & Reddick, 2019). Thus, this leads to an increased level of trust, continued usage through positive

attitudes, and better perception in societal returns through satisfaction (Bourne, 2016; Janstrup et al., 2017; Liou, 2019).

Since smart policing service quality research in emerging countries has received limited attention, there is a paucity of research focusing on service quality relationships in this setting, especially the UAE. As such, research on smart policing service quality is necessary to facilitate its critical impact evaluation in order to move beyond the discussions of the potential impact that it might have and the anecdotal examples of how it is already being used (Anshari & Ariff Lim, 2017; Bullock, 2017; Chen et al., 2014; Jang et al., 2019). Thus, it seeks to explore the dimensions of smart policing service quality and measure the impact of overall smart policing service quality on the public - individually through trust, attitudes, and satisfaction outcomes. This study puts forth the following research questions:

1. What are the dimensions of smart policing service quality in UAE?
2. Is there any influence of overall smart policing service quality on users' trust, attitudes and satisfaction in this context?

1.5 SIGNIFICANT OF THE STUDY

This study discusses its contribution in terms of the theory, methodology, and practice. Theoretically, the study extends service quality research by reframing the concept as a hierarchical-reflective construct and modelling its impact on public trust, attitudes, and satisfaction in the framework of smart policing in the UAE. Methodologically, the study validates the covariance-based structural equation modelling (CB-SEM) or

path modelling, that can be used to estimate the parameters of a higher-order construct and its association with the subsequent consequential latent variables in a nomological network.

Practically, the study provides managers with a service quality model for conducting an integrated analysis and design of service delivery systems. Overall, the study makes a significant contribution towards achieving patronage for the government (i.e., police force), the better policing outcome for the public, and above all, improving the societal returns in emerging countries, particularly in the UAE.

1.5.1 THEORETICAL CONTRIBUTION

This study extends the existing service quality theory in the discourse of smart policing services by capturing public perceptions about two primary dimensions (functional quality and technical quality) and five subdimensions (transparency, integrity, interactivity, responsiveness, serviceability). It advances the theory by modelling the association between service quality and two new outcome constructs of relationship quality (i.e., trust and attitudes), which have not previously been investigated in the policing literature.

1.5.2 PRACTICAL CONTRIBUTION

The implications of this research are highly relevant to smart policing service providers, police force, smart government initiatives, and society in general. The findings suggest that the public evaluates the service quality of

smart policing at an overall level, at dimensional level (functional quality and technical quality), and at sub-dimensional level (transparency, integrity, interactivity, responsiveness, serviceability). For providers of smart policing services, this finding improves how the public evaluates smart policing service quality to create and produce public value. In particular, the findings suggest that smart policing providers should focus on improving the provided quality of services across the two primary dimensions, which can be achieved through five dimensions. The model also offers managers an understanding of how individual service quality dimensions of smart policing and overall service quality interact in the formation of trust, attitudes, and satisfaction. The findings support the importance of the overall smart policing service quality as a significant decision-making variable in predicting the relationship quality outcomes (i.e., trust, attitudes, satisfaction). Thus, the findings on smart policing service quality-attitudes-satisfaction offer managers an understanding of public preferences on services to maximise economic efficiency and affordability and promoting national economic development (economic sustainability). The findings on smart policing service quality-trust-satisfaction help managers to track the level of the public in making choices based on feelings of safety and security that are reflected from the societal welfare caused by smart policing implementation in the UAE. Alleviating the burdens of physical, administrative procedures and minimising possible police-resident conflicts may improve economic sustainability through improving the operational efficiency of the introduced governmental service and enhancing the sense of citizenship and patriotism.

1.6 DEFINITION OF KEY TERMS

In this section, the study defines key terms used in the dissertation. These terminologies are smart policing service quality, transparency, integrity, 4, interactivity, responsivity, serviceability, trust, attitudes, and satisfaction.

1.6.1 SMART POLICING SERVICE QUALITY

Service quality refers to the consumer's judgment on the quality and excellence of an entity (Zeithaml, 1987). Smart service is defined as smart technology devices used as a platform to support service transactions (Chatterjee et al., 2018; Lee et al., 2019). Examples of smart devices include sensors, actuators, Security cameras, remotely controllable lighting, smart television, cars, and smart phones, with high-speed networking capacity. Policing refers to a strategic, future-oriented, and targeted approach, proactive, and focusing upon problem-oriented for crime prevention (Goldstein, 2003). Following El-Haddadeh et al. (2019), this study refers to smart policing service quality as the used and provision of versatile police services solutions such as crime prevention advice, non-crime-related issues such as traffic issues and news, instructions on ongoing or forthcoming events, reports, and information about their departments, through connection, interaction, and exchange of data with the public to improve public engagement.

1.6.2 TRANSPARENCY

Literature often describes transparency as the capability of the entity to convey an array of services to the user (Nilashi et al., 2016; Janda et al., 2002; Jansen & Ølnes, 2016). There are several definitions for transparency in the literature.

Transparency is defined as “a truly open access to the availability of information to the public and clarity about the information. Transparency is also encoding users’ perception of the open flow of information.” This study uses an operational definition for transparency as an open flow of information, including the information’s easy access to the general public and the clarity about government rules, regulations and decisions. This study uses the last definition as an operational one.

1.6.3 INTEGRITY

Karssing (2007:3) defines integrity as “professionals performing tasks adequately, carefully, and responsibly while considering all relevant interests”. In technology-enabled policing, integrity can be viewed as referring to the concern with honesty, justice, fairness, and trustworthiness and security as well as being concerned with the feeling of safety and the maintenance of confidentiality (Johnston, 1995).

1.6.4 INTERACTIVITY

Interactivity is defined as the key feature of any police-public reciprocal activities through smart technology-enabled platforms (Elnaghi et al., 2018). In this study, interactivity refers to the ability of a provider to respond to user demands and consequently offers the typical social benefits derived from interacting with others via any smart technology or device.

1.6.5 RESPONSIVITY

Candiello *et al.* (2012) establish that responsivity indicates the quality of fast reaction in service activities. Giovannini *et al.* (2015) refer to responsivity as the perceived experience from the input-output gain of electronic devices. These are consistent with Menezes *et al.* (2016), where this study defines responsivity as the swiftness and the agility to accommodate problem-solving in unanticipated situations; also connected to the notion of haste in troubleshooting problems.

1.6.6 SERVICEABILITY

Yuen and Chan (2010) refer to serviceability in terms of the ease of access to smart-based content and functions. Karjaluoto *et al.* (2018) describe serviceability as a composite of the perceived usefulness and ease of use of content and function by the users of mobile devices. This study refers to serviceability as the degree of practicality and ease-of-use of a service's content and function with particular resources and within a specified time.

1.6.7 TRUST

Trust refers to consumer confidence in an entity's reliability and integrity (Morgan & Hunt, 1994). However, other scholars recognise trust to be appropriately defined as a perception of trustworthiness as it entails performing tasks effectively and reliably upon users' interests with respect to promises (Flavian et al., 2006; Mayer et al., 1995). Das and Teng (2001) define trust as the tendency to believe an individual or one party capable of being trusted. This study concurs with Grandison and Sloman (2000), whereby trust in technology means that users of technology are willing to depend on its system functions as the users believe that the technology has desirable attributes to protect their concerns.

1.6.8 ATTITUDES

Attitude refers to a tendency to respond favourably or unfavourably to the process related to the use of an application (Malone, 1990). This study refers to attitudes as the sum of feelings affected by a specific situation (Bailey & Pearson, 1983) using application-related activities required or necessary to accomplish one's job (Rainer & Harrison, 1993).

1.6.9 SATISFACTION

Sanzo et al. (2003) define satisfaction as an emotional response for explaining the manner of relationship between two parties. User satisfaction refers to the extent to which the users believe that the application platform and

system available can meet their service requirements (Ives et al., 1983) and are situated at the core of the exchange-based relationships (Vesel et al., 2010). For this research, satisfaction is considered a cumulative construct and an affective users' condition towards the service provider rather than being a transaction-specific phenomenon (Thakur, 2014).

1.7 DISSERTATION STRUCTURE

This dissertation consists of seven chapters, starting with an introduction , which provides an overview of the entire study. The remaining chapters of this dissertation are given in Table 1.

Table 1.

Structure of the dissertation

Chapters	Contents
Chapter 1: Introduction	○ Background of the study ○ Research problem ○ Research objectives ○ Research questions ○ Significance of the study ○ Definition of key terms ○ Chapter summary
Chapter 2: Literature Review: Context	○ Smart policing ○ Smart policing around the world ○ Policing in the UAE: An overview ○ Smart government in the UAE ○ Smart policing in the UAE ○ Nature and characteristics of services

Chapters	Contents
	○ The nature and characteristics of smart policing ○ Chapter summary
Chapter 3: Literature Review: Theory	○ Overview ○ Defining service quality ○ Service quality theories ○ Service quality theories in policing services ○ Service quality and relationship quality ○ Chapter summary
Chapter 4: Gaps and Hypotheses Development	○ Overview ○ Knowledge gaps ○ Conceptual model ○ Hypotheses development ○ Chapter summary
Chapter 5: Research Methodology	○ Introduction ○ Research process ○ Research design ○ Instrument development ○ Data analysis technique ○ Discriminant validity ○ Test of normality and outliers ○ Structural model ○ Data analysis technique for this study ○ Chapter summary
Chapter 6: Data Analysis and Results	○ Introduction ○ Sample profile ○ Instrument development process

Chapters	Contents
	○ Instrument testing ○ Nature of the outcome constructs ○ Hierarchical-reflective service quality model ○ Estimating the hierarchical smart policing service quality model ○ Structural model ○ Mediation analysis ○ Overall findings of hypotheses testing ○ Chapter summary
Chapter 7: Discussions and Conclusions	○ Discussion of results ○ Contribution of study ○ Limitations ○ Future research directions ○ Conclusion ○

1.8 CHAPTER SUMMARY

Chapter one provides an overview of the present study. This chapter initially discusses the background, the research problem, objectives, and questions in smart policing service quality in emerging countries. The chapter then presents and highlights the significance of the study theoretically, methodologically, and practically. Finally, the chapter presents the key terms used in this study and briefly outlines the seven chapters of this dissertation. The next two chapters review the literature and synthesise the findings and gaps of smart policing service quality in emerging countries.

CHAPTER 2

LITERATURE REVIEW: CONTEXT

2.1 SMART POLICING

Smart policing services are components of the smart government ecosystem that share significant characteristics of a smart government such as transparency and integrity (Chatfield & Reddick, 2019; Liou, 2019). The application of some of these common characteristics such as responsiveness and interactivity can be easily expanded from traditional service-based industries to smart policing service quality assessments (De Keyser et al., 2019; Nowak, 2019). However, other features of the smart government policing system require adaptation to the rapid changes in digital and technological advancements to enhance user satisfaction (Ali & Raza, 2017; Kennedy, 2019). Hence, it is imperative to understand the factors influencing the users' perceptions of service to improve user experience and satisfaction levels with the service provided (Li & Shang, 2020). It should be noted that service performance is a subjective construct that depends on the confluence of user perceptions and expectations of the services based on their service experience. Hence, service quality is challenging because of its intangible nature,

particularly in meeting the unique expectations of users (Parasuraman et al., 1991).

Studies on smart governance indicate that the critical role of successful service performance in public services lies in improving the participation of urban residents through maintaining and nurturing high-quality relationships with any organization, individual and group that influences the provided service (Relational capital). Smart governance enhances social and environmental sustainability as well (Argento et al., 2019). Given the frequent conflicts between residents and the police, studies on the quality of smart policing services are rather challenging. For instance, Liou (2019) provided evidence of conflicts arising between smart technologies and police services in the USA. Nowadays, residents are more aware of their rights and duties as citizens, and thus, the use of the traditional policing model to address their issues is not sufficient. The user experience for smart policing services differs from the traditional policing practices in terms of effectiveness and flexibility. Therefore, tension between the residents and the police is minimised.

Additionally, there are also instances where the services offered were neither requested, solicited, or frequently used by the residents. A clear focus on the users of the public service to understand users' perceptions and expectations regarding the services delivered is needed. Implementing smart policing services, therefore, promotes the sustainability and utilisation of social and relational capital that require modern, progressive, and contemporary policing services (Hu & Lovrich, 2019; Liou, 2019).

Kankanhalli et al. (2019) performed a comprehensive review of the conceptual framework of various industry-specific smart services inspired by the smart government. The study identified several common factors between studies performed across various cultures. Specifically, transparency, integrity, interactivity, responsivity, and serviceability, as well as their interrelationships, represented the key factors and issues that were identified as variables to be investigated.

2.2 SMART POLICING AROUND THE WORLD

Police force faces an enormous challenge of ensuring social security and safety. For this reason, the idea of transforming police services into smart policing services has gained much popularity among countries around the world (Yamin et al., 2020). Prior research has focused mainly on business-led services (Abd-Elrahman et al., 2019; Kennedy, 2019; Zuo et al., 2019). The fact that the use of smart technology platform helps the government to improve public sector services, particularly in the security and safety domain, has received far less attention. The following discusses the applicability of smart policing in the emerging economies, comparable to the UAE status.

Similar to the UAE, there are many east Asian countries that took applied short-term and long-term anti-corruption plans, including civic technologies and smart technologies. We view South Korea, Singapore, and India as politically and economically comparable countries to the UAE in that end.

2.2.1 SOUTH KOREA

Around the 2000s, the overall idea of the pervasive city was about to materialise, setting up the local intelligent services in which different city capacities were incorporated with information technologies, for instance, South Korea with its launching of U-City at the national level. For example, Songdo, U-City, covers around 60 km in Incheon Free Economic Zone. In this area, it contributes to about 310 million dollars for development (Rugkhapan & Murray, 2019). This example of Songdo U-City is regularly viewed and functions as a pioneer of the keen city, in both the scale and activities, since it is entirely made up of urban parts including modern zone, businesses, private bodies that are incorporated with ICT (Albino et al., 2015). The benchmark of Songdo U-City is the epitome of uniqueness. All the residents in the area are provided with the technology features that will ease the resident in changing, transmitting, and exchanging information with other residents by using different kinds of devices. The U-City development is considered very challenging due to the technical quality and management issues, especially in dealing with engineering, construction, or maintenance of the accommodation in the area (Shwayri, 2013).

Since the technologies had hit many developed countries, many countries are taking a smart alternative in introducing smart policing in their system. For example, in South Korea, the clearance of crime rate is over 80 per cent in the era of the 1990s. However, the technology development in South Korea had impacted the crime rate clearance to be lowered in 2014,

with 78.3 per cent (Rugkhapan & Murray, 2019). The introduction of biometrics, digital imaging, face recognition, and lie detector in the authorities' system is a smart move by the government to secure the city from any crime.

2.2.2 SINGAPORE

Smart policing in Singapore was introduced after the country adopted the smart city concept in 2014. According to Abdul Rahman (2020), smart policing was introduced to strengthen the police force as they face emerging security terrorisations from both traditional and modern sources and the emergence of technologies used by criminals. Hence, security must be upgraded to keep up with the growing threats and meet the public's demand for a more efficient approach to ensure that the threats are contained and eliminated.

To combat crimes, the government has taken the initiative to introduce Smart CCTVs to enable law enforcers to enhance the situational awareness in addition to attain supplementary information to aid analysis and investigation (Abdul Rahman, 2017). Apart from installing Smart CCTVs at strategic places such as traffic lights, road junctions, and walkways, the police department equipped their personnel with police smartphones (Kong & Woods, 2018). The smartphones allow police personnel to receive relevant information 24 hours a day and seven days a week. The personnel is also equipped with 3D handheld scanners to capture images of crime scenes (Lee et al., 2019).

Singapore has also moved a step forward by introducing smart glasses, miniature humanoid robots, and an enhanced live firing system as part of smart policing (Vidiasova et al., 2017). The smart glasses will be equipped with up-to-date features such as facial recognition and real-time visual recording. The purpose of introducing mini-robots is to close the gap between the police and schoolchildren. The robots will be customised with messages from the police and used to inform young children that they should not be afraid of the law enforcers.

To ensure that their services are friendly to the public, Singapore Police Force is reachable using 999 or a separate police hotline. They also used the short messaging service to accommodate those with limited disabilities as an alternative form of communication. Websites are also provided so that the public can access their services at their convenience where the public can file police reports online, request for administrative assistance, and submit information to help SPF with their investigations (Lee et al., 2019).

2.2.3 INDIA

Smart policing was introduced in India in 2014 to curb its rising crime rates (Sherman, 2013). Smart policing in India comes from SMART as an acronym for sensitive, modern, mobile, alert, accountable, reliable, responsive, techno-savvy, and trained, and the implementation concept to improve the country's standards security and public order (Tomor et al., 2019). According

to Tomor *et al.* (2019), the main reasons behind the implementation are to enable the government to provide India's people:

1. Proper channels for crime prevention, investigation, and discouragement
2. Effective public order management
3. Proper handling of cases and protection for women, children and the elderly
4. Combat terrorism
5. Traffic management
6. Effective enforcement of legislation
7. Effective border protection

Smart policing in India is part of the reformation in which the infrastructure and legal structure are revamped. In response to that, the Indian government introduced the Digital Police Portal embedded into Crime and Criminal Tracking Network and Systems (Hoelscher, 2016). The portal is used to track offenders and to enable victims to ask for assistance online. Despite the effort in using smart policing in India to reduce crime, the implementation is not without flaws as there are several issues that had surfaced, hence affecting the credibility of the force and the policy itself. The consumers perceived that the police personnel lacked accountability and did not have the public's best interest at heart (Rana et al., 2019). Hence, the police force could not win society's trust as the society believed that they were treated differently based on their caste, religious beliefs, and gender. It was highlighted that the

organisation must be aware of the quality of service offered to maximise the benefit of operationalising smart policing (Kamboj & Gupta, 2020).

2.3 POLICING IN THE UAE: AN OVERVIEW

The UAE was formed in 1972 and was known as one of the wealthiest and most developed countries in Western Asia (Fullard, 2015). The UAE is located in the eastern part of the Arab Peninsular, surrounded by the Persian Gulf and the Arabian Sea (Figure 1). The total area of the federation of seven emirates is approximately 83,600 square kilometers, with Abu Dhabi, the capital, being the largest Emirate, and Ajman being the smallest. The total population of the UAE is 9.54 million, and 93 per cent of the population is urban. 6.29 million of the UAE population is between the age of 25 and 54 and has a median age of 33.5 years. The majority of the population is male (6.89 million; 72%), with the majority residing in Dubai (3.32 million, 35.7%). From the total population, only 11.48 per cent is Emirati (1,095,519), while Indian nationals represent the highest expatriate population, at 2.62 million (27.5%) (UAE Federal Competitiveness and Statistics Authority, 2019).

The UAE federal police are centralised and under the control of the Ministry of the Interior. However, the UAE constitution also gives the right to each Emirate to establish a local police force. There is not much difference between the local and the federal police in the UAE except for the division of policing tasks from where the administration is located. The local police force controls its internal affairs and other aspects of policing, while the federal

police handles the immigration work, traffic affairs, and securing borders. The Abu Dhabi, Dubai, and Sharjah police forces also play a vital role and are distinguished from the other four emirates.

With a concern to develop and strengthen police governance, the UAE police is also keen to improve the use of policing in the country and use smart technology devices in a more sophisticated way to improve the standard of living of the residents. To cope with current challenges and trends, the UAE federal police has invested in and implemented a capable technological infrastructure to facilitate the integrated, simplified, effective, and more efficient policing services and reduce the cost of government service delivery.

A forward-thinking and innovative approach to policing, including an approach to a re-orientation towards the user perspectives, has the potential to significantly change the public user's experience of policing services, promoting a partnership between the police and the community which would result in a more active role for visible community policing (Chen et al., 2014). The reality is that, with the age group between 25 and 54 dominating the population in the UAE, the UAE police are expected to engage more in the use of smart technology devices in order to interact with the public more widely, more frequently, and at a more personal level than usual.

The UAE is ranked as the world's second safest country by the World Economic Fund for tourists (Khaleej Times, 2018). This achievement is a landmark, representing the transformation of the police services from traditional to electronic services and marking the evolution into smart police services. A sustainable new economy is critical for the UAE, so smart policing

has been launched as part of the smart government initiative of 2013 towards realising the UAE vision of 2021. The aim is to make these services available on smart technology devices 24/7 and 365 days a year to increase the accessibility and promptness of police services (Abu Dhabi Police, 2015).



Figure 1. Location of the UAE (Source: BBC, 2018)

2.4 SMART GOVERNMENT IN THE UAE

The National Plan for UAE Smart Government Goals was initiated in 2014 in alignment with the national direction embodied in UAE Vision 2021, the UAE National Agenda, and the Information and Communications Technology Sector Strategy (Bowe, 2019). The Smart Government is a brainchild of His Highness Sheikh Mohammed Bin Rashid Al Maktoum, UAE Vice President, Prime Minister, and Ruler of Dubai. The National Plan for UAE Smart Government Goals has a clear vision, mission, and also a set of

strategic objectives to guide and align the supporting planned investments organised in the 5-year roadmap. This was built on what was launched in 2013 following UAE's announcement on the transition to Smart Government and the introduction of several new initiatives reaching 2018 (AlZaabi, 2019). Ultimately, the Smart Government program seeks to make government services personalised for the public and increase residents' happiness (Alsaadi et al., 2018). This effort created a huge wave of positive change and advancement across the nation. It prompted government entities to consider updating strategies and plans and to put more effort towards modernising their capabilities and services (Ahmad & Khalid, 2017).

UAE's Smart Government is a cornerstone of this nationwide effort. Ever since the announcement of the transition to Smart Government, a number of national initiatives were launched to enable government entities transformation and to act as a form of support on this exciting journey of change (Bowe, 2019). Smart technology refers to both physical and logical applications (i.e., mobile, web, databases, wireless access, and sensors) which adapt automatically and modify behaviour to fit environments, use sensors, and produce data to analyse and infer, allowing conclusions to be drawn (Zoughbi & Al-Nasrawi, 2015). This has contributed greatly to the quick advancement and progress towards smarter government services, public, and technologies. Various initiatives have been collectively established to support the components of the plan, and enable entities to transform services in a unified, harmonised manner; to facilitate the development of many new services for residents, businesses, and governments (Kankanhalli et al., 2019).

According to Zairi (2019), the transformation approaches to smart environment are:

1. The Government transitions to smart devices as the primary access channel.
2. Increased focus is placed on smart services that are predictive and pervasive.
3. There is an advanced use of Secure Identity across federal and local government entities.
4. The infrastructure is integrated at a national level.

The National Plan's development included scrutinising the existing mobile and electronic government strategies and planned to leverage what the Government has done and chart new domains and initiatives, opening up the possibility for further innovation and advancement towards a Smart Government (AlZaabi, 2019). Smart Government Maturity models are objective, independent frameworks used to evaluate entities across structured, consistent criteria (Zakzak & Salem, 2019). This was crucial because of the entities' varying maturity levels and the various aspects involved with baselining and measuring their smart transformation. The Smart Government Maturity Model is composed of a service quality dimension for police with multiple subcomponents. Service delivery emphasises the capacity to choose high-value services, deliver services using appropriate access channels, promote service adoption, and influence the service delivery environment (AlZaabi, 2019; Bowe, 2019). User focus core elements include accessibility,

functionality, useability, interactive, and integratedness. The transition from a Traditional Government to Smart Government is illustrated in Figure 2.

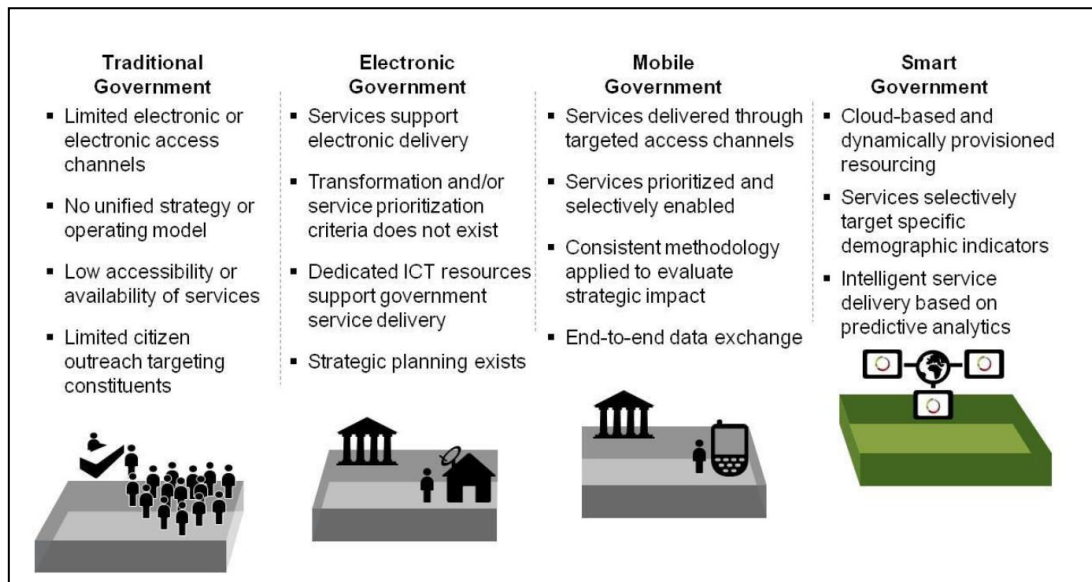


Figure 2. Traditional Government to Smart Government – the UAE approach
(AlKetbi, 2018)

2.5 SMART POLICING IN THE UAE

The smart policing platform is a paradigm where the interconnection of devices through the internet provides the ability to collect, share, and analyse police services' information to enable innovative applications (Gubbi, Buyya, Marusic, & Palaniswami, 2013). By enabling the interaction with a wide variety of objects, smart technology can help the police develop many new services to meet the expectations of smart society. Smart policing involves connecting objects and the digital world's environment as it offers multiple applications and services for the public. Moreover, smart policing is not just about the connection of sensing devices, but includes the generation of

insights or knowledge from the data, which assists in solving a problem or automating a process without human intervention (Chatterjee et al., 2018). With the huge volumes of data collected through the connected smart technology devices, the police can analyse and learn from the data to create public services and values.

Smart policing has been envisioned as an adaptive evolution of traditional policing, in response to the rapid digital technological change, to innovate how the police can achieve better public engagement, accountability, and interoperability (Ismagilova, Hughes, Dwivedi, & Raman, 2019). The evolution of the term smart policing pertains to an attempt of the police to cope with complex and uncertain environments and to achieve resilience through the use of intelligent technologies, as they act as facilitators of innovation, sustainability, competitiveness, and liveability (Ferro De Guimarães et al., 2020). Thus, smart policing is closely linked to service quality because policing services are one of the fastest-growing initiatives in the UAE. The innovation in police services promotes the efficient circulation of idle resources among different stakeholders, effectively improves the allocation efficiency of social resources, and reflects upon the concept of green consumption (Arundel et al., 2019). It is arguably the most important service with a pervasive impact on daily life, with a deadly combination of limited access to the services, uneven quality, and high costs.

Although policing services in the emerging economies are on an upbeat path, this initiative faces serious challenges. Policing services research has been undertaken mainly in developed economies, while less attention has been

paid to emerging markets such as the UAE, the latter of which represent a fast-moving and prosperous knowledge-based economy for fostering a unique innovation ecosystem (Camboim et al., 2019; Diercks et al., 2019).

In reaching the 2030 agenda for sustainable development, smart policing is adopted by the United Arab Emirates (UAE), where the kingdom recognises the significance of technology and innovation in enhancing the happiness and competitiveness index in UAE. Esposito (2017) mentioned that the happiness and competitiveness index would increase year by year in conjunction with the technology development in the future world of UAE. In UAE, The Ministry of Interior has implemented the latest technology and strategic management for the entire kingdom to increase sustainability, reduce the crime rate, and focus on public surveillance from any potential crimes. For example, Abu Dhabi Police Force (ADPF) uses technology and innovation in its daily operations as it strives to maintain the department's effectiveness and efficiency. Implementing the latest technology in the police and security system is consistent with the UAE vision 2021 National Agenda that aims to be the safest country in the world. The implementation of the latest technology would enhance the sense of security, reliability of security and police services, average response time to emergencies and judicial system efficiency.

Smart policing adopted by the UAE has made the country the safest in the world for the fourth consecutive year by Numbeo, a crowd-sourced global data website (Sebugwaawo, 2020). These strategies are consistent with the UAE government's plan to foster artificial intelligence and making UAE one of the best police forces in the world (Alfaham & Bashir, 2017). For example,

the government has introduced Dubai's Smart Police Station for the public to access smart policing through kiosks. In this initiative, the UAE government is developing the country to be the safest in the world. The smart policing concept is also a part of the UAE's effort in using artificial intelligence to reduce crime and promote a safe environment.

2.6 NATURE AND CHARACTERISTICS OF SERVICES

2.6.1 DEFINING SERVICES

Service is a difficult concept to understand due to its intangible nature, particularly in meeting users' unique expectations (Parasuraman et al., 2005). Butt *et al.* (2019) view services as essentially intangible activities that fulfil certain needs. Many recent scholars (e.g., Ahmad & Khalid, 2017; 2020a) have supported this logic and based their service definition on intangibility. Berry (1995: 238) refer to service as a deed, a performance, an effort, and when a service is purchased, there is generally nothing tangible to show for it.

This is consistent with Cunningham (2003) definition, which also identifies a service as an activity or benefit under an exchange process that is based on intangibility and no ownership. Grönroos (1991) proposes that a service is not a thing, but a series of activities produced and delivered simultaneously, at least to some extent. However, Grönroos (2000) redefines services as processes that consist of a set of activities which take place in interactions between a customer and people, goods and other physical

resources, systems and/or infrastructures representing the service provider and possibly involving other customers, which aim to solve customers' problems.

Acknowledging the process viewpoint of service, Zaithaml *et al.* (1993) and Parasuraman *et al.* (2005) introduce perceived value orientation in services by identifying them as deeds, processes, or performances. Overall, Lovelock and Wirtz (2011) recommend services as process-based economic activities that provide a place, form, time, problem-solving or experiential benefits to the user. In the same vein, Bordoloi *et al.* (2019) refer to service as a time-perishable, intangible experience performed for a customer acting in the role of a co-producer. Lee and Lee (2020) echo the same concept by referring to service as a simultaneous or near-simultaneous exchange of production and consumption, transformation in the experience and value that customers receive from the engagement with providers, and intangibility goods are not exchanged. Researchers identify service as an economic activity that benefits a customer by bringing the desired change in customer status at a specific time and place.

Overall, this study adopts the unifying viewpoints of Grönroos (2000), Parasuraman *et al.* (2005) and Zaithaml *et al.* (1993) which refer to service as a function of customers' expectations and overall reaction to the service of the relative organisation to be provided compared to their perceptions of the actual service experience.

2.6.2 EXPLORING THE NATURE OF SERVICES

Intangibility, inseparability, variability, or also known as heterogeneity, and perishability are the four most common characteristics of services (Zeithaml et al., 1993). As shown in Table 2, research on services has always addressed these characteristics to identify their challenges and opportunities. As such, theories and models in service literature have always focused on these characteristics to extend knowledge. However, the unique characteristics of services have increased the problems and challenges that are rarely paralleled in services. Services are complex, multi-dimensional, and multi-layered. There are multiple benefits, but there is also a multiplicity of interactions between users and organisations as well as between users and service providers (Parasuraman et al., 2005).

2.6.2.1 INTANGIBILITY

Shostack (1977) refers to intangibility as the most basic nature of services that distinguishes them from goods. Although intangibility is the important nature of services, it is logical to think of the varying level of intangibility (Lovelock et al. 2011; Zeithaml et al., 2020). As services are inherently intangible, it is very difficult for users to evaluate service quality before consumption. It indicates that service elements cannot be tasted, smelled, touched, or seen (Mehraliyev et al., 2020). Moreover, service providers are generally located in different locations. As a result, it is harder for users to compare a particular service performance with other providers due to the lack of easily available reference points (Lovelock *et al.* 2011). Services

cannot be experimented with or sampled before involvement in the exchange process, which creates additional perceived risk for users in terms of the functional quality or emotional benefit (2020a).

2.6.2.2 INSEPARABILITY

Inseparability refers to the simultaneous production and consumption of a service. Research indicates that it is very difficult to separate the service from its provider (Berry, 1995; Parasuraman et al., 1991). Studies also provide evidence that users are expected to cooperate and co-produce the service by interacting with the provider's equipment, facility, and systems (Zeithaml et al., 2020). The degree and nature of users' involvement in the service process influence the service performance and the quality of the encounter (Lee & Lee, 2020). Therefore, the quality of interaction between providers and users influences the user's perception of service quality and satisfaction. This suggests that both service providers and users are required to play an active role in enhancing productivity, experience, and satisfaction. Research also argues that this emphasizes the roles of dynamic 'front-stage' and 'back-stage' to provide better user experience (Akter et al., 2019).

2.6.2.3 VARIABILITY

Variability or heterogeneity indicates that it is challenging to maintain consistency in service outcomes (Parasuraman et al., 2005; Zeithaml et al., 2020). As people are engaged in the service process, providers and users with varying backgrounds make it difficult to control service quality. As such,

differences in attitudes, transaction speed, and quality of service performance affect the service interaction, and sometimes this leads to service failures (Ahmad & Khalid, 2017). Variability also indicates that the difference in provider and user orientations in terms of the personality, manner, and actions leads to the variation in service perceptions and evaluations. Due to service variability, it is not always possible to generate identical service outcomes each time the service is executed (El-Haddadeh et al., 2019). Therefore, it is important to decrease the variability by implementing standardised procedures at all service touchpoints, which can be done by adopting rigorous management of all service quality dimensions.

2.6.2.4 PERISHABILITY

Perishability implies that services expire, are short-lived, cannot be stocked, and can be kept for later use. Research suggests that services cannot be returned once they have been purchased (Zeithaml et al., 2020). Therefore, it is important to manage demand levels by matching service capacity (Parasuraman et al., 2005). Studies argue on the importance of managing demand and supply at a particular time to satisfy service needs. Service providers face major challenges when there is variation in demand. Thus, a critical task is to manage the demand levels according to available resources.

In addition to these basic characteristics of services, the role of the users in production and delivery influences service performance (Berry 1995; Brady & Cronin Jr., 2001). Since service is an exchange process, the quality of users' input influences the service outcomes (Zeithaml et al., 2020). Users should be

provided with proper knowledge about the service process using communication channels toward improving the quality of input. For high involvement services, such as in policing, it is often important to train users to provide quality input for a better service outcome (Chen et al., 2017; 2020a; Lovelock *et al.* 2011). Furthermore, as the exchange process in service does not transfer any ownership to users, users' experience makes a huge difference in service perception. This characteristic indicates the challenge of effectively reducing users' dissonance to manage a long-term relationship. Overall, the basic characteristics of services indicate that service evaluations are highly subjective and context-specific (Chatfield & Reddick, 2019; Cronin et al., 2000).

Table 2.

Service characteristics and their implications in service research

Service characteristics	Challenges	Implications	References
<i>Intangibility</i> Service cannot be tasted, smelled, touched or seen.	Difficult to provide concrete evidence; difficult to evaluate service quality; risk and uncertainty in visualising service benefits.	Ensuring service benefits; documenting performance; offering guarantee.	Ekaabi <i>et al.</i> (2020a); Lovelock <i>et al.</i> (2011); Mehraliyev <i>et al.</i> (2020); Parasuraman <i>et al.</i> , (1991); Shostack (1977); Zeithaml, <i>et al.</i> (2020)

Service characteristics	Challenges	Implications	References
<i>Inseparability</i> Services are produced and consumed simultaneously.	Limited production capacity; difficult to ensure consistency in provider's equipment, facility or overall systems.	Ensuring quality of interaction to ensure service benefits	Akter <i>et al.</i> (2019); Berry (1995); Lee & Lee (2020); Parasuraman <i>et al.</i> (1991); Zeithaml, <i>et al.</i> (2020)
<i>Variability</i> Services vary as per contexts.	Difficult to ensure consistency, reliability and service quality or harder to protect customers from service failures	Determining quality standards to prevent service failures; implementing good service recovery procedures.	Ahmad & Khalid (2017); El-Haddadeh <i>et al.</i> (2019); Parasuraman <i>et al.</i> (2005); Zeithaml <i>et al.</i> (2020)
<i>Perishability</i> Services cannot be stored.	Services cannot be stored; time pressure in service execution; difficult to manage service demands, waiting time, right-time service.	Fixing service systems to adjust capacity.	Berry (1995); Brady & Cronin Jr. (2001); Chatfield & Reddick (2019); Chen <i>et al.</i> (2017); Cronin <i>et al.</i> (2000); Ekaabi <i>et al.</i> (2020a); Lovelock <i>et al.</i> (2011);

Service characteristics	Challenges	Implications	References
			Parasuraman <i>et al.</i> (2005); Zeithaml <i>et al.</i> (2020)

2.7 THE NATURE AND CHARACTERISTICS OF SMART POLICING

Smart policing enables the police and public to access, use, and feed information through meaningful interaction, offering more personal experiences (Eterno et al., 2017). Smart policing has a widespread and rigorous impact on security and public safety (Chatfield & Reddick, 2019).

The service literature shows a wide variation in exploring into the nature of policing services in terms of its characteristics, contexts, processes, and interaction (Bourne, 2016; Chen et al., 2014; 2020a). Although service characteristics (e.g., intangibility, inseparability, perishability and variability) received overwhelming attention in characterising the nature of services (Parasuraman et al., 2005; Zeithaml et al., 2020), some other factors (e.g., people-based, function-based, psychological-based) also play an important role in defining these services. Overall, the service classification scheme provides an important insight into understanding the nature of different services.

Table 3 synthesizes the service classification scheme proposed in the literature. This scheme offers critical insight regarding the nature of policing

services and its strategic implications. For example, policing is predominantly categorised as a high contact service (Liou, 2019; Sarrico et al., 2013) which is provided for people (Bourne, 2016) dependent on credence properties (Sarrico et al., 2013) and the value is added by interaction (Donnelly et al., 2003; 2020a). Some scholars highlight that police services are dependent on a high degree of interaction (e.g., Chen et al., 2014; Circo et al., 2019) and involve many users (Ahmad & Khalid, 2017; Chatfield and Reddick, 2019). According to Eterno *et al.* (2017), policing services are both labour and skill intensive, contributing to considerable variability in the performance from one service to another and from one police officer to another, and from one location to another.

The variability is not just in police officers' service style and communication skills, and the location of police stations but also in their technical skills. The study shows that policing services share common characteristics with other services. For example, policing services are intangible as the core benefits are inseparable because they are people-centred and perishable as the providers generate value through timely security solutions. Some scholars identified a policing service as an authorised service as it is hard to judge its performance even after use (e.g., Berry, 1995; Parasuraman et al., 2005; Zeithaml et al., 2020). Overall, these characteristics indicate that it is necessary to evaluate the performance of any policing service using users' perceptions (Chen et al., 2014; 2020a). According to McCarthy et al. (2019), users' perceptions of quality are inherently meaningful and should be the primary focus of attention within the policing system because they are a

powerful driver of outcomes important to various other stakeholders. This is consistent with Grönroos (2001) that suggests that service quality is based on functional quality and outcome quality, in which the perception of service quality is assessed based on the expected service quality that consists of functional quality (users' perceptions of the service delivery) and technical quality.

According to Janstrup *et al.* (2017), this is becoming important to conceptualize users' perceptions of policing service quality and uncover what drives those perceptions. Consistent with Ekaabi *et al.* (2020a), the features of functional quality and technical quality as the primary dimensions of smart policing service quality warrant further development and research to measure smart policing service quality.

As the study focuses on an innovative policing paradigm, the understanding of users' perceptions regarding the nature and characteristics of this service is critical because users still have fairly unformed and flexible notions about this service. Therefore, Table 3 presents a service classification scheme based on the extant literature to distinguish the nature of policing services from other services.

Table 3.

Nature of policing services in the service classification scheme

Author	Proposed classification				Comments on policing services
Zeithaml <i>et al.</i> (2020)	Search	vs.	experience	vs.	Policing services are based on credence

		properties, that is, it is harder to assess its quality even after consumption.
Lovelock & Wirtz (2011)	The nature of the service act (tangible vs. intangible); relationship with customers (continuous, discrete, membership, no formal relationships); customisation and judgment in service delivery; nature of demand in relation to supply; methods of service delivery (single or multi-site, provider's or customer's premises)	Generally, policing services are intangible and highly customized. Smart policing services are ubiquitous.
Berry (1995)	Intangibility, inseparability, perishability, variability	Policing services are labour and skill intensive

2.8 CHAPTER SUMMARY

This chapter revisits the nature, characteristics, roles, opportunities, and challenges of the smart policing context in the developing countries, and the UAE. Service quality has received greater attention. Although the effect of smart technologies has been identified as the major challenges for smart policing context, a review of the literature found that studies in this domain are largely circumstantial and fragmented. However, no study has empirically evaluated the dynamics of the service quality in this domain. The present

study has evidenced frequent calls to explore the existing service quality theories in order to develop a comprehensive quality model for policing services. Thus, the next chapter reviews service quality theories from an interdisciplinary perspective to identify the pertinent research gaps concerning the components and outcome of service quality in smart policing.

CHAPTER 3

LITERATURE REVIEW: THEORY

3.1 OVERVIEW

This chapter explores different service quality theories and discovers the fundamental nature and gaps of those theories from a smart policing perspective. The literature review in the previous chapter found that smart policing transforms the security context of smart government delivery in developing countries. However, the major challenge lies in user-perceived service quality. Specifically, the review found that service quality dynamics (i.e., components and outcomes) play an instrumental role in influencing users' overall perceptions of smart policing service performance. As such, this chapter concentrates on the service quality concept. This chapter argues that the nature of service quality for a technology-mediated service is complex. It is necessary to explore this concept using a cross-disciplinary approach from the perspective of organisational, marketing, and information management literature.

3.2 DEFINING SERVICE QUALITY

Parasuraman et al. (1991) demonstrate quality as zero defects. Cronin et al. (2000) consider quality as conformance to requirements. However, Reeves and Bednar (1994) provide a comprehensive view of quality and identify four dominant views of quality: quality as excellence, quality as a value, quality as conformance with specifications and quality as meeting expectations. According to Grönroos (2000), quality is a complicated and indistinct concept, and there is no single universal definition of quality in the literature. Due to its elusive nature (Parasuraman et al. 1991), research in this context has remained unresolved (Hu & Lovrich, 2019; Liou, 2019). Hence, service quality is a difficult concept to understand (Parasuraman et al., 1991), remains a difficult concept to grasp (Brady & Cronin, 2001), and far from conclusive (Kankanhalli et al., 2019; Liou, 2019), due to its intangible nature, particularly in meeting the unique expectations of users.

The research has undertaken either a production-oriented or customer-oriented view of quality (Lee & Lee, 2020). Meanwhile, the production or manufacturing-based approach focused on objective or technical quality to measure standardised products (Oliver 1997), and the customer-oriented approach focused on the perceptions of customers or quality in the eye of the customer (Brady & Cronin 2001; Grönroos, 2000; Parasuraman et al., 2005). Because of the complex nature of quality, the customer-oriented view has become the mainstream approach in defining quality in service research (Kennedy, 2019). Therefore, in aiming at the customer-oriented view, it is imperative to understand the factors influencing the users' perceptions of

service to improve user experience and satisfaction levels with the service provided (Li and Shang, 2019). This is consistent with studies that mention that it is commonly understood as a function of customers' expectations of the service to be provided (Grönroos, 1991; Zeithaml, 1987). It should be noted that service performance is a subjective construct that depends on the confluence of user perceptions and expectations of the services based on their service experience. These definitions reflect that the quality of service should be viewed from the users' point of view to measure an entity's performance level.

3.2.1 DEFINING SERVICE QUALITY: POLICING SERVICES PERSPECTIVE

Service quality has been widely discussed in the literature (Gupta, 2016; Zauner et al., 2015) and is commonly understood as a function of customers' expectations of the service to be provided compared with their perceptions of the actual service experience (Grönroos, 1990; Zeithaml et al., 1993). In essence, service quality is the customer's overall reaction to the service of the relative organisation (Parasuraman et al., 2005). Studies in behavioural intention have linked service quality to satisfaction (Carter & Grommon, 2017; Mustelier-Puig et al., 2018).

In the policing services, police service quality has enabled the police and public to access, use, and feed information through meaningful interaction, offering more personal experiences (Sarrico et al., 2013).

Therefore, the definition of service quality as a user's judgment of, or impression about, an entity's overall excellence or superiority is generally acceptable (Cronin et al., 2000; Parasuraman et al., 2005). Similarly, Chen *et al.* (2014) concentrate on user-perceived service quality which reflects Ekaabi *et al.* (2020a) viewpoint that the policing service quality can be used to measure the expected-performance relationship of a public sector organisation; offering information for further understanding of deficiencies, why quality or service deviations happen, and how to improve these deficiencies and deviations to improve customer satisfaction. Therefore, a more complex approach can be pursued based on dynamic domains to replace domains that may now be outdated and irrelevant due to the dynamic changes in public sector organisations.

Thus, the role of users in defining the nature and level of service quality has been emphasised in the policing literature to sustain efficient strategies to improve the perception of service quality platforms in public sector organisations especially related to the security and sustainability issues that persist in services. Chatfield and Reddick (2019) argue that user-centred evaluation is to be effectively used. They mentioned that technical quality is complex especially in sectors such as policing services and public sector organisations that reflect credence-based services (i.e., services that are difficult to evaluate by the users), where it may be unreasonable to expect users to provide quality ratings based on technical quality merits of the service. Instead, subjective criteria must be used, understood, and translated into objective performance parameters. As such, in a smart government, there

is a clear need to define the user-centric context of service quality to present a single, homogeneous metric that captures overall users' perceptions (Chatterjee et al., 2018; Driss et al., 2019). Groundbreaking studies on service quality in smart policing have already focused on user-perceived service quality by defining it as users' judgment about the overall excellence or superiority of a smart policing service (Chatfield & Reddick, 2019).

3.2.2 CONCEPTUALISATION OF SERVICE QUALITY

To gain a better perspective of the constructs in service quality, various conceptual and empirical studies have been performed to conceptualize and measure service quality. Based on the initial study on the disconfirmation paradigm (Oliver, 1997), it was suggested that quality is derived from the comparison of the users' expectations and perceptions of service performance (Cronin et al., 2000; Parasuraman et al., 1991). In defining and conceptualising perceived service quality, Gronroos (1984) suggests using expectation as a reference point against which performance can be judged, but Parasuraman *et al.* (2005) define perceived service quality as the difference between expected and perceived service. Although Parasuraman *et al.*'s (1988) expected and perceived service score characterisation to be very popular; multiple studies have criticised it (e.g., Coulthard, 2004; Gilmore & McMullan, 2009; Yu et al., 2008; Skålén & Strandvik, 2005; Sureshchandar et al., 2001). These studies highlight that the expectation score adds little value to service quality measurement. Therefore, scholars (e.g., Brady & Cronin

2001; Dabholka & Overby, 2005; Zauner et al., 2015) focus only on the perception measures to define and conceptualize perceived service quality as perception scores performed better than difference scores. In the same vein, researchers in the policing service (e.g., Bourne, 2016; Bouranta et al., 2015; 2020a) have embraced the perception-only measures to define service quality.

Grönroos (2001) indicated that the perception of service quality is assessed based on the expected service quality and technical qualities. Following the disconfirmation paradigm, SERVQUAL (Parasuraman et al., 1988) was developed to measure the users' expectations and perceptions of the service received. The conceptual definition of service quality has always received theoretical attention by identifying the dimensions as a second-order factor model (Gronroos 1984; Parasuraman et al., 1988) or third-order factor model (Brady & Cronin 2001; Dabholkar et al., 1996; Dagger et al., 2007; Parasuraman *et al.* 2005). This dimensionality of the service quality concept suggests that service quality might have first-order, second-order, or third-order dimensions reflected by a higher-order overall perceived service quality. It indicates that overall service quality has a reflection over dimensions and subdimensions. Research highlighting the complexity of such hierarchical dimensions of the service quality concept, Dagger et al. (2007) mention that the measurement models for ordered-categorical indicators of service quality help to evaluate service quality precisely. The extant literature has also emphasised that the conceptualisation of service quality should be context-specific (Akter et al., 2019; Dabholkar *et al.* 1996; Dagger *et al.* 2007; 2020b).

Although studies have frequently highlighted the context-dependent nature of the service quality concept, relatively few studies have focused on such modelling. There is evidence of many failed attempts to capture service quality by applying generic service quality models in new contexts (Dagger et al., 2007). Synthesising the above findings, the study defines service quality as a multidimensional, hierarchical, and context-specific concept which should always be viewed from users' perspectives.

3.3 SERVICE QUALITY THEORIES

Grönroos' (1984) and Parasuraman et al.'s (1985) service quality models have played a major role in service quality literature and have been employed in different disciplines, such as services marketing and information systems, health care and policing. In fact, in marketing and organisational literature, service quality and user satisfaction have played a crucial role in establishing the foundation for the traditional service quality theory (Brady & Cronin 2001).

3.3.1 THE NORDIC MODEL

Grönroos (1984) introduces the Nordic model of service quality (Figure 3). This model suggests that service quality perceptions should be measured under two dimensions of functional quality (how) and technical quality (what). The functional quality focuses on the delivery mechanism and captures customers' perceptions while services are delivered (Brady & Cronin

2001). The technical quality focuses on service information and captures customers' reactions to it. Grönroos (1984) bases his arguments on the disconfirmation paradigm (Oliver, 1997), and suggests that the service quality should be measured by comparing expected service with perceived service.

Although this is one of the foundational theories and famous for its pivotal conceptualisation among researchers (e.g., Chen et al., 2017), it has been seriously criticised for its limited dimensions. Subsequent studies propose service quality as a multilevel and multidimensional concept (e.g., Brady & Cronin 2001; Dabholkar et al. 1996; Parasuraman et al. 2005). Other studies argue on the absence of subdimensions and urge for the integration of subdimensions to understand the complexity of human perceptions (e.g., Chen et al., 2017; Dabholkar et al. 1996).

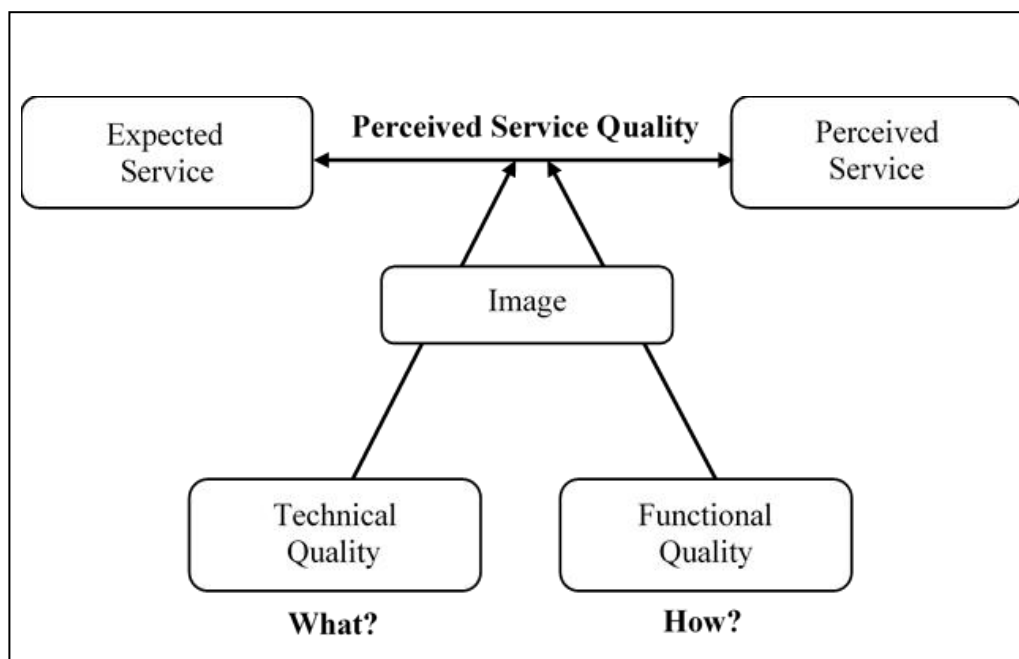


Figure 3. The Nordic Model (Source: Gronroos, 1984)

3.3.2 SERVQUAL MODEL

Many studies concentrate on the SERVQUAL model (Parasuraman et al. 1988) (Figure 4 and Table 4). SERVQUAL model is very influential in service literature (Donnelly et al., 2003; Maghsoodi et al., 2019; Prakash, 2019) and it is applied widely in healthcare (Akter et al., 2019), public security (policing) (Chen et al., 2014), airline (Shah et al., 2020), telecommunications (Abd-Elrahman et al., 2019), tourism and hospitality (Shafiq et al., 2019), banking (Arcand et al., 2017), and education (Gregory, 2019) industries. These studies have been argued to indicate that SERVQUAL is the basis of service quality evaluation for context-specific industry (Parasuraman et al., 1991).

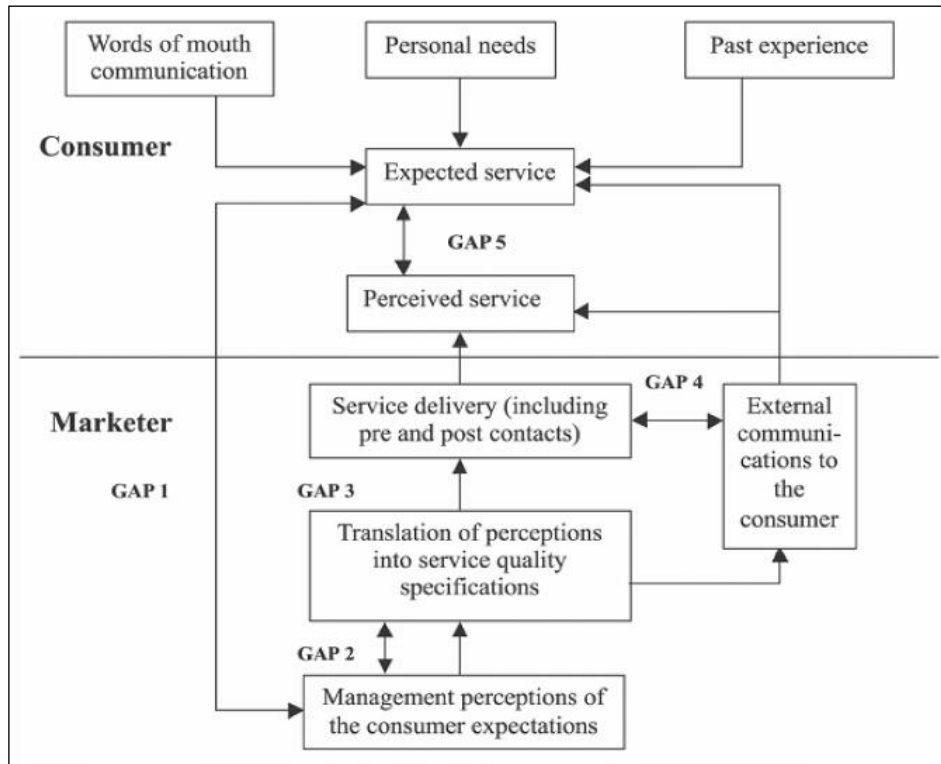


Figure 4. SERVQUAL Model (Source: Parasuraman et al., 1985)

The initial exploratory research resulted in ten dimensions of tangibles, reliability, responsiveness, communication, credibility, security, competence, courtesy, understanding, and access to measure consumers' services (Parasuraman et al., 1985). However, the model's dimension was reduced to only reliability, responsiveness, assurance, empathy and tangibles and named as SERVQUAL model due to the overlapping nature of the initial dimensions (Parasuraman et al., 1988).

Despite SERVQUAL acceptance, popularity and extensive use across the industry, SERVQUAL has been seriously criticised for being designed as a generic measure across all contexts rather than customised as context-specific (Coulthard, 2004; Gilmore & McMullan, 2009; Yu, Hong, Gu, & Wang, 2008; Skålen & Strandvik, 2005; Sureshchandar et al., 2001). Customisation may occur in the form of adding new items or changing the wording of the items per the application (Dabholka & Overby, 2005). However, studies argued that the modified versions of SERVQUAL had dropped the expectation dimension entirely (e.g., (Cronin et al., 2000; Donnelly et al., 2003; Parasuraman *et al.* 1991) because the expected service is always higher than the perceived service (Brady & Cronin 2001). These provide a suggestion that it is hard to measure service expectations in the case of credence properties such as policing services (Bourne, 2016).

Table 4.

Summary of SERVQUAL model

10 dimensions	SERVQUAL dimensions	Definitions
Reliability	Reliability	Ability to perform the promised service dependably and accurately.
Responsiveness	Responsiveness	Willingness to help customers and provide service.
Competence, Courtesy, Credibility, Security	Assurance	Knowledge and courtesy of employees and with trust and confidence.
Access, Communication, Understanding Customer	Empathy	Customised and caring attention.
Tangibles	Tangibles	Appearance of physical facilities, equipment, personnel and communication materials.

Furthermore, some researchers (e.g., Boulding et al., 1993) added dimensions to the expectation portion of the model and other (Dagger *et al.* 2007; Ramanathan et al., 2018) conjoint analyses instead of the different methods to determine service quality perception. Methodologically, the model was questioned because of its item-total correlation (Dabholka & Overby, 2005), unidimensionality (Brady & Cronin 2001), construct validity (Ma et al.,

2005), poor reliability of the difference score problem (Brown *et al.* 1993) and limited contextual application (Dagger *et al.* 2007). Subsequent studies (Dabholka & Overby, 2005; Brady & Cronin 2001; Dagger *et al.* 2007) mentioned that the disconfirmation model has conceptual, theoretical, and measurement problems and suggested that alternative perceived quality models should be used.

Therefore, Cronin *et al.* (2000) recommended that a direct measure of perceptions, such as SERVPERF, is preferable to avoid the discrepancy between expected and perceived service quality. They argue that SERVQUAL is too simplistic to measure this complex cognitive evaluation process by separately measuring the expected and perceived levels of service quality and subtracting them. Critics both in organisational and marketing (e.g., Brown *et al.* 1993; Brady & Cronin 2001; Dagger *et al.* 2007) and in information management (e.g., Jia *et al.* 2008; Ma *et al.* 2005) point to the conceptual and empirical difficulties with the original SERVQUAL instrument and suggest for the alternatives to the original gap scored model to be used. Despite the weaknesses mentioned earlier, the SERVQUAL model is still distinct from others in the overall assessment of interactive service because of its multiple dimensions for measuring service quality (Brady & Cronin 2001; DeLone & McLean, 2003; Jiang *et al.*, 2002). However, since service quality perceptions represent latent variables and service takes place at multiple levels under multiple dimensions, the major concern is to produce such a model that is context-specific, hierarchical, and multidimensional.

Overall, these studies and arguments imply that the central idea proposed in this study is that service quality should be regarded as a multidimensional construct, with a hierarchical structure. This is consistent with studies by Grönroos (2001) and Brady and Cronin (2001) suggesting that further research in hierarchical modelling can better capture the service quality perception of a particular service.

3.3.3 E-S-QUAL MODEL

Service quality theories in a web-based electronic service strongly influence the mobile service because, in both cases, services are delivered over an electronic platform. Several powerful models have been developed to address the issues of service quality over this platform, such as eQUAL (Barnes & Vidgen, 2003), web quality (Aladwani & Palvia 2002), E-S-QUAL (Parasuraman *et al.* 2005), eTailQ (Caruana & Ewing, 2006), perceived service quality in the web (Yang *et al.* 2004), WebQual (Loiacono *et al.* 2007), PeSQ (Cristobal *et al.*, 2007) and service quality in general portals (Liu *et al.* 2009). Barnes and Vidgen (2003) introduced three dimensions to measure the quality of a web-based electronic platform of information quality, interaction, and service quality and usability. Janda *et al.* (2002) suggested five quality dimensions: performance, access, security, sensation, and information. Collier and Bienstock (2003) established three quality dimensions: process quality, information quality, and recovery quality to measure the service quality of the electronic platform. However, all these

models have been seriously criticised for not defining electronic services broadly, for missing some core dimensions, and for generalising the models across all electronic service settings (Akter et al., 2019; Chatfield & Reddick, 2019).

To overcome the earlier models' pitfalls, Parasuraman et al. (2005) developed the E-S-QUAL or electronic service quality model (Table 5) to measure the service quality of web-based electronic services. The E-S-QUAL model's uniqueness lies in its capacity to capture perceptions on human–technology interaction for any web-based e-service platform (Sousa & Voss, 2006). Similarly, Fassnacht and Koese (2006) presented quite a broad model by focusing on online electronic networks, which proposed to measure service quality through environment quality, delivery quality, and information quality. However, this model was criticised for not addressing the unique characteristics of the security of the smart platform to provide the robustness of service quality that lies in its holistic capacity (e.g., interactivity, responsivity, and serviceability) to benefit the public now and in the future (Accenture, 2013), ultimately leading to a high level of user satisfaction (Carter & Grommon, 2017). Therefore, it restricts the service quality measurement of all smart-related services. Most electronic-based platforms of service quality studies are primarily based on the front office (i.e., quality of interaction between the end-user and the virtual platform). However, service quality failures are frequently related to back-office operations (i.e., transparency and integrity). Therefore, it is important to evaluate service

quality at all moments of contact (Cooley et al., 2019; Donnelly et al., 2006; Kaptein & Reenen, 2001).

Due to the absence of research within smart service quality, the literature review for this study draws mainly upon the empirical studies conducted in different sectors and settings that assess service quality in smart technology contexts. Previous studies have proven that the security and reliability dimensions are related to technical quality value (e.g., Bauer et al., 2006; Sá et al., 2016). Besides, users also consider interactive, responsiveness, and accessibility dimensions in functional quality values (e.g., Anshari & Ariff Lim, 2017; Loiacono et al., 2002). Therefore, this study enriches the contribution by evaluating the impact of other technical quality and functional quality dimensions because of the fact that their association with policing services in the smart context is rarely observed in the policing literature. Thus, smart service quality must satisfy both technical quality and functional quality user values if it is to keep up with the value framework of security community users (Accenture, 2013). Therefore, they proposed the dimensions of the E-SQUAL model (Parasuraman et al., 2005) to measure E-S-QUAL and the SERVQUAL model (Parasuraman, 1988) to measure the interpersonal interaction quality for any service over a smart platform (Table 5, and Figure 5). However, Sousa and Voss's (2006) conceptual model was not empirically tested, and, again, it was proposed as a generic model for all electronic services ignoring the contextual influence of service quality settings.

Table 5.

E-S-QUAL model (Parasuraman et al., 2005)

Dimensions	Definiton
Efficiency	The ease and speed of accessing and using the site.
System availability	The extent to which the site's promises about order delivery and item availability are fulfilled.
Fulfilment	The correct technical functioning of the site.
Privacy	The degree to which the site is safe and protects customer information

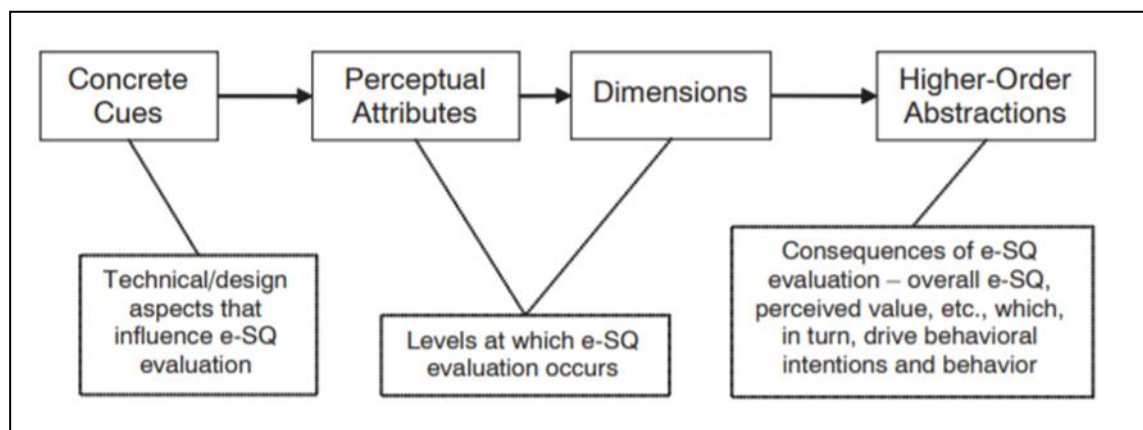


Figure 5. A Means-End Framework for Understanding the Domain and Consequences of e-SQ (Parasuraman et al., 2005)

3.4 SERVICE QUALITY THEORIES IN POLICING SERVICES

Research on policing service quality perceptions has initially focused on applying the generic model of Parasuraman *et al.*'s (1985) five-dimensional SERVQUAL model (i.e., reliability, responsiveness, assurance, empathy, and tangibles). However, the complexity of the service quality evaluations is

evident in the many failed attempts to replicate the existing theory in new contexts (Chatfield & Reddick, 2019).

3.4.1 MULTIDIMENSIONAL VIEWS ON SERVICE QUALITY

The perception of quality is complex and wide-ranging (Kunz et al., 2019; Nowak, 2019). Service quality refers to the judgment of attitude based on the performance of the service (Cronin et al., 2000; Parasuraman et al., 1991). This concept has been extensively investigated in the marketing literature. Service quality is frequently described as the key success factor of competitive advantage and can be used to build a strong customer base (Li and Shang, 2019; Nowak, 2019). A considerable number of literature studies related to service has indicated that service quality differs from user satisfaction, perception of value, and behavioral intentions (Ali and Raza, 2019; Kunz et al., 2019; Li and Shang, 2019; Nowak, 2019). These studies indicate the need to explore the dimensions of service quality that are important for users.

To gain a better perspective of the constructs in service quality, various conceptual and empirical studies have been performed to conceptualize and measure service quality. Based on the initial study on the disconfirmation paradigm (Oliver, 1980), it was suggested that quality is derived from the comparison of the users' expectations and perceptions of service performance (Cronin et al., 2000; Parasuraman et al., 1988). Following the disconfirmation

paradigm, SERVQUAL (Parasuraman et al., 1988) was developed to measure the users' expectations and perceptions of the service received.

Consistent with these initial conceptualisations of service quality, subsequent studies were performed on various aspects which include identifying the structure of service quality (Chen et al., 2017; Li and Shang, 2019), developing modified versions of SERVQUAL, known as SERVPERF (Cronin and Taylor, 1992) and POLQUAL (Sarrico et al., 2013); creating new measurement models such as PubHosQual (Aagja and Garg, 2010) and COBRA (Osman et al., 2014), as well as adapting the existing models to incorporate specific smart government features such as security and public safety (Chatfield and Reddick, 2019). Following Grönroos (2001) and Brady and Cronin (2001), the central idea proposed in this study is that service quality should be considered a multidimensional construct, with a hierarchical structure.

3.4.2 POLICE SERVICE QUALITY

Police service quality has enabled the police and the public to access, use, and feed information through meaningful interactions, offering more personal experiences (Sarrico et al., 2013). The growth of police service quality is considered inevitable, as an effect of new public management movement and consequent public sector reforms that are directly affecting the perceived quality by the users (Ahmad & Khalid, 2017). To satisfy the smart society, effective strategies are needed to highlight and promote the benefits

and perceived values of police service quality (Sarrico et al., 2013). Earlier studies on police service quality studies have focused mainly on police service quality and user satisfaction (Bouranta et al., 2015; Chen et al., 2014; Sarrico et al., 2013). However, it is important to examine police service quality from the smart government perspective, an approach rarely observed in the policing literature.

3.4.3 SMART POLICING SERVICE QUALITY

Smart policing enables the police and public to access, use, and feed information through meaningful interaction, offering more personal experiences (Eterno et al., 2017). The growth of smart policing is considered inevitable, despite residents' concerns over security and privacy, connectivity problems, and public anxiety over the threat of identity or information theft, lack of access, delays in response, and stifling bureaucracy (Osei-Kojo, 2017; Shin, 2017).

Despite these challenges, earlier studies have demonstrated that electronic service quality brings improved flexibility and networking (Ahmad & Khalid, 2017). To satisfy the smart society, effective strategies are needed to highlight and promote the benefits (Anshari & Ariff Lim, 2017), and perceived values of smart policing services quality (Zauner et al., 2015). Policing service quality studies have demonstrated that research has focused mainly on factors that impact satisfaction, based on a service quality model (SERVQUAL) (Donnelly et al., 2006; Sarrico et al., 2013).

Previous studies performed on the concept of service quality have identified several quality dimensions. By comprehensively analysing these dimensions from various sources covering all aspects of smart policing service qualities, the dimensions specified by Grönroos (2001) based on functional quality and outcome quality were adopted. Based on Grönroos' model (2001; 2006), this study describes the features of functional quality and technical qualities as the primary dimensions of smart policing service quality. Grönroos' model is used because it is a more appropriate representation of service quality than the American perspective with its limited concentration on the dimension of functional quality (Boulding et al., 2005; Caceres & Paparoidamis, 2007; Kang, & James, 2004; Mels, Boshoff & Nel, 1997).

3.5 SERVICE QUALITY AND RELATIONSHIP QUALITY

Relationship quality denotes a higher-order construct representing cooperation, adaptation, and atmosphere (Lee et al., 2019). Drawing from Dwyer et al. (1987) and Macneil (1983), relationship quality reflects upon the differences in relational exchange behaviors, affecting satisfaction, trust, and attitudes of users. Hennig-Thurau et al. (2002) explain that several key dimensions reflect the nature of the relationship between organisations and users. User perceptions of relationship quality refer to the holistic and cumulative development of long-term quality and form a dynamic construct based on multichannel interaction, namely offline, online, and mobile (Grönroos, 2004). Research suggests that relationship quality comprises of satisfaction, trust, and attitudes (Boonlertvanich, 2019; Prentice et al., 2019).

According to Prentice et al. (2019), the obligation to continue to conduct transactions with institutions is not common in private and public settings. Moreover, studies suggest that satisfaction, trust, and attitudes are often considered as the outcome of service quality (Akter et al., 2019; Arcand et al., 2017; Kim et al., 2011; Silva et al., 2017). This is consistent with a study that argues that users vary in their relationships with an organisation on a continuum from transactional to highly relational (Garbarino & Johnson, 1999). These provide a formative idea for an organisation to analyze the position of its users to collaborate exchanges. Therefore, it explains the components of user relationship quality that conceptualize user relationship quality utilising attitudes, trust, and satisfaction in the capacity of related but independent constructs. Relationship quality perceptions are also considered at the institution level from a holistic perspective of the smart platform.

3.5.1 SERVICE QUALITY AND SATISFACTION

The extant literature has frequently identified overall service quality as a cognitive construct that works as an antecedent of an emotive satisfaction' construct (e.g., Cronin & Taylor 1992; Dagger *et al.* 2007; 2020a). In addition to service quality, satisfaction has been instrumental in helping organisations to clarify objectives, define measures of performance, and develop performance to meet users' expectations (Chatfield & Reddick, 2019). Oliver (1997) specifies satisfaction as an essential ingredient of success in the

competitive business world. Owing to its strong effects on critical outcome constructs, Siyam *et al.* (2020) urges service providers to manage satisfaction effectively.

Literature in the services sector has also looked into the link between service quality and satisfaction (e.g., Brady & Cronin 2001; Dabholka & Overby, 2005; Oliver, 1997; Parasuraman *et al.* 1994). Similarly, service quality has been correlated with satisfaction in the information management literature (e.g., Chatterjee *et al.*, 2018; Jiang *et al.* 2002; Janstrup *et al.*, 2017). In this regard, Chatfield and Reddick, (2019) recommend that the principal reason to measure user satisfaction is to improve the quality of service they provide irrespective of whether a user interacts with one or multiple information systems, the quality of service can influence the use and user satisfaction. DeLone and McLean (2003), in their revised model of information system success, propose a link between service quality and satisfaction in order to measure individual productivity. Blythe *et al.* (2020) observe that smart platform user satisfaction has a significant impact on smart context use; that is, a higher level of satisfaction creates greater user dependence. Driss *et al.* (2019) concur that user satisfaction is an important outcome variable to evaluate the performance of a system because of its critical effects on decision making and productivity benefits. Linders *et al.* (2018) view satisfaction as the user's own experiences of a service where the outcome has been evaluated in terms of the received value. Although satisfaction has been used in a myriad of service contexts, there has been

limited empirical research on users' service satisfaction in the smart policing context.

3.5.2 SERVICE QUALITY, TRUST AND SATISFACTION

Studies have found both a direct relationship between service quality, and satisfaction between service quality and trust, and between an indirect relationship between service quality and satisfaction through trust (e.g., Akhtar et al., 2012; Boonlertvanich, 2019; Bouranta et al., 2015; Bourne, 2016; Chang et al., 2013; Rita et al., 2019). DeLone and McLean (2003) confirm that service quality leads to satisfaction, and increased trust leads to satisfaction. Their study confirm a strong relationship between service quality, trust, and satisfaction through their meta-analysis. Jafari *et al.* (2011) study to assess the validity of DeLone and McLean's (2003) IS success models discovers that user trust impacts smart platform use, and a higher level of satisfaction creates greater user dependence on the system.

Because of the lack of knowledge in this area (Akhtar et al., 2012) researchers have started exploring into this area in more detail (Bourne, 2016; Bouranta et al., 2015; Chen et al., 2014; Lee et al., 2019; Sarrico et al., 2013). Service quality has been suggested to be linked to trust and satisfaction in the policing service context (Ekaabi, 2020); however, few studies have modeled the direct and indirect impacts of service quality on satisfaction through trust.

3.5.3 SERVICE QUALITY, ATTITUDES AND SATISFACTION

Organisational justice denotes one's perception of how fairly people are treated by an organisation, and consists of distributive, procedural dimensions. Community policing is defined as police working to meet the needs and expectations of the citizens they are responsible for protection. In smart policing, residents develop attitudes and beliefs regarding the justice system and authority (eg, legal actors, legal processes, and the law itself) to which police officers respond back to shape the police attitude–behavior conduct.

There is an intricate relationship between service quality, attitudes, and satisfaction perceptions. Attitudes are a subjective concept (Moon & Armstrong, 2020), often used interchangeably with a commitment to relationship quality (Karim, 2020). Thus, from a holistic viewpoint, attitudes act as a stabilising force regulating users' perception (Almutawa et al., 2018). However, in the policing context, attitudes are viewed as feeling and emotion that is subjective, individual, an experiential construct which measures overall discretionary behavior in a particular policing domain (Anshari & Ariff Lim, 2017).

In psychology, organisational, marketing, information management, the relationship between service quality, attitudes, and satisfaction has been explored to evaluate a service (e.g., Maggon & Chaudhry, 2018; Argento et al., 2019). These outcome variables measure users' feelings or attitudes and satisfaction when they use the system, rather than the impact of the system (Arcand et al., 2017; Silva et al., 2017).

Although the relevance of smart platform to attitudes has been acknowledged and recognised in the service systems industry (Akter et al., 2019), information system researchers have remained quiet on the relevance of relationship quality to the information technology-based service evaluation. This absence has also been noted by a few studies in information system (e.g., Chatfield & Reddick, 2019), contenting that feeling and emotion are an important element in measuring the perception of a transformative service system.

In the smart policing context, attitudes assessment is particularly important as users' subjective feelings on transformative service will lead to a strong positive impact on satisfaction (Chatterjee et al., 2018; 2020b; Karim, 2020). It is important to understand how service quality evaluation influences the relationship quality between attitudes and satisfaction. Despite a natural relationship between the quality of service systems, attitudes, and satisfaction, only a few studies have developed metrics to assess this relationship (Chatfield & Reddick, 2019).

3.5.4 SERVICE QUALITY, TRUST AND ATTITUDES

Pakurár et al. (2019) explain that the nature of the relationship between organisations and users is reflected by the element of cognitive, affective, and conative components of behavior. Grönroos (2004) mentions that user perceptions of relationship quality refers to a development of long term quality that is holistic and cumulative, and it forms a dynamic construct based on

multichannel interaction, namely offline, online and mobile. Earlier service quality studies on retail and financial services sectors suggest on the relationship quality outcomes of trust and commitment (Abd-Elrahman et al., 2019; Ali & Raza, 2017; Almutawa et al., 2018; Chen et al., 2017). However, recent research argues that a smart government ecosystem that shares significant characteristics of a smart government such as transparency and integrity (Chatfield and Reddick, 2019; Liou, 2019) requires elements of attitudes as a set of relatively enduring beliefs to assist judgments (Askari et al., 2020). Behavioral mental structure (i.e., attitudes and trust) is evidenced as a critical role of successful service performance in public services that lies in improving the participation of urban residents through social and relational capital, in addition to achieving social and environmental sustainability (Argento et al., 2019).

Although attitudes and trust have been researched exhaustively in service quality studies, the studies are fragmented, and limited studies have embedded trust and attitudes as the service quality consequences and outcomes and part of relationship quality (Moon & Armstrong, 2020). According to Vesel and Zabkar (2010), the obligation to continue to conduct transactions with institutions is not common in certain settings, such as in the retail or financial services sectors. A few studies also argue that attitudes should be considered the component of relationship quality because the organisation-user relationship is different in various settings (Arcand et al., 2017; Kim et al., 2011; Silva et al., 2017).

Therefore, it is important to frame attitude and trust emphasised as a behavioral mental structure to understand further users' perceptions and expectations regarding the public services delivered. The implementation of smart policing services promotes sustainability, as well as the utilisation of social and relational capitals that require modern, progressive, and contemporary policing services (Hu and Lovrich, 2019; Liou, 2019).

3.6 CHAPTER SUMMARY

This chapter revisits the extant literature in service quality in an interdisciplinary manner in order to synthesize the findings that form the foundation for developing the research model. The findings indicate that service quality is a hierarchical, multidimensional, and context-specific construct. Literature suggests that service quality, particularly smart policing service quality has a clear impact on critical service outcomes, that is, satisfaction, attitudes, and trust. Although the literature review frequently identifies service quality as a critical concept in policing services, particularly in a smart context, there is a paucity of research that has adequately conceptualised the components and consequences of smart policing service quality. Overall, the literature review in the research context (Chapter 2) and theories (Chapter 3) defines literature gaps to solidify the foundation of the research model that is proposed in the next chapter.

CHAPTER 4

LITERATURE REVIEW: GAPS AND HYPOTHESES

DEVELOPMENT

4.1 OVERVIEW

This chapter aims to address the knowledge gaps of the study and develop a service quality model in smart policing based on the research findings and gaps identified earlier in this chapter. Therefore, this chapter provides the conceptualisation of service quality dimensions and the assessment of the overall impact on trust, attitudes, and satisfaction. The literature review suggests that service quality dynamics in smart policing are different from those in other service quality platforms as the quality of the overall service performance depends on the smart context dimensions of policing services of transparency, integrity, interactivity, and responsiveness, and serviceability. However, there is a paucity of research in this domain that has adequately conceptualised service quality dynamics and empirically validated their associations. Therefore, to fill this knowledge gap, this study develops a hierarchical, multidimensional, and context-specific service quality model for smart policing.

4.2 KNOWLEDGE GAPS

4.2.1 GAP#1: CHARACTERISTICS OF POLICING SERVICE QUALITY

Smart policing services are a component of the smart government ecosystem that shares significant characteristics of a smart government such as transparency and integrity (Chatfield and Reddick, 2019; Liou, 2019). The application of some of these common characteristics can be easily expanded from traditional service-based industries to smart policing service quality assessments such as responsivity and interactivity (De Keyser et al., 2019; Nowak, 2019). However, other features of the smart government policing system require adaptation to the rapid changes in digital and technological advancements to directly or indirectly affect user satisfaction (Ali and Raza, 2017; Kennedy, 2019). Therefore, it is imperative to understand the factors influencing the users' perceptions of service to improve user experience and satisfaction, trust, and attitude levels with the service provided (Li and Shang, 2019).

Smart policing allows the police and public to access, use, and feed information through meaningful interaction, offering more personal experiences (Eterno et al., 2017).

4.2.2 GAP #2: SMART POLICING SERVICE QUALITY

To satisfy the smart society, effective strategies are needed to highlight and promote the benefits (Anshari & Ariff Lim, 2017), and perceived values

of smart policing services quality (Zauner et al., 2015). Policing service quality studies have demonstrated that research has tended to focus mainly on factors that impact satisfaction, based on a service quality model (SERVQUAL) (Donnelly et al., 2006; Sarrico et al., 2013). However, it is important to examine smart policing service quality, an approach rarely observed in the policing literature. More specifically, it is important to consider the impact of smart policing service quality on satisfaction. To date, the impacts of smart policing service quality on levels of trust, attitudes, and satisfaction have yet to be explored.

Studies on smart government indicate that the critical role of successful service performance in public services lies in improving the participation of urban residents through social and relational capital, in addition to achieving social and environmental sustainability (Argento et al., 2019). Due to the frequent occurrence of conflicts between residents and the police, studies on the quality of smart policing services are rather challenging and should be addressed collectively with the issues associated with the use of smart technologies to create public value. For instance, Liou (2019) provides evidence of conflicts arising between smart technologies and police services in the USA. Nowadays, residents are more aware of their rights and duties as citizens, and thus, the use of the traditional policing model to address their issues is not sufficient. The user experience for smart policing services is considered to be different from the traditional policing practices that have been criticised as an ineffective and inflexible method of addressing different

issues faced by the residents, thus increasing the tension and distance between the residents and the police.

Additionally, there are also instances where the services offered were neither requested, solicited, or frequently used by the residents. Therefore, it is important to ensure a clear focus on the users of the public service to understand users' perceptions and expectations regarding the services delivered. Ultimately, the implementation of smart policing services promotes sustainability, as well as the utilisation of social and relational capitals that require modern, progressive, and contemporary policing services (Hu & Lovrich, 2019; Liou, 2019).

4.2.3 GAP#3: DIMENSIONS OF SMART POLICING SERVICE QUALITY

Although the extant literature has evidenced multiple dimensions of service quality, such as two (e.g., Gronroos, 2000), three (e.g., Brady & Cronin 2001), five (e.g., Parasuraman et al., 1988) and even ten dimensions (e.g., Parasuraman et al., 1985), there is no standard agreement as to the nature or content of dimensions in defining service quality (Brady & Cronin 2001; Dagger *et al.* 2007). However, it is generally agreed that service quality should be defined from the users' viewpoint, and its conceptualisation should result in multilevel, and multidimensional constructs.

Previous studies proved security and reliability dimensions relevant to technical quality (e.g., Bauer et al., 2006; Sá et al., 2016), and functional quality (e.g., Anshari & Ariff Lim, 2017; Loiacono et al., 2002). This study

evaluates the extent to which technical quality and functional quality dimensions are predictors of satisfaction. This study includes transparency and integrity as technical quality dimensions, as well as interactivity, responsiveness, and serviceability as important functional quality dimensions because of their association with policing services and smart devices. It is widely agreed that technical quality and functional quality factors positively impact smart policing (Donnelly et al., 2006; Kaptein & Reenen, 2001). Accordingly, this study postulates that these dimensions can play a vital role in establishing a smart policing quality service framework in the UAE.

In this study, the primary dimensions of functional quality were identified by underpinning the literature and evaluating the users' perceptions of functional quality (interactivity, responsiveness, and serviceability) using mobile and electronic platforms. Previous studies have indicated that interactivity was an important service quality factor because of their meaningful interactions and reciprocal activities through various platforms that enable smart technology in police services (Ahmad & Khalid, 2017; Elnaghi et al., 2018; Santos, 2003). Grönroos (2006) mentions that responsiveness involves speed and agility, while Zaithaml et al. (1993) describe it as a quick response in fixing issues in an unexpected situation. Similarly, Menezes et al. (2016) group several descriptions of responsiveness, which included speed and agility and helpfulness in solving problems, particularly in unanticipated circumstances. Likewise, Parasuraman et al. (2005) indicate that access, flexibility, and ease of navigation considered imperative subdimensions of serviceability. Additionally, Jung et al. (2018) and

Karjaluoto et al. (2018) suggest that the practicality and usability of the service content and functions were the key aspects commonly applauded by all users.

Kankanhalli et al. (2019) prompt transparency and integrity to be the basic determinants of technical quality for smart services. Van Ryzin (2011) explicates that these elements rely on outcomes and trust in public service. Similarly, transparency is highlighted as a crucial factor distinguishing between public and commercial services (Jansen and Olnes, 2016; Lee et al., 2019a; Sá et al., 2016). Several researchers have also indicated that integrity is the central technical quality value in assessing public sector service quality (Huberts, 2018; Lee et al., 2019b; Van der Wal et al., 2006; Wu et al., 2018).

4.2.4 GAP#4: CONCEPTUALISATION OF SMART POLICING SERVICE QUALITY MODEL

There is a paucity of research in service quality dynamics in the smart policing service quality. In this regard, Chatfield and Reddick (2019) mention that even with the importance of the topic area of information systems in smart government literature, the recent literature on smart policing addressing the security and sustainability issues that persist in smart services is relatively sparse. Specifically, there is no empirically-tested service quality model for the transformative smart policing platform, which is applicable across all contexts. Research gaps in smart policing service quality and its association with critical service outcomes are always detected in using improper

conceptual models, lack of reliable and valid instruments, utilising non-representative sampling, and overgeneralising the retrieved findings. This study overcomes these research gaps to advance knowledge and practice within the domain of smart policing.

4.2.5 GAP#5: SMART POLICING SERVICE QUALITY MODEL AND RELATIONSHIP QUALITY

Studies have found both direct and indirect relationships between service quality, trust, and commitment (e.g., Eisingerich & Bell, 2008; Pakurár et al., 2019; Rita et al., 2019). However, only a few studies have evidenced direct and indirect relationships between service quality and attitudes via trust (e.g., Moon & Armstrong, 2020), and no study has evidenced these relationships in policing service studies. Although DeLone and McLean (2003) suggest that trust is needed to measure satisfaction, it is argued that trust might lead to attitudes to affect satisfaction (Tang & Ho, 2019; Zakzak & Salem, 2019). These studies establish the indirect relation of trust between service quality and attitudes. Researchers are starting to explore these relationships due to the dearth of knowledge in this area to understand further the link between service quality, trust, and attitudes (Bourne, 2016; Bouranta et al., 2015; 2020a).

4.3 CONCEPTUAL MODEL

A conceptual model enables systematic accumulation and presentation of knowledge (Collier & Bienstock, 2006; Gregor, 2006; Töhönen et al., 2020). The model proposed in this study explains the service quality dynamics of

smart policing services by framing its components and consequences in the UAE (Figure 6). Epistemologically, the model embraces an explaining and predicting paradigm (Gregor, 2006) and a proxy view of a service quality artefact (Ekaabi 2020b). The model extends the knowledge by developing a hierarchical, multidimensional service quality model to measure the UAE's smart policing service. Specifically, the conceptual model depicts the components and consequences of service quality in smart government domain of security in the UAE.

The conceptual model is based on the literature in organisational, marketing, and information management as the study focuses on a technology-mediated service platform. In service research, such an interdisciplinary approach is important and necessary to adequately address the challenges and opportunities (Zauner et al., 2015). The conceptual model elucidates an overview of associations in terms of a cognitive (i.e., service quality), affective (i.e., satisfaction); and behavioural mental structure (i.e., attitudes and trust) in the three-component model (Blythe et al., 2020; Brady & Cronin, 2001; Chatfield & Reddick, 2019; Cronin & Taylor, 1992; Zeithaml et al. 2020). The model links users' beliefs, affect and judgment within the user's behavioural and mental structure, which begins with cognitive beliefs (i.e., evaluating perceived service quality), followed by affective responses (i.e., satisfaction) and ends with mental structure effects (i.e., attitudes and trust) that seem intuitively appealing towards affecting relationships. This relationship simplifies the service quality dominant decision-making for a

service platform (e.g., smart policing service) with an effect on individual outcomes (i.e., satisfaction, attitudes, and trust).

The role of users in defining service quality has become a meaningful indicator for police service quality and represents the most important perspective (Akhtar et al., 2012; Donnelly et al., 2003; Kuo & Lord, 2019). Therefore, this study focuses on users' perceived service quality of smart policing services in the UAE to conceptualises a service quality model for smart policing service. To do so, users' perception of five primary quality is assessed: transparency (Bauer et al., 2006; Kim & Kim, 2016; Sá et al., 2016; Parasuraman et al., 2005; Prasad & Sharma, 2015); integrity (Chen et al., 2017; Kaptein & Avelino, 2005; Kaptein & Reenen, 2001; Lee & Lin, 2005; Parasuraman et al., 2005; Van Ryzin, 2011), interactivity (Elnaghi et al., 2019; Loiacono et al., 2002; Parasuraman et al., 2005; Srinivasan et al., 2002), responsivity (Candiello et al., 2012; Giovannini et al., 2015; Menezes et al., 2016; Parasuraman et al., 2005), and serviceability (Jung et al., 2018; Karjaluoto et al., 2018; Parasuraman et al., 2005; Yuen & Chan, 2010). The study also proposes that the overall smart policing service quality poses direct and indirect impacts on satisfaction through trust and attitudes.

Much as service quality has been studied in information management, organisational research, and marketing studies (Zeithaml et al., 2020); it remains understudied in police service research (Ekaabi et al., 2020a; 2020b). The proposed model integrates *technical quality* governance (i.e., transparency and integrity) for the security domain in smart, *functional quality* (i.e., interactivity, responsivity, and serviceability) for smart society to address

collectively with the issues associated with the use of smart technologies to create public value, and *outcome quality* (i.e., quality of service benefits) to provide a panoramic view for perceiving smart policing service quality.

This study measures only the perception score of service quality because it matches users' evaluation of the service experienced more precisely in the police service (Brady & Cronin 2001; Cronin & Taylor 1992; Chatfield & Reddick, 2019; Dabholkar et al. 2000; Dagger et al. 2007; Tang & Ho, 2019), which is the authority for security domain in the smart government initiatives platform in the UAE. The conceptual model is comprised of hierarchical-reflective constructs to be consistent with research on service quality perception (Brady & Cronin 2001; Fassnacht & Koese 2006; Parasuraman et al. 2005) and measurement model specifications (2000b; MacKenzie et al., 2011; Töhönen et al., 2020). The hierarchical construct allows for more theoretical parsimony and less model complexity (Hair et al., 2019; MacKenzie et al. 2011). The study also adopts the perspective of a reflective model (Hair et al., 2019; Sarstedt et al., 2019) because all the dimensions of service quality share a common theme. As such, the study argues that transparency, integrity, interactivity, responsiveness, and serviceability are reflections of smart policing service quality. Figure 6 defines the dimensions of the model proposed for smart policing service quality.

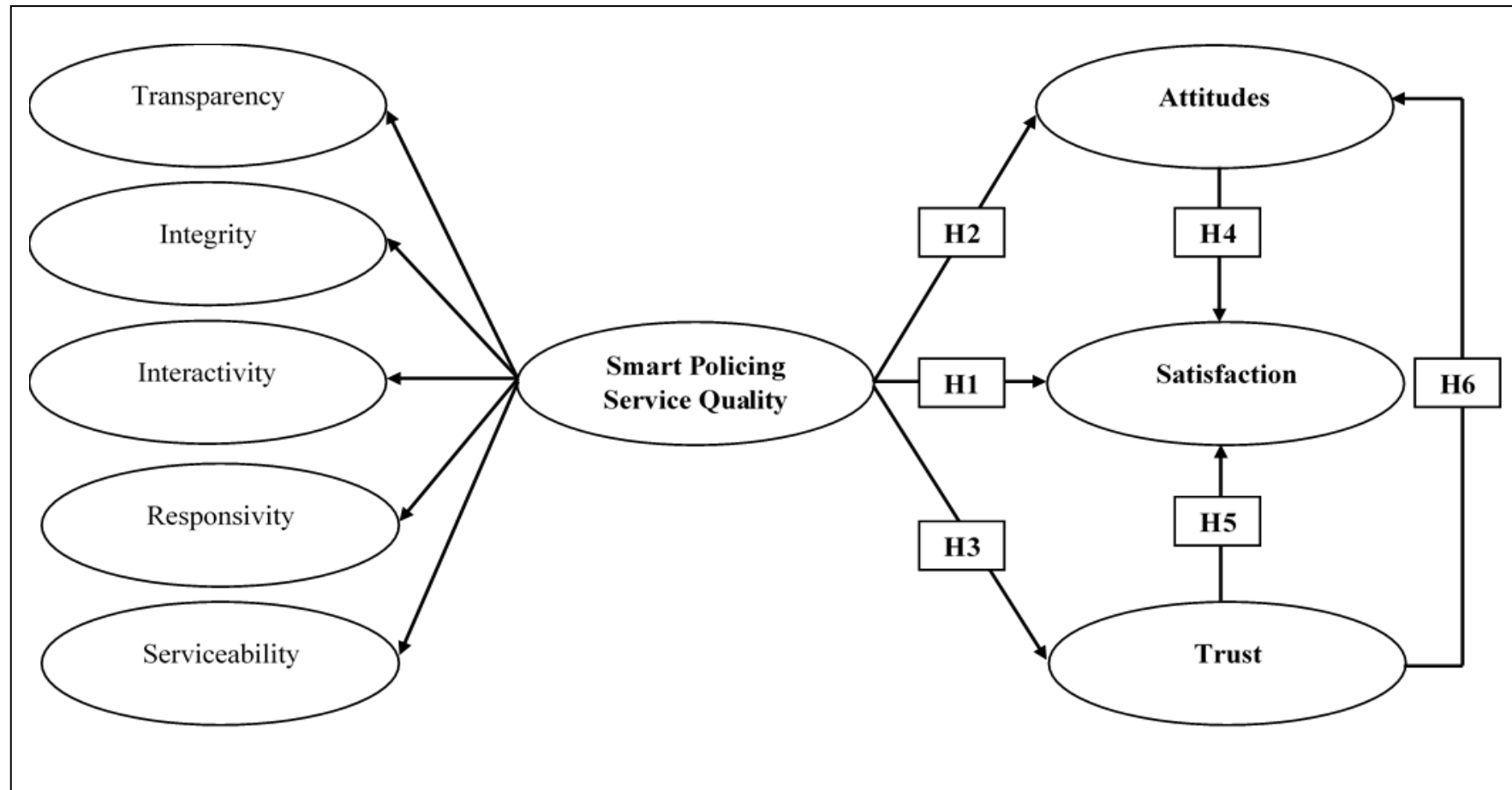


Figure 6. Research conceptual model

4.3.1 PRIMARY DIMENSIONS OF SMART POLICING SERVICE QUALITY

Table 6 defines the dimensions of the smart policing service quality model. Specifically, in the following sections, this study discusses the association among constructs by investigating five primary dimensions (i.e., that transparency, integrity, interactivity, responsivity, and serviceability) of service quality in smart policing.

4.3.1.1 TRANSPARENCY

The service quality literature has considered information transparency (Kim & Kim, 2016), service transparency (Prasad & Sharma, 2015), and decision-making transparency (Sá et al., 2016) to be the distinguishing factors influencing service quality in retail and banking setting. Most recently, the degree of dissemination of transparency can be found in almost every sector. This corresponds to an argument in the literature where transparency is often described as the capability of the entity to convey an array of services to the user (Nilashi et al., 2016; Janda et al., 2002; Jansen & Ølne, 2016).

Current literature on transparency in the relationship between governments and citizens has strongly emphasised this concept of openness. Oliver (2004) argues that transparency in an organisation is not only about what has been communicated externally, but about what is right on the inside, in the guts of its operations, and further explains that transparency describes the trend for organisations to face more active demands for disclosure of information. In the past, many government entities had passively provided

information only on request and could do so at their discretion. Now they are being required to engage in more active disclosure. Studies show that transparency impacts service quality and suggests that the information and clarity about rules, regulations, and decisions must be available to the general public (Joshi, 2013; Kim & Kim, 2016; Tyler et al., 2015). As a result, transparency has become an important dimension in measuring public service quality performance.

Transparency describes organisations' trend to face more active demands for disclosing information (Joshi, 2013). In the past, government entities had passively provided information only on request and could do so at their discretion (Kim & Kim, 2016). They are presently required to engage in more active disclosure (Tyler et al., 2015). Furthermore, it has been argued that transparency serves as a strategy of accountability (Lum & Nagin, 2017). Citizens are now allowed to monitor the quality of public services, and public employees are encouraged to satisfy society. The literature on transparency advises that organisations should be transparent to increase the degree of satisfaction (Jansen & Ølnes, 2016). Kaptein and Reenen (2001) stress that transparency is expected to contribute positively to satisfaction by building credibility. Transaction transparency in a smart environment proves to be a critical predictor of satisfaction (Wu et al., 2017), especially in the public service sector (Janssen et al., 2017).

Additionally, transparency serves as a strategy to correct poor performance (Al-Debei et al., 2015; Thaichon & Quach, 2015), has a positive effect on trust and accountability (Ganguli & Roy, 2010; Willis et al., 2017),

and is linked with the values of accountability (Bullock, 2017; Holzner & Holzner, 2006; Lum et al., 2017). These outcomes allow citizens to monitor the quality of public services and encourage public employees to satisfy citizens. The literature on transparency advises that public services should be transparent to increase the degree of trust (Chen et al., 2014; Colvin & Goh, 2005; Jansen & Ølnes, 2016; Nilashi et al., 2016).

4.3.1.2 INTEGRITY

Karssing (2007, p. 3) defines integrity as professionals performing tasks adequately, carefully, and responsibly, while taking into consideration all relevant interests. In the absence of research in the smart platform of police service quality context relevant to this topic, this review of the literature covers extant empirical studies conducted in different sectors and settings—the only notable exception to the absence of research on smart policing service quality perception of integrity. The literature on service quality dimensions toward smart policing and service quality is limited, and more systematic research is needed to broaden the understanding of the resident's view on policing.

Dimensions of reliability (Bauer et al., 2006; Chen et al., 2017; Lee & Lin, 2005), credibility (Cox & Dale, 2001), trust (Lee & Lin, 2005; Loiacono et al., 2002; Santos, 2003; Parasuraman et al., 1988), and fulfilment (Wolfenbarger & Gilly, 2003; Yen & Lu, 2008) have been frequently studied as factors in service quality in much of the sectors. Current literature is seemingly inconclusive in establishing service quality dimensions of integrity.

Previous studies related to integrity, security, and system (Madu & Madu, 2002; Zalatar, 2012). Johnston (1995) argues that the overlapping security and system makes the integrity of these factors difficult to identify. This is consistent with Johnson and Silvestron (1995) suggestion to include integrity as an additional service quality determinant. This concern leads to the adoption of a definition of integrity that refers to the concern with honesty, justice, fairness, trustworthiness, and security as concerned with the feeling of safety and the maintenance of confidentiality (Johnston, 1995, p. 61).

This study considers a broader interpretation of integrity in technology-enabled policing. Integrity can be viewed as an act (technology-assisted/without) of compliance with the relevant moral issues and norms to regime values in service quality decision making and implementation processes in governance. While most studies consider integrity in service quality to be similar between public and private service sectors, Van der Wal et al. (2006) argue that empirical research does not consider the distinct values of integrity between the public and private services sectors. Huberts (2018) expands this point by arguing that integrity is one of the central values of public sector ethics, while integrity in the private service sector often takes into account the corporate governance environment (Kaptein & Avelino, 2005). Integrity is also, naturally, an important feature of smart policing service quality, which can have a significant effect on satisfaction relationships (Bouranta et al., 2015; Bullock, 2017; Lum & Koper, 2017; Lum & Nagin, 2017). In an examination of the integrity management of police in the Netherlands, Kaptein and Reenen (2001) conclude that integrity significantly impacts society's

satisfaction levels as a whole. Research also suggested that integrity positively influences citizens' satisfaction with the police in India (Madan & Nalla, 2015), and in the USA (Hickman et al., 2016). Bouranta et al. (2015) observe that the policing system's integrity has a unique impact on the levels of satisfaction among the public.

4.3.1.3 INTERACTIVITY

Interactivity is defined as the key feature of any police-public reciprocal activities through smart technology-enabled platforms (Elnaghi et al., 2018). In this study, interactivity refers to the ability of a provider to respond to user demands and consequently offer the typical social benefits derived from the interaction with others via any smart technology or device.

Smart technology has pushed users into a social era (Arcand et al., 2017), where everybody can contribute and interact with unacquainted users online (Al-Hubaishi et al., 2017). Ekaabi et al. (2020a) see users as social thrivers, and they prefer using interactive smart-based features to interact socially. Some research also establishes the need for social interaction as a dimension of service quality measure of self-service technology, including smart policing services (Al-Ibrahim, 2014; Lian, 2015; Rahman et al., 2017; Shareef et al., 2016). Further, Flavian *et al.* (2006) and Santos (2003) argue that virtual elements provide the ability for meaningful interactivity between users and service providers. Bullock (2017) adds that this interaction creates a form of social capital for the police, which can boost the relationship quality by enhancing the perceived benefits of long term relations with the smart

policing entity. Srinivasan *et al.* (2002) point to interactivity as a key dimension of service quality, clarifying attitudes toward organisations that offer sustenance via smart communities.

In smart policing service quality, interactivity does not occur among friends but rather with public services' representatives and users. Therefore, studies argue that interactivity relies on a provider's ability to respond to the user's demand, which consequently offers social benefits derived from the interaction with others via smart devices. In the smart environment, connectedness enables users to actively interact with a service representative whenever they perceive the need to do so while interacting with others related to policing services and also offering relevant users' testimonials on smart platforms. Interactivity enhances a user's perception of smart services and quality relationships (Chen, 2014).

Public-police interaction represents a unique form of activities regarding action speed, information content, and highly sensitive types of information through a secure technology network (Mustelier-Puig *et al.*, 2018). However, little research has been conducted in smart policing with the inclusion of public-police interactivity (Driss *et al.*, 2019). Interactivity, in this context, creates a form of social capital for police, which can boost the quality-satisfaction relationship by enhancing the perceived benefits of long term relations with smart policing (Bullock, 2017). Recent research points to the public-police capability of acting or influencing each other as an important factor of service quality, as interactivity enhances the satisfaction with the use of smart technology (Ahmad & Khalid, 2017; Alsaadi *et al.*, 2018). Other

studies indicated also confirm that interactivity clarifies the satisfaction towards police forces in a service quality context (Elnaghi et al., 2018). Overall, then, interactivity reflects positively on the smart policing service quality and satisfaction relationships (Jiménez-Barreto & Campo-Martínez, 2018).

4.3.1.4 RESPONSIVITY

Candiello et al. (2012) establish that responsivity means the quality of fast reaction in service activities. Giovannini et al. (2015) refer to responsivity as the perceived experienced from the input-output gained from electronic devices. These are consistent with Menezes et al. (2016), where they define responsivity as the swiftness and the agility to accommodate problem-solving in unanticipated situations; also referred to haste in troubleshooting problems.

To capture the functionality quality facet of the smart context, earlier literature included enjoyment (Bauer et al., 2006; Van der Heijden et al., 2003; Venkatesh, 2000), and responsiveness (Bauer et al., 2006; Madu & Madu, 2002) as an additional dimension to service quality toward the mobile applications. Contrasting to responsiveness, this study argues that enjoyment is not an appropriate dimension to measure service quality for smart policing services because it requires a certain response towards policy-related activities. Candiello et al. (2012) explain that responsivity meets the perceived-expected performance area of service quality because responsiveness toward activities offers required information maintenance to verify the service scalability and application of users.

In the smart government context, Bauer *et al.* (2006) demonstrate that responsivity increases usage due to the perceived quality from the services. These findings extend to the general mobile services context. According to Giovannini *et al.* (2015), responsivity can be substantiated as a dimension of service quality in smart context, especially when it comes to effective policing. The impact of responsivity on smart service quality is not very well researched (Candiello *et al.*, 2012; Giovannini *et al.*, 2015; Menezes *et al.*, 2016). Most of the studies rely on the responsiveness dimension to measure the quality of reaction. Candiello *et al.* (2012) and Loiacono *et al.* (2002) establish that responsivity is enhanced by the quality of fast reaction on the service's activities.

Bauer *et al.* (2006) find that responsivity increases usage due to the perceived quality of the service. Giovannini *et al.* (2015) substantiate responsivity as a dimension of smart service quality, especially regarding effective policing. However, others have argued that the impact of responsivity on smart service quality has been under-researched (Candiello *et al.*, 2012; Giovannini *et al.*, 2015; Menezes *et al.*, 2016). Parasuraman *et al.* (1988) indicate responsiveness as being related to the readiness of services to perform quickly to meet customer expectations, which, naturally, increases satisfaction. However, this study argues that performing a service quickly does not necessarily correspond to satisfaction in the smart policing context. Public-policing sequential activities are required to enable meaningful, responsive actions to increase satisfaction. In an examination of the eGovernment services, Candiello *et al.* (2012) discover that responsivity significantly

impacts citizens' satisfaction. Police services should include responsiveness into their service model to influence citizen's feelings and satisfaction (Dukes et al., 2009).

4.3.1.5 SERVICEABILITY

Yuen and Chan (2010) refer to serviceability in terms of the ease of access to smart-based content and functions. Karjaluoto *et al.* (2018) describe serviceability as a composite of the perceived usefulness and ease of use of content and function by the users of mobile devices. This study contends that serviceability is the degree of practicality and ease-of-use of a service's content and function with given resources and within a specified time in the smart-context.

Serviceability deliberates the option to reflect the hypertextual/hypermedia nature of smart environments, where information and function are intertwined as smart-content. Wojdyski and Kalyanaraman (2016) explain that text and images convey information and serve as navigational cues based on the hyperlink click-ability due to the dissociated content and function. Aladwani and Palvia (2002) and Loiacono *et al.* (2002) also group together the content and interaction, as well as the connection and contextual quality in the web-service quality scale. Encompassing ergonomic criteria used for interface design and inspection in human-computer interaction literature, the term serviceability refers to the extent of the user-oriented and support interactivity to enhance self-efficacy with the medium (Yuen & Chan, 2010). Thus, this study defines serviceability as a composite of

the perceived usefulness and ease of use of content and function by the users of smart devices.

Earlier research indicates that serviceability influences smart service quality (Malhotra & Malhotra, 2013; Yang et al., 2014). Easy access to smart-based content and information positively impacts attitudes, trust, and satisfies the users (Bauer et al., 2002; Wojdyski & Kalyanaraman, 2016; Yuen & Chan, 2010). Recent studies suggest that serviceability influences service quality and significantly impacts customer satisfaction (Yang, 2018). Arcand et al. (2017) establish that it positively impacts customer satisfaction in mobile banking services. Service usefulness and ease-of-use affect user satisfaction in the quality of the mobile augmented reality of South Korea's cultural heritage tourism sites (Jung et al., 2018) and for mobile financial services apps in Finland (Karjaluoto et al., 2018). Easy access to smart-based content and function also positively impacts and satisfies the users (Wojdyski & Kalyanaraman, 2016)

Table 6.

Summary of dimensions from previous research and sources

Construct	Definition	Dimensions of previous research	Sources
Transparency	The open flow of information including the information's easy access to the general public and the clarity	Usefulness Reliability Warranty	Bauer <i>et al.</i> (2006), Kim and Kim (2016), Sá <i>et al.</i> (2016), Parasuraman <i>et al.</i> (2005), and

Construct	Definition	Dimensions of previous research	Sources
	about government rules, regulations and decisions		Prasad and Sharma (2015)
Integrity	An act (technology-assisted/or without) of compliance with the relevant moral issues and norms to regime values in service quality decision making and implementation processes in governance	Security Privacy Anonymity Credibility Trust Safety Empathy	Bauer <i>et al.</i> (2006), Chen <i>et al.</i> (2017), Kaptein and Avelino (2005), Kaptein and Reenen (2001), Lee and Lin (2005), Parasuraman <i>et al.</i> (2005), and Van Ryzin (2011)
Interactivity	The ability of a provider to respond to user demands and consequently offer the typical social benefits derived from interacting with others via any smart technology or device	Sociality Relevant Interactivity Interactive Efficiency	Elnaghi <i>et al.</i> (2018), Loiacono <i>et al.</i> (2002), Parasuraman <i>et al.</i> (2005), and Srinivasan <i>et al.</i> (2002)
Responsivity	Swiftness and the agility to accommodate problem-solving in	Ease of navigation Consistency Ease of access	Bauer <i>et al.</i> (2006), Candiello <i>et al.</i> (2012), Giovannini <i>et al.</i> (2015),

Construct	Definition	Dimensions of previous research	Sources
Serviceability	unanticipated situations; also referred to haste in troubleshooting problems	Responsiveness Response time Fulfilment	Menezes <i>et al.</i> (2016), and Parasuraman <i>et al.</i> (2005)
	The degree of practicality and ease-of-use of a service's content and function with given resources and within a specified time in the smart-context	Practicality Functionality Accessibility Ability to serve System availability	Jung <i>et al.</i> (2018), Karjaluoto <i>et al.</i> (2018), Parasuraman <i>et al.</i> (2005), and Yuen and Chan (2010)

Table 7.

Sample studies in the policing service quality with major findings

Author(s)	Country	Aim/ Method	Findings
Kiely & Peek (2002)	UK	In-depth interviews and thematic analysis	Police officers have their own views on the quality of service which do not always match that of quality of service directives or mission statements. The findings inform on ways in which the culture of an organisation impacts on service quality initiatives and have

Author(s)	Country	Aim/ Method	Findings
			implications for a wide range of service organisations.
Sarrico et al. (2013)	Portugal	Build a customer quality assessment scale for use in the field of policing. Telephone interviews over a three-month period. The proposed scale's reliability and validity are assessed.	It is possible to implement a SERVQUAL-based approach in police traffic services. The adapted scale – POLQUAL – includes all five original dimensions plus another new dimension “promptitude”. The most negative gaps found are for the dimensions of reliability and tangibles. Perceived quality of service decreases as the level of education of the driver increases.
Tarí (2006)	Spain	Examines a project aimed at improving service quality in a Spanish police force reliability analyses and the analysis of the validity of the measurement instrument	Self-assessment and process management can improve service quality and have positive effects upon employees. The measurement instrument was reliable and valid to maximize their efforts towards service quality, and that the whole process may succeed when there is sufficient managerial involvement.

Author(s)	Country	Aim/ Method	Findings
Tyagi et al. (2016)	India	Examines the quality of service provided by police officials at tourist sites in the Uttarakhand region, India and its impact on the level of tourists' confidence in the police Data analysis was carried out using CFA and an SPSS macro named PROCESS.	Police organizational culture has a direct influence on tourists' confidence in the police and police service quality partially mediates the relationship between the two; also leader behaviour positively moderates between police culture and service quality. This study adds to the literature on tourists' confidence in the policing of tourist sites, police culture, leader behaviour, and police service quality.
Webb (1998)		Addresses segmentation potential of customer expectations by investigating the extent to which demographics constitute expectation segmentation criteria in the police service Qualitative	Both the desired and predictive expectation standards are considered. Managerial and research implications are given.
Zaibaf et al. (2013)		Examine the effect of perceived quality on customer satisfaction	Functional quality has a positive and significant impact on the image and

Author(s)	Country	Aim/ Method	Findings
		using Gronroos' service quality model	perceived quality. Further, the image has a positive and significant impact on
		A self-administrated questionnaire was used to collect data from 267 respondents. A two-stage cluster-sampling plan was used to collect samples. SEM and one-sample t-tests were employed to analyze data.	perceived quality and consequently, perceived quality has a positive and significant impact on customer satisfaction.

4.4 HYPOTHESES DEVELOPMENT

Mobile health or mHealth is defined as the use of mobile phone and wireless technologies to support the achievement of health objectives. This study argues that mHealth service quality is a hierarchical construct which consists of five primary dimensions (i.e., transparency, integrity, interactivity, responsivity and serviceability). The overall service quality construct reflects an overall assessment of the standard of service received (Brady & Cronin 2001; Dagger *et al.* 2007; 2020a). The study models the effects of the overall smart policing service quality construct on satisfaction, attitudes and trust as these concepts offer distinctive perspectives to enrich the understanding of smart policing utilisation behaviour. In the following sections, the study discusses the association between constructs and proposes relevant hypotheses. The summary of the hypotheses is shown in Table 7.

4.4.1 SMART POLICING SERVICE QUALITY AND SATISFACTION

Service satisfaction becomes an important cornerstone for service-oriented business practices around the world (Gelbrich *et al.*, 2020). Service quality has been widely discussed in the literature (Gupta, 2016; Zauner *et al.*, 2015) and is commonly compared with their perceptions of the actual service experience (Grönroos, 1990; Zaithaml *et al.*, 1993).

In the public sector, specifically in the public security-domain, satisfaction is a major indicator in measuring the effects of quality or overall service performance (Van der Wal, Huberts *et al.*, 2006; Wirtz *et al.*, 2019).

Satisfaction also leads to favourable results, such as higher rates of residents' happiness and higher perception in safety among the residents (Linders et al., 2018; McCarthy et al., 2019). As such, user satisfaction turns into an integral part of the security domain of public-sector strategic processes (Chatterjee et al., 2018; Wirtz et al., 2019). Ekaabi et al. (2020a) suggest that satisfaction should receive equal importance to service quality in order to design and manage the police service systems effectively.

Satisfaction is an affective response (Wang et al., 2019) although scholars report this construct from different viewpoints, such as a fulfilment response (Oliver, 1997), an overall evaluation (Verschelde & Rogge, 2012), a psychological state (Suhartanto et al., 2020), a global evaluative judgment (Brida et al., 2020) and a summary attribute phenomenon (Wang et al., 2018). Service quality is a cognitive construct, whereas satisfaction is an attitudinal construct (e.g., Cronin & Taylor 1992; Gelbrich et al., 2020; Zaithaml et al., 2020). Therefore, the literature identifies satisfaction as a sentimental response to the cognitive service quality approach (Ives et al., 1983; Oliver 1997; Zauner et al., 2015). This distinction suggests a causal model that identifies service quality as an antecedent to satisfaction (Chen et al., 2014; Ekaabi, et al., 2020; in press; Jansen & Ølnes, 2016). In police services settings, numerous studies support this causal linkage between service quality and satisfaction (Chen et al., 2014; Donnelly et al., 2003; Dukes et al., 2009; Lai & Zhao, 2018). The impact of overall service quality on user satisfaction is a dominant concern in the police services (Dukes et al., 2009; Lai & Zhao, 2018). Several researchers (e.g., Abu-Shanab & Al-Azzam, 2012;

Bhattacharjee, 2002) have used this construct directly using multi-item measures to evaluate its impact on satisfaction and trust.

Service quality is the customer's overall reaction to the service of the relative organisation (Parasuraman et al., 2005). Studies in the field of behavioural intention had linked service quality to satisfaction (Carter & Grommon, 2017; Mustelier-Puig et al., 2018). In government services markets, customer satisfaction is seen as a key driver of performance, making its evaluation and management crucial (Ahmad & Khalid, 2017). Satisfaction can, therefore, be described as a key construct for all aspects of relationships between two parties and is placed at the core of any exchange-based relationship. Gupta (2016) and Haryanto et al., (2017) concur that satisfaction stems from emotional experience derived from consumer's past experiences. Satisfaction is recognised as a cumulative construct: an effective customer condition which is properly derived from an evaluation of all conditions which relate to service quality, instead of a transaction-specific phenomenon (Bolton et al., 2018).

Police literature suggests that service quality should be separately conceptualised and linked to satisfaction (Chen et al., 2014; Donnelly et al., 2003; Dukes et al., 2009; Lai & Zhao, 2018) in order to maximize performance and to minimize failures (Wirtz et al., 2019). In traditional police services, service quality is increasingly used as an instrumental tool to satisfy users, identify target groups, clarify objectives, define measures of performance and develop performance information systems (e.g., Akhtar et al., 2012; Bouranta et al., 2015). In smart policing, the provision of police service

quality has been linked with satisfaction levels (Accenture, 2013; Zakzak & Salem, 2019). Thus, given the important link between service quality and satisfaction, this study posits that satisfaction affect perceived service quality in smart policing services.

H1: Smart policing service quality has a positive impact on satisfaction

4.4.2 SMART POLICING SERVICE QUALITY, ATTITUDES AND SATISFACTION

The success of a technology-mediated service platform, such as smart policing, depends a lot on ongoing usage rather than initial acceptance (Ahmad & Khalid, 2017; Venkatesh et al., 2016). Literature has evidenced that the applicability for predicting human behaviours in IT adoption has been empirically proven and general acceptance gained in smart government and information systems literature (Chatfield & Reddick, 2019; 2020a; Eom et al., 2016; Wirtz et al., 2019). Cumulative findings indicate that attitudes are linked to the cost-benefit paradigm in which the decision-making is based on the subjective perceptions of the individual about performance and expectation (Bourne, 2016; Jansen & Ølnes, 2016).

In line with previous studies, this study defines attitude as a tendency to respond favourably or unfavourably to the process related to the use of an application (Malone, 1990). This study refers to attitudes as the sum of feelings affected by a specific situation (Bailey & Pearson, 1983) using application-related activities required or necessary to accomplish one's job

(Rainer & Harrison, 1993). Therefore, attitude is considered a psychological construct that expresses the mental and emotional status of an individual. The attitude to use expresses the mental and emotional attachment of a person to use or participate in a certain thing, event, or technology based on several factors (Shahzad et al., 2020; Wang et al., 2020). Attitude is similar to users' perceived benefits decision which primarily leads to satisfaction with a particular product or service (Blut, 2016; Hu & Lovrich, 2019). Attitudes lies at the centre of psychological and managerial studies in smart services due to the subjective nature of users that requires a belief in helping them make decisions (Almutawa et al., 2018; Karim, 2020; Moon & Armstrong, 2020). Thus, attitude is a highly relevant construct from a practical perspective because the attitudes on service usage obviously influence satisfaction. This is consistent with earlier literature that agrees to the role of attitudes as the feeling and emotion subjective to individual experiential construct to measure the overall discretionary behaviour (satisfaction) in this context (Anshari & Ariff Lim, 2017).

Both service quality and attitudes have a profound impact on satisfaction (Maggon & Chaudhry, 2018; Argento et al., 2019). According to Pakurár *et al.* (2019), user attitudes will have a mediating role on satisfaction rather than an effect independent from the service quality. Prior studies have found that there is a direct quality impact on satisfaction and also an indirect impact on satisfaction through attitudes (Chatterjee et al., 2018; Karim, 2020). However, this study uses commitment instead of satisfaction as it is necessary for a smart context to be truly able to measure the effect of the relationship

quality in this context. Satisfaction is defined as an emotional response for explaining the manner of relationship between two parties (Sanzo et al., 2003). User satisfaction refers to the extent that the users believe that the application platform and system available would meet their service requirements (Ives et al., 1983) and would be situated at the core of the exchange-based relationships (Vesel et al., 2010). This study, however, refers to satisfaction as a cumulative construct and an affective users' condition that results from a global evaluation of all the aspects that make up the users' relationship with the service provider rather than being a transaction-specific phenomenon (Thakur, 2014).

Satisfaction is defined as usage-based behaviour in which it is commonly labelled as post-implementation or post-adoption phase (Akter et al., 2013; Hou, 2016; Popović et al., 2019). This study focuses on post-adoption, that refers to users' conditional behaviour based on the evaluation of service requirements (Ives et al., 1983; Thakur, 2014). Some researchers (e.g., Chatfield & Reddick, 2019) argue that the long-term sustainability of the smart platform and its eventual success depend on the level of satisfaction of users after the utilisation of the police services. In smart policing service quality, perceived quality and attitudes tend to strengthen a user's satisfaction in using the system (Chatfield & Reddick, 2019; Ismagilova et al., 2019). Also, in police services, quality perceptions and attitudes have a strong influence on one's inclination to be satisfied using such services (2020a). A growing number of service providers are interested in

knowing about this relationship because it predicts the overall social benefits of smart government, in particular in the security domain (Chatfield & Reddick, 2019; 2020a; 2020b; Ismagilova et al., 2019; Ranchordás & Goanta, 2019). Therefore, the study hypothesises that:

H2: Smart policing service quality has a significant impact on attitudes.

Badri, Al Khaili, and Al Mansoori (2015) postulated citizens' expectation, perception of service quality and satisfaction with services moderate residents' trust in the UAE government. Because attitudes of individuals usually involve personal judgments and cultural prejudice, cross-cultural findings varied in the literature (Melián-Alzola, & Martín-Santana, 2020; Oktal, O., Alpu, O., & Yazici, 2016; Sarrico et al., 2013; Suzuki, & Demircioglu, 2020; Van Ryzin, 2013; Wagner et al., 2017; Wright, & Headley, 2021). Therefore, the study postulates that:

H3: Attitudes pose a significant impact on satisfaction.

4.4.3 SMART POLICING SERVICE QUALITY, TRUST AND SATISFACTION

Trust generally refers to the user's confidence in an entity's reliability and integrity (Morgan & Hunt, 1994). However, other scholars recognize trust to be appropriately defined as the perception of trustworthiness as it performs tasks effectively and reliably upon users' interest with respect to promises (Flavian, Guinaliu, & Gurrea, 2006; Mayer, Davis, & Schoorman, 1995). Das

and Teng (2001) define trust as the tendency to believe by an individual or one party that is capable of being trusted. Given the smart policing context of the study and the importance of security domain as a critical element in smart government (Chatfield & Reddick, 2019), this study defines trust as a means that users of technology are willing to depend on its system functions as the users believe that the technology has the desirable attributes to protect their concerns (Grandison & Sloman, 2000). Studies show that the users' experience on service quality and level of trust are interlinked because the better quality experience of the police services leads to the belief of the ability of the service to meet users' expectations that drive users' satisfaction (Candiello et al., 2012; Mergel et al., 2018). As such, Wu *et al.* (2017) mention trust as a critical success factor that might have a strong influence on users satisfaction.

Researchers have identified the critical role of users' trust and residents' trust in government services through digital technology (Venkatesh et al., 2016; Wang et al., 2020). The relevance of smart services to smart society has been acknowledged and recognised in the government's initiatives in providing holistic, agile and sustainable services to users (Chatfield & Reddick, 2019; El-Haddadeh et al., 2019). Wirtz *et al.* (2019) suggest that the goals of any technology should be to increase user engagement (e.g.; attitudes and trust). As such, there is a growing need to understand the digital technology services dynamics which change and affect the engagement on public sector services (Ahmad & Khalid, 2017; Gil-Garcia et al., 2019), in

particular smart government services (Chatfield & Reddick, 2019; Ismagilova et al., 2019).

The premise of this section is that users are offered a variety of police services to fulfil their needs; the more they trust the services' ability to meet their expectation, it will increase the tendency to respond favourably, thus increasing the satisfying needs (Bouranta et al., 2015; Elnaghi et al., 2019; Kuo & Lord, 2019). This study specifies trust as an outcome variable of overall service quality and it is more interested in how smart policing service quality contributes to relationship quality outcomes (trust, attitudes and satisfaction) than to the intention of using by satisfied users. In the general police service context, prior studies found that there is a link between service quality, trust, attitudes and satisfaction (Chen et al., 2014; Kuo & Lord, 2019; Lai & Zhao, 2018; Madan & Nalla, 2015; Sarrico et al., 2013; Tyler et al., 2015; Vuorensyrjä, 2018). Since service trust and attitudes contribute to, and enhance satisfaction, it is related to the relationship quality on an individual (Hennig-Thurau et al., 2002; Kim & Kim, 2016; Silva et al., 2017; Vesel et al., 2010). This is consistent with Dagger et al., (2007) that suggest that the perception of service quality may affect the relationship quality and thus may have the potential to contribute to trust and attitudes as the important elements in measuring user satisfaction.

Studies also confirmed that these concepts (i.e., service quality, trust, attitudes and satisfaction) are distinctive, and urged an evaluation of their association to enrich the understanding of user behaviour (e.g., Silva et al., 2017; Zeithaml et al., 2020). However, no studies have yet to frame the direct

impact of the overall police service quality on trust and indirect impact through trust and attitudes on satisfaction in the smart policing service quality domain. Also, this study is interested in exploring the association between trust and attitudes as it expects that when users place more trust in smart policing experience, they will act positively in using this service. Thus, the study hypothesises that:

H4: Smart policing service quality has a significant impact on trust

H5: Trust has a significant impact on satisfaction.

H6: Trust has a significant impact on attitudes.

4.4.4 MEDIATING EFFECTS OF TRUST AND ATTITUDES

Trust and attitudes are the major drivers of positive satisfaction perception. Therefore, achieving high user satisfaction is a key goal of any service system (Bordoloi et al., 2019; Oliver, 1997). This study identifies trust and attitudes as a mediator because firstly, service quality (predictor) influences trust and attitudes (mediator); secondly, trust and attitudes influence satisfaction (criterion variables) and, finally, service quality influences the criterion variables in the absence of the mediator's influence (Baron & Kenny, 1986; Hayes & Preacher, 2014; Preacher & Hayes, 2004; Zhao et al., 2010). In addition, trust and attitudes roles as the mediator between service quality (e.g., cognitive beliefs) and satisfaction (e.g., affective) draw much attention in psychology (Fishbein & Ajzen, 2010), marketing (Zeithaml et al., 2020), and information management literature (Ahmad & Khalid, 2017; Almutawa et al.,

2018; Chatfield & Reddick, 2019; Elkaabi et al., 2020; Elkaabi et al., in press).

Therefore, this study prompts trust and attitudes as a critical mediator in the research model and argues that it is important to explore the mediating role of trust and attitudes in smart policing service quality. This study postulates that:

H5a: Attitudes mediates the relationship between smart policing service quality and satisfaction

H5b: Trust mediates the relationship between smart policing service quality and satisfaction

H5c: Attitudes mediates the relationship between trust and satisfaction

Table 8.

Summary of hypotheses and causal explanations

Effects	Hypotheses	Hypothesised relationships
Main effects model	H1: Smart policing service quality has a significant impact on satisfaction	SPSQ $\rightarrow$ SF
	H2: Smart policing service quality has a significant impact on attitudes	SPSQ $\rightarrow$ AT
	H3: Smart policing service quality has a significant impact on trust	SPSQ $\rightarrow$ TR
	H4: Attitudes has a significant impact on satisfaction	AT $\rightarrow$ SF
	H5: Trust has a significant impact on satisfaction	TR $\rightarrow$ SF
	H6: Trust has a significant impact on attitudes	TR $\rightarrow$ AT
Mediating effects	H1a: Attitudes mediates the relationship between smart policing service quality and	SPSQ $\rightarrow$ AT $\rightarrow$ SF

satisfaction

H1b: Trust mediates the relationship $SPSQ \rightarrow TR \rightarrow SF$
between smart policing service quality and
satisfaction

H5a: Attitudes mediates the relationship $TR \rightarrow AT \rightarrow SF$
between trust and satisfaction

4.5 CHAPTER SUMMARY

The objective of this chapter is to develop a smart policing service quality model and its association with user trust, attitudes and satisfaction in smart policing service quality in the UAE. With the support of relevant literature, the proposed research model specifies that service quality in smart policing is a second-order, hierarchical-reflective model which has a significant positive impact on consequential latent variables (i.e., trust, attitudes and satisfaction). The study proposes six main effect hypotheses to investigate the associations between higher-order smart policing service quality with trust, attitudes and satisfaction. This study also proposes three mediating effect hypotheses to examine the role of trust and attitudes as the mediator. The study then specifies the nature of the research model to establish rigour in the research methodology and empirical findings. Overall, the conceptual model of the study fills the gaps identified in Chapter 2 (Literature Review: Context) and Chapter 3 (Literature Review: Theory) by proposing a smart policing service quality model in the UAE. The study

discusses research methodology in the next chapter to validate the proposed conceptual model with its hypothetical relationships.

CHAPTER 5

RESEARCH METHODOLOGY

5.1 INTRODUCTION

The research sequences are introduced in this chapter. The model of the research process provides a guideline for the study and this would tremendously assist the research planning and data collection. The research will be carried out systematically and efficiently. The research interest was identified to allow for the preliminary data gathering. This includes the literature review in order to find a suitable gap before a research problem is identified and defined. The plan and structure of the investigation were delineated to enable a blueprint for the data collection, measurement, and analysis to be provided. The findings from the preliminary tests would be able to help in the processes of refining the research framework and revising the instruments.

5.2 RESEARCH PROCESS

A sequence of a research process served as the guideline to the methods and procedures used to allow for the research information to be collected

analysed (Zikmund et al., 2010). The model is a solid guideline for this study, and it also helps in organising and carrying out the research planning and data collection systematically and efficiently.

Firstly, the research interest is identified as the enabler for preliminary data gathering. The preliminary data gathering entails the literature review and an informal interview to ensure that no vital variables in previous studies for problem identification and definition are missed. The plan and structure of investigation were then delineated so that a theoretical blueprint for the data collection, measurement, and analysis can be provided- this helps gain a better understanding of the problem addressed. The findings obtained from preliminary tests not only helped in refining the research framework but they were instrumental to the revision of the instrument. This guarantees that the right data can be gathered and analysed before any solution is made (Sekaran & Bougie, 2010).

5.3 RESEARCH DESIGN

Zikmund, Babin, Carr, and Griffin (2010) defined a research design as “a master plan specifying the methods and procedures for collecting and analysing the needed information”. This is to ensure that the requisite data can be gathered and analysed to arrive at a solution (Sekaran & Bougie, 2010).

5.3.1 POPULATION AND SAMPLING

The population of this research consisted of all UAE residents in 2019 which is 9.7 million according to the World Bank data (Global Media Insight, 2019). Out of this figure, 97.5 per cent of the total population are the users of the smart policing application under the purview of the Ministry of Interior (MOI). To fulfil the study purpose, the sample is collected from the UAE residents with at least a one-time experience using the MOI applications, under the smart policing applications. This is crucial as the perception of service quality based on their experience using the smart policing is very important in measuring their attitudes, trust and satisfaction. In addition, their perception on smart policing service quality may elevate their understanding of how trust and attitudes can leave an impact on user satisfaction. By delving into the new construct of smart policing and connecting it to attitudes, trust and satisfaction, it provides the strategies for smart service quality transformative potential for augmentation and other activities that can potentially impact the future society. Thus, the total sampling frame for this study is based on World Bank's 2019 UAE's population of 9.8 million with 97.48 per cent of the total population being smart policing users.

According to Krejcie and Morgan (1970), 382 is sizeable sample size for a population as large as 55,000. The sample size was consistent with the rule of thumb for determining sample size as stated by Roscoe (1975). He maintained that a sample size of between 30 and 500 is appropriate for most research. Another approach to calculating the required sampling size in

behavioural science (Cohen, 1992) is that a sample size of between 85 and 217 is acceptable for correlation analysis.

This study employs the unrestricted probability sampling to offer highly generalizable findings (Fosnacht, Sarraf, Howe & Peck, 2017; Tipton et al., 2016). It would be favourable to have population estimates that represent the target population and eliminate the sampling bias. Also, producing simple random sampling is quite convenient and less hassling (Fosnacht et al., 2017). This approach allocates equal opportunity for all known individuals within the population to be selected as study subjects (Table 9).

Table 9.

Overview of the sampling process

Sampling process	Sampling strategy of the study	Comments
Target population	The smart policing service users in the UAE (9.5 million people).	The aggregate of all the elements sharing some common set of characteristics comprising the population for our research. problem.
Sampling frame	Two urban areas (Abu Dhabi and Dubai emirates)	These urban clusters represent the sample units of the target population.
Sampling unit	All residents in two emirates	These sample units contain the elements of

		the target population to be sampled.
Sampling elements	18+ males and females who have the experience of using this service at least once in the last year.	These respondents met our qualifications and could give information to test inferences.
Sampling strategy	Probability sampling	All have an equal chance of being selected as a study subject
Sampling size	631 completed samples	110 for pilot and 521 for the main study.

5.3.2 TYPE OF STUDY

Zikmund et al. (2010) made a justification that research methods should be chosen to be compatible with the research problem, the study objective, and the availability of data sources, the urgency of decisions and the cost of obtaining the data. This study was naturally exploratory because it is still at its infancy in this field. Sekaran and Bougie (2010) suggested that exploratory studies are ideal when it comes to investigating new and vague research subjects. It was also causal, for the identification of the reasons for actions. This type of study allows for replicability which is definitely an advantage (Hair et al., 2010). A descriptive element was used for the respondents' demographic profiles to give support to the exploratory approach.

Exploratory studies can help clarify ambiguous problems and through exploration, researchers will be able to clarify and develop the concepts more clearly (Cooper & Schindler, 2000; Zikmund, 2003). Cooper and Schindler

(2000) have further explained that for an area of investigation that is new and vague, exploration can also be a very helpful approach. This would allow the researchers to explore, determine and learn potentially new contributions with regard to the area of study.

In contrast, causal studies are also known as explanatory studies (Davis, 1999). Causal studies would enable the explanation of an expectation of the relationship (Zikmund, 2003) and it will help to delineate the cause of the problems (Sekaran & Bougie, 2010). Sekaran and Bougie (2010) have added that often cause and effect relationships are established through regression analyses such as cross-laggard correlations and path analysis. By contrast, correlation studies are used when one has an interest in delineating the important variables related to the problem.

The descriptive study is undertaken so that the characteristics of the variables of interest in a situation can be ascertained and described (Sekaran & Bougie, 2010). Zikmund (2003) explains that descriptive studies can help answer the questions of who, what, when, where and how. Therefore, this study fit in as both exploratory and explanatory study. The exploratory study attempts to incorporate the smart policing service quality features that have been scarce and to have it linked with the relationship among the quality variables of attitudes, trust and satisfaction. Simultaneously, it is an explanatory study as it carries the elements of causation. The hypotheses are developed to examine the relationships of the interdependent, intervening, and dependent variables following the outline of the research framework. The explanatory study involves with an explanation of the findings that may

significantly lead to some theoretical and practical implications deemed vital to enabling future research to capture the essence of this research and further explore the limitation of this study.

5.3.3 QUANTITATIVE VERSUS QUALITATIVE RESEARCH

Quantitative research allows for data measurement and analysis. It details various associations and causality of the study variables. This is beneficial because the research findings are more objective (Zikmund et al., 2010). Quantitative research also allows for hypothesis testing because of its ability to measure data statistically (Roscoe, 1975).

Qualitative research concentrates tremendously on the process. Quantitative research, on the other hand, stresses on the structural matters to test hypotheses (Saunders et al., 2007), so it presents a more objective view of the study and its participants (Hair et al., 2010). Hypothesis testing in quantitative research permits the interpretation of empirical results, further leading to data normalisation.

This study employs both a qualitative approach and quantitative approach as it is aiming at exploring the smart policing service quality construct and investigating the effect of smart policing service quality construct on attitudes, trust and satisfaction. The triangulation research helps increase the credibility and validity of results. The triangulation approach was considered best addressed via the qualitative and quantitative data as they can be generalised to the population of interest. Cohen et al., (2000) refer to

triangulation as an approach that maps out and explains more fully, the richness and complexity of human behaviour by examining it from another perspective (p. 254). Meanwhile, O'Donoghue and Punch (2003) mentioned triangulation as a method of cross-checking data from multiple sources to search for regularities in the research data (p. 78). Consistent with Altrichter et al., (2008) they concurred that both qualitative as inquiry and quantitative as validation in research gives a more detailed and balanced picture of the situation (p. 147). For this study, the quantitative method was used for the data collection and analyses in the pilot test, whereas both qualitative and quantitative were therefore used for the main study's data collection and analyses.

5.3.4 DATA COLLECTION METHOD

There are three phases of data collection in this research. Qualitative and quantitative data were utilised for both the pilot testing and the main study. Pilot testing facilitates the inquiry and validation to determine the appropriateness of the data collection plan for the main study. At this point, the errors resulted from poor design can well be minimised (Zikmund et al., 2010). The problems with the data collection instrument can also be identified and rectified in pilot testing (Sekaran & Bougie, 2010), subsequently giving room to modification. Testing manipulations and measures in advance is crucial as the original instruments were tested in the contexts much different from the present one (Brandt et al., 2014).

As the psychometric scale-development procedures were fulfilled, the pilot test was replicated in the main study. Qualitative data as inquiry is analysed in the content analysis and quantitative data as validation strategy entailed gathering and measuring information on a series of variables in a systematic manner. This process enabled the researcher to answer the research questions and evaluate the study outcomes. A formal data collection process is necessary to ensure that data are both defined and accurate, and to ensure that decisions based on the findings are valid (Cooper & Schindler, 2008). The process provides a baseline regarding what to measure and indicate what to improve. Accurate data collection is essential to help maintain the integrity of research (Zikmund et al., 2010). It requires an array of appropriate data collection techniques and instruments, and clearly defined instructions for their correct use so that errors can be minimised (Sekaran & Bougie, 2010).

5.3.5 PRIMARY VERSUS SECONDARY DATA

For most research works, data can be obtained from both primary and secondary sources (Sekaran & Bougie, 2010). The primary data was adopted for this study since the secondary source data was deemed inadequate as the only source of information in this study. Secondary data serves to provide support to the phenomena of interest to allow for hypotheses and research framework development to be established. However, since the secondary data was derived from the literature, it requires further inquiry and validation to fit the purpose of the current study.

Interviews (personal, telephone or computer-based), questionnaires (mail, electronically or personally administered), focus groups, observation and experimentation (Sekaran & Bougie, 2010) have been adopted to obtain the primary data. This study used an interview as a source of inquiry and online survey for the validation. Primary data obtained from this source are considered reliable for the replication of procedures and examination of the result, owing to the familiarity of the data collection procedure and analysis methods (Cooper & Schindler, 2008). The data were anticipated to provide up-to-date information that would directly address the research questions established.

5.3.5.1 FOCUS GROUP DISCUSSION

Focus group discussion was used as one of the primary data in this study to enquire about the root cause of the issue at hand. It is defined as “the way of collecting qualitative data, which – essentially involves engaging a small number of people in an informal group discussion (or discussions), focused around a particular topic or set of issues” (Ochieng et al., 2018, p. 24). Previous research in social science in general often leans on focus group discussions to assist researchers in the identification of the survey questions (Kaufman et al., 2018). Other scholars have offered another justification that a focus group is a prominent element of complex social stimuli and a precursor to other quantitative tests (Reay et al., 2019). Besides, focus group data collection primarily aims to assess respondent’s attitudes, perspectives and opinions (Naznin et al., 2018). Under the robust nature of the service quality

research and sensitivity of policing research, focus group discussion is adopted in this study due to its flexible nature of including community-based participatory research (Khanra & Joseph, 2019; Xu & Zhang, 2019).

For this reason, focus group discussion was identified as an appropriate technique for this study since it has been employed for both the pretesting and pilot-testing phases in service quality and policing research (Alsaadi, et al., 2018; Chen et al., 2014; Chen et al., 2017; Khanra & Joseph, 2019; Xu & Zhang, 2019). Focus group discussion is regarded as the most effective in a small group size comprising of six to twelve participants (Krueger & Casey, 2009). Additionally, a small group of focus group can help reduce the potential bias due to the fact that the subject is sensitive in nature (Khanra & Joseph, 2019). Krueger and Casey (2009), however, emphasised that focus group discussion must fulfil the characteristics of “people who possess certain characteristics that provide qualitative data in a focused discussion to help understand the topic of interest” (p.10). Also, according to Naznin *et al.* (2018), focus group discussion usually takes one and two hours. The motivation behind the focus group size and time allocation is to ensure that there is a sufficient number of participants to yield diversity in the information provided. Krueger and Casey (2009) and Kaufman *et al.* (2018) have also argued that qualitative data that complements stand-alone quantifiable survey results can provide more relevant results and are more practical when it comes to validating the conceptual framework. After all, researchers were all in agreement that social desirability bias provides a possible reason for perception-attitude-behaviour gap and a tendency for cognitive bias by

respondents to condone the fact indicating the existence of heterogeneity and complexity in the community (Khanra & Joseph, 2019; Xu & Zhang, 2019).

Janstrup et al. (2017) in their evaluation of the police service quality argue that further research could relate to the expert-based approach and could investigate the experiences of the general public to get the impressions from the “users’ perspective”, as well as suggest a methodological framework that corrects for the strategic response, emotional and layman opinion biases inherent in general user interviews. In this study, the summary of the discussions was established for the pre-testing and pilot-testing phases. The primary purpose of this approach is to spur free-flowing discussions and brainstorm ideas (Krueger & Casey, 2009). Equally importantly, the moderator role was kept to the minimum to minimize any possible intervention that could hinder the free, open discussion.

5.3.5.2 SURVEY QUESTIONNAIRE

To date, responding to questionnaires gains its popularity for data collection in safety research as its advantages have outnumbered the disadvantages (Stephens et al., 2017; Yousefi et al., 2016). As cost can be the main obstacle for many studies, employing this method provides financial flexibility. Respondents’ anonymity, confidentiality and leisureliness of response make questionnaire stand out as an attractive method (Sekaran & Bougie, 2010). To minimize the non-response bias, the number of online questionnaires may be doubled to be distributed to ensure that the sample collected would be adequate (Dolnicar et al., 2016). Concentrating on the

response rate, Frohlich (2002) has concluded that a response rate between 30 per cent and 35 per cent is considered acceptable to make any study generalisation. Bartlett *et al.* (2001) recommended a minimum returned sample size of 119 for the study's generalizability.

Therefore, this research utilised an online survey for data collection in both pilot and main study. The questionnaire was specifically addressed to the UAE residents who used smart policing applications provided by the Ministry of Interior so that their perception on smart policing service quality and its relations to attitudes, trust and satisfaction can be obtained.

5.4 INSTRUMENT DEVELOPMENT

This study developed and validated a higher-order service quality scale for smart policing by taking close guidance from the instrument development and validation procedures established in seminal studies (e.g., Akter *et al.*, 2019; Nunkoo *et al.*, 2017; Palaci *et al.*, 2019). For the execution of the entire procedures, the study consulted with the extant literature, such as Parasuraman *et al.*'s (1988) generic service quality model, Dabholkar *et al.*'s (1996) hierarchical service quality model, Parasuraman *et al.*'s (2005) E-SQual model, Donnelly *et al.*'s (2006) police service quality model, Sarrico *et al.*'s (2013) police traffic service quality model, and Janstrup *et al.*'s (2017) police service quality in the electronic context. In the same vein with the adoption of psychometric scale-development procedures advanced by marketing, organisational and information management studies (e.g., Ali *et al.*, 2017; Chen *et al.*, 2017; Le *et al.*, 2020; Ozdemir *et al.*, 2019; Prakash & Phadtare,

2018), this study highlighted the scale reliability and validation techniques intended to establish rigour in both the instrument development and validation.

The study adhered with the back-to-back translation procedure to conduct instrument testing put forth by Brislin (1970). Firstly, the primary version of the items in English (Table 9) was developed and then these items were translated into Arabic. As the next stage, the Arabic version was retranslated until a panel of experts proficient in both languages agreed that the two versions were reasonably comparable (Behr, 2017). With regard to translation-retranslation, Cha et al. (2007) commented that the translation process is an important part of cross-cultural studies and there is no gold standard of translation techniques due to the research environment (e.g. accessibility and availability of bilingual people), as well as the different research questions. It is worth noting that back-translation is an established mechanism in cross-country research as the local language version has to have the same meaning as the version in the original language (Behr, 2017; Brislin, 1970).

English and Arabic are the languages used in the survey instrument, which was then distributed electronically to be filled in by participants to allow for effective participation. Electronic (online) distribution of survey instrument guaranteed that the access is convenient. Furthermore, online or web-based survey guaranteed voluntary, anonymous, and confidential participation (informed consent was provided in the opening section of the survey) as it has wide use and high data reliability (Kalantari et al., 2011).

In this study, modification helped the construct of items identified from the previous studies to correspond to the local context. The questionnaire for this study was divided into two sections: Section A evaluated the demographic of respondents. Demographic data of gender, age, the highest level of education and experience of using smart policing applications are the variables most frequently examined in service quality research (Chen et al., 2017).

Section B was further divided into four subsections. The content validity has to be maximised, so the scales developed by other marketing and policing scholars were used and adapted to the study. Most are scales used in an online context but are already adapted to a smart environment.

As part of the response bias mitigating measure, this study also used the Likert scale. Specifically, 7-point Likert scale served as scaled response format questions to offer a variety of less point scale in which adjacent options are less radically different (or more gradually different) from each other in comparison to a much lesser point scale. This larger (step by step) spectrum of choices offers a participant more freedom to choose the best options they preferred (Wakita et al., 2012).

5.4.1 SMART POLICING SERVICE QUALITY

For the development of scales for smart policing service quality, the study adapted items from electronic service quality and policing studies (e.g.,

Chen et al., 2017; Janstrup et al., 2017; Maguire & Johnson, 2010; Parasuraman et al. 2005; Sá et al., 2016; Yang et al., 2014).

A three-item modified composite scale was adopted from Kim and Kim (2016), Sá et al. (2016), and Prasad and Sharma (2015) to measure the users' perception on the transparency feature of smart policing service quality. Sample items include: "The information and details in the smart policing are constantly updated", and "The smart policing discloses sufficient information and details".

A five-item scale was modified and drawn from Bauer *et al.* (2006), Chen *et al.* (2017), and Lee and Lin (2005) to measure users' perception on the integrity feature of smart policing service quality. Sample items include: "The smart policing provides information and details as promised", and "The smart policing content is reliable".

A five-items composite scale was adopted from Loiacono *et al.* (2002), and Srinivasan et al. (2002) to measure users' perception of the interactivity feature of smart policing service quality. Sample items include: "The smart policing data and information can be accessed from any location", and "The smart policing capture real-time evidence".

A mix of five items from Aladwani and Palvia (2002), and Yang et al. (2014) were adapted and modified to measure users' perception on the responsivity feature of smart policing service quality. Sample items include: "The smart policing enables quick completion of the transaction", and "The smart policing is high performing".

The five items were modified and drawn from Cox and Dale (2001), and Parasuraman *et al.* (2005) to measure users' perception of the serviceability feature of smart policing service quality. Sample items include: "The smart policing provides helpful customer support", and "The smart policing does not crash". These items were modified to measure users' perception and they directly indicated users' opinions of smart policing service quality features and overall smart policing service quality.

5.4.2 SATISFACTION

A five-item scale was adapted from Cronin *et al.* (2000), Liang and Chen (2009), and Vatanasombut *et al.* (2008) and adjusted to measure users' self-reported satisfaction. A self-rated user approach was adopted to be harmonious with the measurement of other constructs in previous research (e.g., Chen *et al.*, 2014; Janstrup *et al.*, 2017). Sample items include: "The smart policing satisfies my needs", and "The smart policing meets the expectations".

5.4.3 TRUST

The scale for assessing trust was adapted from Bhattacharjee (2002), and Chouk and Perrien (2005). It was developed to measure the level of users' trust in smart policing service quality to support their perception of satisfaction. A three-item scale was modified, and these items include: "The smart policing is trustworthy", and "The smart policing is competent".

5.4.4 ATTITUDES

The measurement of users' attitudes was adapted from Bhattacharjee (2000), Hsu et al. (2006), Wu and Chen (2005) and Taylor and Todd (1995). Three items were used to measure the attitudes of users based on the experience of using smart policing and to help them to identify directly their level of satisfaction based on the service quality experienced. The items include: "The smart policing provides pleasant experience", and "The smart policing is convenience".

Table 10 outlines the service quality scales that have been identified as suitable to be adapted from the literature. Table 11 presents the organisation of the instrument sections.

Table 10.

Scale adaptation for smart policing service quality and outcome constructs

Constructs	Definitions	Scale adaptation
Transparency	The open flow of information, including the information's easy access to the general public and the clarity about government rules, regulations and decisions	Kim and Kim (2016), Sá <i>et al.</i> (2016), and Prasad and Sharma (2015)
Integrity	Users' concern with honesty, justice, fairness and trustworthiness and security as being concerned with the feeling of safety and the maintenance of confidentiality	Bauer <i>et al.</i> (2006), Chen <i>et al.</i> (2017), and Lee and Lin (2005)

Constructs	Definitions	Scale adaptation
	of information	
Interactivity	The ability of a provider to respond to a user's demand that consequently offer social benefits derived from informational interaction with others via smart technology devices.	Loiacono <i>et al.</i> (2002), and Srinivasan <i>et al.</i> (2002)
Responsivity	Perceived experience from input-output gained of smart technology devices	Aladwani and Palvia (2002), and Yang <i>et al.</i> (2014)
Serviceability	A composite of the perceived usefulness and ease of use of content and function by the users of smart technology devices.	Cox and Dale (2001), and Parasuraman <i>et al.</i> (2005)
Trust	Users of technology are willing to depend on its system functions as the users believe the technology has the desirable attributes to protect their concerns.	Bhattacharjee (2002), and Chouk and Perrien (2005)
Attitude	The sum of feelings that being affected by a specific situation by using application-related activities.	Bhattacharjee (2000), Hsu <i>et al.</i> (2006), Wu and Chen (2005) and Taylor and Todd (1995)
Satisfaction	Users' affect with (or feelings about) prior smart policing services' use.	Cronin <i>et al.</i> (2000), Liang and Chen (2009), and Vatanasombut <i>et al.</i> (2008)

Table 11.

Organisation of Survey Instrument Sections

Section	Subsection	No. of Items
Demographics	Gender	
	Age	
	Education	
	Experience using smart policing apps	
Smart Policing Service Quality	Integrity	5
	Transparency	3
	Interactivity	5
	Responsivity	5
	Serviceability	5
Relationship Quality	Attitudes	3
	Trust	3
	Satisfaction	5

5.5 DATA ANALYSIS TECHNIQUE

The data were analysed using the Statistical Package for Social Sciences (SPSS) version 18.0 (SPSS Inc., 2009). Structural equation modelling (SEM) used AMOS version 23.0 (Arbuckle, 2003). SPSS was used for the pilot study and SEM served to test the measurement and structural models. Descriptive and frequency analyses were used for the demographic and other general characteristics of respondents. SEM was used for the simultaneous estimation of multiple equations in examining the hypothesised model (Hair et al., 2010).

There are two approaches to applying SEM: covariance-based structural equation modelling (CB-SEM) approach and partial least squares structural equation modelling (PLS-SEM). Table 12 compares the criteria of using each approach.

Table 12.

Parameters of using PLS-SEM or CB-SE

Criterion		PLS-SEM	CB-SEM
Path variances		Estimated	Estimated
Indicator weights		Estimated	Not applicable
Indicator loadings		Estimated	Estimated
Indicator error variances		Often standardised to unity	Often standardised to unity
Indicator error covariances		Assumed to be zero	Can be estimated or prespecified
Exogenous construct correlations		Estimated	Can be estimated, or prespecified
Sample size		Range from 30 to 100 cases	A minimal number of observation ranges from 20 to 800.
Model complexity		Large	Small to moderate
Approach		Variance based	Covariance based

The CB-SEM approach uses a mathematical model to describe the covariance matrix of a set of observed variables from a smaller set of underlying factors, but it can be extended to include the analysis of other types of structures (e.g., means, random coefficients). The mathematical model is generally represented as a set of matrix operations used to solve a system of linear equations, and a robust statistical software (e.g., AMOS and LISREL). SEM facilitates the specification of latent variable models that address the effects of clustering and include measurement errors both within and between groups. The first SEM submodel, referred to as the measurement model, is used to define a small number of underlying (or latent) constructs through measuring their observed indicators. The measurement model corrects the constructs for errors in their observed measures and is therefore important in establishing the reliability and validity of variables used in organisational analysis. Correcting for measurement error facilitates more accurate estimation of the model's structural parameters. For multilevel modelling, this latter point is especially important because most previous multilevel regression research on organizations assumes that predictors at all levels of a data hierarchy are measured without error (Heck & Thomas, 2015).

5.5.1 PILOT TESTING

Focus group discussion was conducted to stimulate the dynamic conversation leading to discovery, exploration, direction and depth about the topics discussed (Alsaadi et al., 2018). Arguments have been raised by

scholars that focus group discussions bridge the gap between the initial perception of interviewees and their final reports of what they have seen on the topics (Xu & Zhang, 2019). In addition, research suggested that focus group discussions are a distinctive, independent source of qualitative data that supplements the quantitative data collection strategies (Janstrup et al., 2017). As a result, it is resourceful and useful in various domains of exploration.

The preceding discussions of the three sources of smart policing service quality have been conducted- firstly, a focus group discussion was conducted to recollect their personal experiences with regard to the use of smart policing services. Their responses were recorded and summarised to obtain more details and the underlying dimensions of service quality of smart policing. Secondly, the validity of the inquiry from the focus group discussion was investigated. This study generated the initial item pool from the work of dimensional consolidation of smart policing service quality. To assure content validity, a preliminary pre-test was conducted so that the candidate items that do not appropriately correspond to the construct definitions they are intended to measure can be eliminated. Thirdly, scale refinement was conducted to eliminate bias toward certain dimensions in terms of the service quality in the smart policing context. Fourthly, a comprehensive scale validation was conducted to assess the measurement model as well as to verify the construct reliability and validity of the process safety scale. The assessment of psychometric properties of dimensions led to the testing of the proposed factor structure of smart policing service quality. This assessment involved with an examination of whether the dimensions can be seen as proper indicators of the

overall service quality of smart policing. This study adopted the same instrument to replicate our findings with new samples in an attempt to mitigate error resulting from capitalisation of chance- this is to ensure robustness and generalisation.

The online questionnaire was subjected to a pilot test based on convenient samples to ensure that the question content, wording, sequence, format and layout, question difficulty and instructions were appropriate (Hilton, 2017). The pilot test aims to check its validity and reliability prior to the main study. Connelly (2008) suggested that pilot test study samples should be 10 per cent of the sample projected for the main study but other authors have argued that the sample required for a pilot study does not even have to be a proportion of the main study sample (Albers & Lakens, 2018; Lane & Hennes, 2018). It is, however, not a straightforward issue to resolve the pilot sample size (Anderson et al., 2017). Hertzog (2008) argued that multiple factors were relevant, including the type of study. Overall, there have been suggestions that an appropriate pilot study sample size can range from 10 to 30 (Hill, 1998; Julious, 2005; Issac & Michael, 1995). In this study, a pilot test was used to pinpoint and eradicate potential problems and weaknesses in the initial questionnaire. Finally, using the collated feedback from the pre-test, the study made context-specific adjustments to finalise the main version of the questionnaire (Appendix A: English Questionnaire and Appendix B: Arabic Questionnaire).

Confirmatory factor analysis (CFA) was used for the measurement model, with convergent and discriminant validity. Convergent validity

specifies the set of items that measure a construct (Kline, 2015), other than testing the dimensionality of items as a representation of a common, latent construct (Ziegler & Hagemann, 2015) that explains a proportion of variance in the latent variables (Wang, French, & Clay, 2015). Discriminant validity specifies the extent to which a construct is truly distinct from other constructs (Byrne, 2010). It, therefore, indicates a much lower proportion of variance from other latent variables (Wang et al., 2015). This analysis is important for the identification of the critical dimensions that would compromise the structure and criterion variables in subsequent analyses. It also enables the understanding of the structure of the variables and determination of correlations among them (Field, 2013). This approach helps to evaluate the construct's validity and reliability to ensure that it can be replicated for studies in the same field (Brandt et al., 2014; Cohen et al., 2007; Maniadis et al., 2017).

5.5.2 DATA EXAMINATION AND PREPARATION

The online survey responses were checked and edited. The process of editing helps to detect errors and omissions and therefore achieve a minimum standard of data quality (Cooper & Schindler, 2008). Incomplete responses were identified, withdrawn and not analyzed. Non-response bias may lead to the omission of meaningful data. Yüksel (2017) explained that non-response bias must be treated carefully to ensure the result can be completely validated and higher variances for the estimates are mitigated.

5.5.3 MODEL SPECIFICATION

One main component of SEM is a measurement model illustrating the relationship between the latent variables and their indicators. Hagel (2014) suggested that a psychometric theory required unidimensionality, and Ziegler and Hagemann (2015) posited that this technique is similar to the testing of the dimensionality of items. To determine which scale items should represent a common, latent construct, CFA was adopted. First-order and second-order model specifications were measured to differentiate between the original variables by extracting factors (Russell, 2002) to take into account factor inter-correlations. This reduces the number of items and builds latent constructs from fewer factors. This analysis is important to identify critical dimensions that could compromise the structure and criterion variables in the analyses that follow.

5.5.4 CONVERGENT VALIDITY

Testing the instrument ensures that the convergent validity of the construct is acceptable, and to test for the model fit. Validity tests were carried out for the first order, second-order and third-order models for the examination of the instrument (Cooper & Schindler, 2008). Validity describes the degree to which an instrument actually measures the conceptual and operational definitions (Guion, 1980). Cooper and Schindler (2008) argued that the measurement tool should be sensitive to the changing situations and times, to

ensure a meaningful measurement. Kline (2015) described convergent validity as assessing the set of items presumed to measure a construct.

According to Fornell and Larcker (1981), the convergent validity of the order constructs must be validated using the average variance extracted (AVE). This measures the amount of variance captured by a construct related to the amount of variance from measurement error. Convergent validity is established on the construct level when the AVEs of latent constructs are higher than 0.50 (AVEs > 0.50). Hair et al. (2010) added that factor loading should also be considered to establish convergent validity at the construct level. Higher factor loadings or factor loadings higher than 0.50 ($\lambda > 0.50$) indicate high convergent validity.

5.5.5 TESTS FOR MODEL FIT

The measurement adequacy of the first order, second-order, and third-order models was further measured and verified through a model fit assessment. It is advisable to consider several fit indices to assess the model fit additional to the chi-square (χ^2) index and degree of freedom (df) (Bollen, 1990; Miles & Shevlin, 2007). At least four common fit indices are deemed sufficient to test the structural equation models (Byrne, 2010; Hooper et al., 2008).

The standardised root mean square residual (SRMR), root mean square error of approximation (RMSEA), comparative fit index (CFI), and the Tucker Lewis Index (TLI) are commonly used fit indexes reported when describing

the fit of structural equation models (Byrne, 2010; Kline, 2015), with the RMSEA, SRMR, and CFI being among the most widely reported in the SEM literature (Kline, 2015). In this study, relative χ^2 (χ^2/df), CFI, TLI, RMSEA and SRMR were chosen instead of χ^2 and GFI, because they are less sensitive to sample size (Bollen, 1990; Kline, 2010; Miles & Shevlin, 2007). This approach is a basic task in SEM modelling that forms the basis for accepting one model over another. Table 13 shows the model fit indices for the study and the acceptable thresholds.

5.5.5.1 MODEL OF CHI-SQUARE (χ^2) AND RELATIVE χ^2 (χ^2/df)

χ^2 is the fundamental measure used in SEM to quantify the differences between the observed and estimated covariance matrices (Hair et al., 2010). According to Hu and Bentler (1999), χ^2 value is the conventional measure to assess the incongruity between the sample and fitted covariance matrices. The probability value associated with χ^2 indicates the likelihood of obtaining a χ^2 value that exceeds the χ^2 value when the null hypothesis is true (Byrne, 2010). The higher the probability associated with χ^2 , therefore, the closer the fit with the hypothesised model (under the null hypothesis). An insignificant threshold of 0.05 indicates a good model fit or known either “badness of fit” (Kline, 2015) or “lack of fit” measure (Mulaik et al., 1989) only if the reported sample size is between 100 and 200 (Tabachnick & Fidell, 2007) with a cut-off value of less than 5.0 (Tabachnick & Fidell, 2007) or less than 3.0 (Kline, 2015).

Bentler and Bonnet (1980) explained that χ^2 is sensitive to sample sizes and it tends to reject the model if very small or very large samples are used

(Kenny & McCoach, 2003). Relative χ^2 (χ^2/df), also known as normed χ^2 , mitigates the impact of sample size on the model (Wheaton, Muthen, Alwin & Summers, 1977). The measures of the amount of mathematical information available to estimate the model parameters are calculated based on the number of unique covariances and variances in the observed covariance matrix (Hair et al., 2010). The criterion for acceptance value for this statistic varies, with a range from less than 2.0 (Tabachnick & Fidell, 2007, Ullman, 2001) through less than 3.0 (Kline, 2015) to less than 5.0 (Bentler, 1990; Marsh et al., 2004; Schumacker & Lomax, 2004; Wheaton et al., 1977) for sample sizes of more than 200 (Bentler, 1990; Marsh et al., 2004).

5.5.5.2 COMPARATIVE FIT INDEX

The comparative fit index (CFI) is a revised version of the NFI (Byrne, 2010) and this was the brainchild of Bentler (1990). CFI addresses the tendency to underestimate fit with smaller samples (Bentler, 1990; Tabachnick & Fidell, 2007). Tabachnick and Fidell (2007) argued that CFI is a common index used in SEM programs and has gained popularity because it is less susceptible to sample sizes (Fan et al., 1999). Bentler (1990) suggested that CFI should be the index of choice for AMOS reporting. The assumption made is that all variables are uncorrelated and they compare the fit of a target model to the fit of an independent model (Bentler, 1990; Kline, 2015). CFI with a value of more than 0.90 is commonly considered to represent a well-fitting model (Bentler, 1990; Hatcher, 1994), although Forza and Filippini (1998) suggested that a CFI value greater than 0.80 was sufficient. However, Hu and

Bentler (1999) noted that a CFI value close to 0.95 was superior because it implies a better fit.

5.5.5.3 TUCKER–LEWIS INDEX (TLI)

The TLI is an incremental fit index, also known as the Non-Normed Fit Index (NNFI). Its purpose is to address the disadvantages of the Normed Fit Index (NFI) (Anderson & Gerbing, 1988). A bigger TLI value indicates a better fit for the model. Values as low as 0.80 (Bentler, 1990; Hair et al., 2010) and larger than 0.95 are interpreted as a satisfactory fit (Hu & Bentler, 1999; Tabachnick & Fidell, 2007), but 0.90 is accepted as the cut-off value in many studies (Byrne, 2010). The key advantage of this fit index is that it is not significantly affected by the sample size (Byrne, 2010; Hu & Bentler, 1999).

5.5.5.4 ROOT MEAN SQUARE ERROR OF APPROXIMATION (RMSEA)

RMSEA measures the error of approximation in the population and is recognised as an important criterion in the covariance structure modelling (Byrne, 2010). Browne and Cudeck (1993) explained that RMSEA is crucial in determining how best to fit population covariance into models with unknown parameter values. RMSEA values range from zero to 1.00. Byrne (2010), MacCallum *et al.* (1996), and Steiger (1998) recommended that the threshold value for RMSEA should be less than 0.08. Browne and Cudeck (1993), and Hu and Bentler (1999), put forth an argument that values of less than 0.05 and 0.06 indicated a good fit. This study concurred with Byrne

(2010), MacCallum *et al.* (1996), and Steiger (1998) that values of less than 0.08 seemed more realistic than the exact fit of less than 0.06.

5.5.5.5 STANDARDISED ROOT MEAN SQUARE RESIDUAL (SRMR)

The SRMR is a measure of the mean absolute correlation residual, with smaller values which suggest good model fit (Kline, 2015). The SRMR is an absolute measure of fit and is defined as the standardised difference between the observed correlation and the predicted correlation. It is a positively biased measure and that bias is greater for small N and for low df studies. As the SRMR is an absolute measure of fit, a value of zero indicates a perfect fit. The SRMR has no penalty for model complexity. Other scholars proposed that values for the SRMR ranging from zero to 1.0 with well-fitting models obtained values less than 0.05 (Byrne, 2010; Diamantopoulos & Siguaw, 2000). However, a value less than 0.08 would be deemed a good fit (Hooper *et al.*, 2008; Hu & Bentler, 1999).

Table 13.

Summary of the observed model fit indices and acceptable threshold value for this study

Fit Indices	Recommended Threshold Value	Sources
χ^2 (reported if sample size between 100 and 200)	< 0.50 < 0.30	Tabachnick and Fidell (2007), Ullman (2001), Kline (2005)
Relative χ^2 (χ^2 /d.f) (reported if sample size	< 2.0	Tabachnick and Fidell (2007), Ullman (2001),

more than 200)	< 3.0	Kline (2005),
	< 5.0	Bentler (1990),
		Marsh <i>et al.</i> (2004),
		Schumacker and Lomax (2004),
		Wheaton <i>et al.</i> (1977)
Comparative Fit Index	> 0.80	Forza and Filippini (1998),
(CFI)	> 0.90	Bentler (1990),
	> 0.90	Hatcher (1994),
	> 0.95	Hu and Bentler (1999)
Tucker–Lewis Index	> 0.80	Bentler (1990),
(TLI)	> 0.80	Hair <i>et al.</i> (2010),
	> 0.90	Byrne (2010),
	> 0.95	Hu and Bentler (1999),
	> 0.95	Tabachnick and Fidell (2007)
Root Mean Square	< 0.08	Byrne (2010),
Error of Approximation	< 0.08	MacCallum <i>et al.</i> (1996),
(RMSEA)	< 0.08	Steiger (1998),
	< 0.06	Hu and Bentler (1999),
	< 0.05	Browne and Cudeck (1993)
Standardised Root	< 0.05	Byrne (2010),
Mean Square Residual	< 0.05	Diamantopoulos and Siguaw
(SRMR)	< 0.08	(2000),
	< 0.08	Hooper <i>et al.</i> (2008),
		Hu and Bentler (1999)

5.6 DISCRIMINANT VALIDITY

Discriminant validity in the measurement model tests the relationships between latent variables. Studies (Hagel, 2014; Ziegler & Hagemann, 2015) have suggested that a construct should be measured for unidimensionality

before a series of model tests for multidimensionality can be conducted. The unidimensionality of a construct is crucial because the nomological items should be defined and interpreted before results can be obtained and ideally replicated for the structural model. It also enables the understanding of the structure of the variables and the determination of the correlations among them (Field, 2013). In this model and dataset, therefore, the dimensions were tested for associations with each other. The validity test was conducted for all constructs in this study. CFA was employed to test the validity of the instrument or the extent to which a construct is truly distinct from another. Fornell and Larcker (1981) argued that AVEs of two latent variables or manifest variables must be greater than the square of their correlations (r^2) to ensure that the discriminant validity is sufficient.

5.7 TEST OF NORMALITY AND OUTLIERS

Kurtosis and skew are the two tools of assessment of normality (Hair et al., 2010). Arbuckle (2003) explained that the critical assumption made in SEM analyses of AMOS, in particular, is that data must be multivariate normal. Kurtosis describes the “peakness” or “flatness” of the distribution compared with a normal distribution, and skew describes the balance of the distribution. If a distribution is unbalanced, it is skewed. A distribution shifted to the left has a positive skew, and a shift to the right is a negative skew. Kurtosis and skewness values of ± 1 are acceptable normality (Marcoulides & Hershberger, 1997) and could be assumed at a 0.05 significance level with a z-statistic value less than 5.0 (Bentler & Satorra, 2010). This study used SEM-

AMOS and kurtosis values of ± 7 (Byrne, 2010) and skew values of ± 2 (Gravetter & Wallnau, 2014) were considered normal at the 0.05 significance level. This is consistent with Bentler and Satorra (2010), suggesting that these values, with a z-statistic of critical ratio (C.R) of 3.476 were highly suggestive of the normality in the sample.

5.8 STRUCTURAL MODEL

There is a growing use of SEM in social science research and it has become a dominant multivariate technique (Hair et al., 2010). Confirmatory modelling strategy, competing modelling strategy, and model development strategy are often used to estimate a complex set of relationships. This study used SEM to examine the causality between the variables outlined in the research framework. SEM was therefore considered appropriate for this study as it provides the estimates of the strength of all hypothesised relationships between variables in the theoretical model (Byrne, 2010; Schreiber et al., 2006; Tomarken & Waller, 2005). This allows researchers to establish and develop more sophisticated theories (Williams et al., 2004).

A confirmatory modelling strategy was applied to the hypothesised model. Kline (2015) stated that within a confirmatory modelling strategy, the researcher specifies a model and SEM is used to determine whether the model fits the data. Byrne (2010) and Hair *et al.* (2010) explained that a good fit of the data does not mean that the proposed model is proven but that it is confirmed as one of the several possible acceptable models.

To ensure the SEM procedures were performed appropriately, Byrne (2010) provided three fundamental levels of analyses for SEM with AMOS. For this study, the comprehensive “six stages in structural equation modelling” proposed by Hair *et al.* (2010) were applied to test both the measurement theory (how the constructs are represented) and the structural theory (how the constructs relate to each other).

5.9 DATA ANALYSIS TECHNIQUE FOR THIS STUDY

This study conducted the exploratory factor analysis with the pilot data to determine the dimensionality, reliability and validity of the service quality instrument. Through exploratory findings, the study confirms smart policing service quality as a multidimensional, hierarchical model with five primary dimensions (i.e., transparency, integrity, interactivity, responsiveness, serviceability). The study also conducted the exploratory factor analysis with the pilot data on three outcome constructs (i.e., attitude, trust and satisfaction). It is noteworthy that the outcome constructs have been adapted from past literature, thus factor analysis at this stage re-confirms their dimensionality structure, reliability and validity.

In this study, the proposed smart policing service quality comes in a hierarchical model. Hierarchical constructs or multidimensional constructs are defined as constructs with more than one dimension where each dimension captures some portion of the overall latent variable (Irimata & Wilson, 2018; Podsakoff *et al.*, 2012; Zheng & Sayed, 2019). Hierarchical modelling has both theoretical and practical implications (Zheng *et al.*, 2019). In theory,

hierarchical modelling shows that users aggregate their evaluation of sub-dimensions to form primary dimensions, subsequently leading to an overall perception of a particular construct. The hierarchical modelling has empirically proven to be successful in increasing theoretical parsimony and reducing model complexity (Podsakoff et al., 2012; Zheng & Sayed, 2019). Due to the multidimensional nature of higher-order constructs, they are entirely different from unidimensional constructs which have a single underlying dimension (Bearden et al., 1993). Since theoretical models require specific dimensions of a construct to be captured, the hierarchical modelling can be used to capture specific facets of a construct. Indeed, a hierarchical structure can better capture the complexity of human perceptions (Phillips et al., 2018). As such, it is defined as measure-specific modelling which allows the matching of specific independent and dependent variables (Milfont & Fischer, 2010). In matching the level of abstraction, hierarchical modelling has also proven to be beneficial in service quality studies (Akter et al., 2019; Koku, 2019; Mustelier-Puig et al., 2018; Wu et al., 2018; Tanouri et al., 2019).

5.10 CHAPTER SUMMARY

The core objective of this chapter is to link the nature of the conceptual model with the research paradigm to establish robustness in research design. The study has shed light on the nature of the research, explaining and predicting the research method, the data collection strategies, and the data analysis technique using SEM. This chapter also gives an understanding on how the output is generated through SEM analyses to enable instrument

development, validation and adaptation techniques for the study. The results from this chapter are discussed further, as a basic foundation for the following chapters.

CHAPTER 6

DATA ANALYSIS AND RESULTS

6.1 INTRODUCTION

This chapter views the objective of developing and validating an instrument to measure service quality in smart policing. As the smart policing implementation is still a novelty, reliable and valid instruments to adequately capture the dimensions of smart policing service quality have been scarce. A summary of the literature on police service quality evaluation (Table 6) shows that to the best of the researcher's knowledge there has yet to be a study which has attempted to develop and validate a smart policing service quality scale. Moreover, poor theoretical development, the inadequate conceptualisation of constructs and a lack of valid operationalisation of measures have intensified the pursuit of the scale development process in this context.

In addition, prior service quality scales were not specifically designed for use in smart policing settings and it may not be suitable in this case because the service quality is a dynamic, multidimensional concept (Akter et al., 2019; Chen et al., 2017; Parasuraman *et al.* 2005) for which

evaluations have to be context-dependent (Dagger *et al.* 2007). Thus, the key objective of this chapter is to develop and validate a multidimensional service quality scale in smart policing.

Next, this chapter specifies the data analysis technique of the study in estimating the research model. The study adopted the SEM AMOS path modelling for estimating the hierarchical-order model, reflective, smart policing service quality model. The chapter explains that SEM AMOS helps obtain more theoretical parsimony and less model complexity when it comes to estimating a higher-order model. Thus, SEM AMOS is used to demonstrate the rigour of data analysis technique in the estimation of the research model.

6.2 SAMPLE PROFILE

A total of 631 surveys were completed in this research work. From that number, 110 surveys were completed for the pilot (or exploratory) study in July 2018 and 290 surveys were completed for the main (or confirmatory) study in December 2018. The response rate for the pilot study was 60 per cent (120 received and completed out of the 200 surveys distributed) and the response rate for the main study was 68 per cent (543 received and completed out of the 800 surveys distributed). This study met the minimum threshold of 30 per cent by Frohlich (2002), which is consistent to measure the effects and generalising results retrieved from a population.

Of the pilot study, ten surveys were excluded and from the main study, 22 surveys were excluded because of the excessive missing data, and response biases. Finally, 110 surveys were analysed for the pilot (exploratory) study

and 521 surveys were analysed for the main (confirmatory) study. The demographic profile of the respondents both in the exploratory and confirmatory study demonstrated a diverse cross-section of the population, as can be referred to in Table 14.

Table 14.

Demographic profile of respondents

Items	Categories	Total	Percentage
Gender	Male	328	52
	Female	303	48
Age	18 - 35	478	76
	36 - 49	131	21
	50 and above	22	3
Nationality	Emirati	459	73
	Non-Emirati	172	27
Income (per month in AED)	Less than 5,000	5	2
	5,001 – 20,000	97	15
	20,001 – 50,000	488	77
	50,001 and above	41	6
Location	Abu Dhabi	352	56
	Dubai	279	44
Occupation sector	Public sector	311	49
	Private sector	293	46
	Non-government organisation	27	5
Frequency of use of smart policing service (yearly)	Once	147	23

2 - 5	231	37
6 - 10	120	19
11 and more	133	21

Fifty-two per cent of the respondents were males and 76 per cent aged between 18 and 35 years. Twent-one per cent aged between 36 and 49 years, and the remaining 3 per cent were older than 50 years. The majority of the respondents (77%) reported a monthly income between AED20,001 and AED50,000. A total of 56 per cent of respondents were from the capital of UAE, Abu Dhabi, whereas 44 per cent were from Dubai. From the total number of respondents, 49 per cent were involved in the public sector, 46 per cent were involved in the private sector and the remaining of 5 per cent were involved in non-government organisations (NGOs). The demographic analysis also indicated that 37 per cent of respondents used this service between two and five times a year, whereas 21 per cent used this service for eleven or more times a year.

6.3 INSTRUMENT DEVELOPMENT PROCESS

For the development of an instrument to measure smart policing service quality, the first step is to investigate the dimensions and subdimensions that influence service quality in smart policing as established in the literature. The investigation enabled the study to identify five primary dimensions that reflect users' perception of overall service quality in smart policing. The five dimensions are defined earlier in Section 1.6.

In the conceptual exploration, service quality in smart policing was identified as a higher-order model, multidimensional construct with five primary dimensions. Thus, it is anticipated that the findings of the qualitative study would support the initially conceptualised components through formal instrument development procedures. Consequently, the study conducted the following qualitative study to examine the dimensions of the smart policing service quality model to confirm its contextual appropriateness. Table 15 presents the literature related to police service quality.

Table 15.

Literature related to police service quality

Study	Year	Sample	Subject area
Janstrup et al.	2017	Workers from transport authorities in Denmark	Police service quality for handling traffic crash reporting
Singh	2016	Royal Police of Malaysia	Internal Service Quality on Job Performance of Royal Police Department
Bouranta et al.	2015	Citizen and police officers in Greece	The police officer and citizen satisfaction
Chen et al.	2014	Police staff and citizens in China	Perceptions and satisfaction between police staff and citizens
Sarrico et al.	2013	Police traffic officers in Portugal	service quality in police traffic services
Maguire & Johnson	2010	Residents in a suburban Virginia,	Public perceptions of police service quality in

		USA	a one-dimensional construct
Donnelly et al.	2006	Customer and police officers in Scotland	the quality of police services using SERVQUAL
Drummond et al.	2000	New York Police Department	Community policing and enhanced service quality
Ganjavi et al.	2000	Residents of Ontario, Canada	Night walking safety and overall satisfaction with police services
Dietz	1997	Residents of Austin, Texas	Community policing quality police service

6.3.1 QUALITATIVE STUDY

This study defines smart policing services as a personalised and interactive police service over smart technology platforms, and this offers ubiquitous and universal access to police services and information to users in order to create quality and excellence services transactions in a resident-policing relationship. To date, more than 9.4 million people in the UAE have access to smart policing services provided by MOI where users can access this service any time anywhere 24/7 using the smart technology platforms.

The study obtained qualitative data from two focus group discussions (FGD) and five in-depth interviews (DI) (Chawla & Joshi, 2019; Chen et al., 2017; Le et al., 2020) with smart policing service users in the UAE. A total of twelve participants, six per focus group, were involved in three focus group

sessions. Screening criteria were used to select respondents for FGDs and DIs. They had to be at least 18 years of age and had used smart policing services and experienced the services in the past 12 months. Participants aged from 18 to 52 years and both genders had equal participation. Each FGD session was conducted by two moderators and lasted for about sixty minutes. Also, five DIs were conducted to explore users' insights on the research agenda. In both focus group discussion and in-depth interviews, the moderators were selected based on their English and Arabic proficiency. Participants were recruited using *convenient* sampling to ensure that there will be productive findings and the richest data for scale development (Chen et al., 2017). The study followed a procedure to arrange the FGDs and DIs.

1. Potential participants who met the screening criteria were provided with an invitation letter from the university, containing the phone number for respondents to call and check that the study was authentic. The academic purpose of the study was explained in the letter with adequate assurance of anonymity and the freedom to not answer particular questions or to withdraw opinions from the discussion at any stage.
2. Potential respondents were contacted via email and mobile phone after one week to arrange and confirm the schedule for both the FGD and DI sessions.
3. Each participant was provided with an email confirming the date, time and venue of the FGD and DI session.

4. Finally, a reminder was sent to each participant a day in advance, via email concerning the FGD and DI sessions.

The respondents were asked the following questions in the English and Arabic in each session, to evaluate their smart policing services experiences and to identify the service quality dimensions. The study translated the following discussion questions into Arabic and retranslated them into English, until a panel of experts, fluent both in English and Arabic, confirmed that the two versions were reasonably comparable (Behr, 2017; Brislin, 1970). The following are the questions used for the aforementioned FGD and DI sessions.

1. In your opinion, what makes smart policing different from e-government and mobile government services?
2. What are the primary dimensions of service quality of this police service?
3. What technical level of communication is important to you?
4. How do you evaluate your interpersonal interaction with the police officer/s over this platform?
5. What benefits do you primarily seek from this police service?
6. Any positive or negative experience that you have had while using this service?

The answers of both FDs and DIs were recorded, synthesised and sorted into different themes using qualitative content analysis (QCA). The analysis sought to identify the dimensions of the smart policing service quality. The QCA process was undertaken independently and its results were combined for

refinement and finalisation processes. According to the procedures of the regular QCA approach as described by Hsieh and Shannon (2005), the process was initiated by reading all responses thoroughly so that a holistic sense of the data can be obtained. Then, each response was read through, preliminary observations documented, and keywords that were to be subjected to coding were underlined. It produced an initial set of codes in which each statement was deciphered into a suitable coding scheme. Should a statement fail to fit into the preliminary coding scheme, it will be left uncoded and was to be re-examined at the end of the analysis. The next process required that each independent analysis was to be assessed, following statement codings to identify any divergence or overlapping content. Specifically, the independent analysis was deemed as predominantly overlapping, whereas all areas displaying divergence were subjected to a discourse until a consensus was reached. The process of attaining the consensus consisted of making edits, which included categorical combinations and sub-category creation, explained by the fact that substantial discrepancies were lacking in the independent analysis.

The findings of the qualitative study frequently identified service quality as a multidimensional and hierarchical concept that entails users' judgment of excellence or superiority of an entity. Users expressed their opinion on different service-level attributes (e.g., "I can access smart policing platform whenever I want" or, "The physician shows sincere interest to solve my problems," or, "It is worthwhile having information services from this platform") under varying dimensions. Throughout this process, the study

found support for five dimensions (i.e., transparency, integrity, interactivity, responsiveness and serviceability), which were proposed in the conceptual model. QCA established that the qualitative findings supported the smart policing service quality model (Figure 5. Research model) proposed in Chapter 4. Table 16 tabulates the comments that were gathered from FGs and DIs.

Table 16.

Summary of qualitative findings

Category	Example of statements	Percentage
Transparency	... updates the progress of the process in a clear manner.	70
	... services act fairly by providing clear and sufficient information.	
	... consistent and trustworthy of the services are superb.	
Integrity	... feel secure while interacting and making transactions.	60
	... always use these services because we know that we are safe and secured.	
	... relying a lot on this service because very accurate about their services and information.	
Interactivity	... very important because it serves as a front-line service for public security and every time, I have experienced the service without any disruptions and the services was very fast and smooth. ... hassle-free and very fast services are	

	very important for working mom like me.	
	... relying a lot on this service as we do not need to go through face to face dealing anymore due to time-constraint	
Responsivity	... identification that allows easy identification of the services provided.	90
	... the current services are more dependable because it responds very fast.	
	... we love a faster service that fits our busy life.	
Serviceability	... travels at least 5 days a week. Therefore, if I face any issue, I quickly use the service because it is very helpful and reliable	85
	... this service provides a live customer support anytime-anywhere, the smartest way to satisfy everybody.	
	... the services are satisfying because it allows for multiple access using smart platforms.	

6.3.2 SCALE DEVELOPMENT

To develop scales for the dimensions of smart policing service quality (i.e., transparency, integrity, interactivity, responsivity and serviceability), items creation and items sorting needed to be undertaken. The objective of items creation was to ensure content validity by choosing the right items for

the construct and yet the objective of items sorting was to guarantee the construct validity by determining the convergence and divergence of items in a sorting process.

6.3.2.1 ITEMS CREATION

Items were identified from existing instruments and the additional items were created via the exploratory interviews; and finally, qualitative findings were matched with existing scales so that the construct definitions established by an analyst with both English and Arabic proficiency, are compatible (Chen et al., 2017; Le et al., 2020) by. In order to develop transparency scales, the study adapted items from service quality studies and police services literature (e.g., Kim & Kim, 2016; Sá et al., 2016; Prasad & Sharma, 2015). For the purpose of integrity, the study adapted items from generic service quality models and police services literature (Bauer et al., 2006; Chen et al., 2017; Lee & Lin, 2005). For interactivity, the study adapted items from electronic service quality literature (Loiacono et al., 2002; Srinivasan et al., 2002), whereas for responsiveness, items were also adapted from electronic service quality literature (Aladwani & Palvia, 2002; Yang et al., 2014). Finally, serviceability items were from both electronic and traditional service quality studies (Cox & Dale, 2001; Parasuraman et al., 2005). The study confirms that the items are manifestations of the focal construct which exists at a higher embedded level separately (MacKenzie, Podsakoff, & Podsakoff, 2011). This is due to the reflective nature within the conceptual model. After a rigorous reevaluation of the existing items, items' pools were created for five

dimensions suitable for the current study. Those items that seemed redundant or confusing were removed.

6.3.2.2 ITEMS SORTING

This phase aims to assess the construct validity by ensuring domain coverage and reliability of items for each construct. The domain coverage was evaluated to ensure that each item was constructed under the service quality dimensions. This validation technique also indicated the degree of correct placement of items within different categories of constructs, giving adequate evidence of construct validity by ensuring items' convergence and divergence. A language panel of a user, student and professor, each proficient in English and Arabic had worked in two different sorting rounds to ensure that a range of perceptions would be included in the analysis (Chen et al., 2017). Based on the overall findings, the study had to reduce the items for the various scales to at least three for each scale. The selection process resulted in the following number of items for each construct, yielding a total of 33 items. Table 17 tabulates the items developed for the service quality constructs.

Table 17.

Items developed for service quality constructs

Dimensions	Codes	Items
Integrity	IG1	performs as promised
	IG2	content is reliable
	IG3	content is fulfilled
	IG4	truthful about its offerings

Transparency	IG5	provides personal data protection
	T1	performance is constantly updated
	T2	transparently disclosing the negative testimonials
	T3	discloses sufficient information
Responsivity	T4	provides the contact details of the person-in-charge
	R1	enables quick completion of a transaction
	R2	is fast
	R3	simple to use
	R4	makes it easy to find what I need
	R5	easy to navigate
	R6	well organised
	R7	high performing
Interactivity	R8	is consistent
	I1	is appealing
	I2	has relevant content
	I3	adds the most value
	I4	adapts to user's needs
	I5	access to data and information from any location
	I6	captures real-time evidence
	I7	enables real-time communication
Serviceability	I8	allows real-time collaboration
	S1	compatible with smart technologies platform
	S2	provides helpful customer support
	S3	offers relevant testimonials
	S4	provides constantly new updates
	S5	does not crash
	S6	offers live chat for immediate customer service
	S7	provides reliable service
	S8	secures communications

6.4 INSTRUMENT TESTING

A procedure has been followed to conduct the instrument testing. Firstly, the primary version of the items in English was developed before these items were translated into Arabic (Brislin, 1970). Secondly, the local version was retranslated until a panel of experts proficient in both languages commented that the two versions were reasonably comparable (Behr, 2017; Brislin, 1970). Thirdly, the study conducted a pre-test of 15 convenient samples to ensure that the question content, wording, sequence, format and layout, question difficulty and instructions were appropriate (MacKenzie *et al.* 2011). Finally, upon the response from the pre-test, the study made context-specific adjustments to finalize the questionnaire's main version(see Appendix A: English Questionnaire and A: Arabic Questionnaire). For the exploratory study, a total of 110 responses were gathered in July 2018 for analysis having received the approval from the Institutional Review Board of Abu Dhabi University (Appendix C).

6.4.1 EXPLORATORY FACTOR ANALYSIS (EFA)

The study conducted exploratory factor analysis (EFA) using a principal component analysis (PCA)-based extraction method and varimax rotation procedure to assess the initial measurement scale (Hair et al., 2010). The study employed PCA for the extraction of variances because it is the most suitable technique that can help reduce a larger number of items under a few underlying latent dimensions (Sekaran & Bougie, 2010). It facilitates the

assessment of the construct validity by looking into the factor loadings which ensure that items were loaded on the right factor (Anderson & Gerbing, 1998). The objective of such factorial validity is to assess constructs independent of the nomological net. According to Hair et al. (2010), varimax as a rotation method is significant because it generates multiple factors and at the same time it maintains orthogonality. To add, PCA with varimax rotation procedure demonstrates the convergent and discriminant validity (Gerbing & Anderson (1992). Finally, the study employed eigenvalues greater than 1 to determine the number of factors: this is also known as latent root criterion (Hair et al., 2010). Thus, all factors with eigenvalues less than 1 are considered insignificant and are not taken into account when it comes to determining the number of factors.

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity were used to assess the appropriateness of factor analysis and it is found that KMO met the overall measure of sampling adequacy ($0.976 > 0.50$) (Sekaran & Bougie, 2010) and Bartlett's test of sphericity provided support for a significant correlation among the variables: chi-square (λ^2) = 21716.323, df = 528, $p = 0.000$ (Hair *et al.* 2010). All five factors have eigenvalues greater than 1 and the cumulative value of 76.197 per cent in explaining the total variance in data (Hair *et al.* 2010; Sekaran & Bougie, 2010). The EFA process found that ten items did not load properly on a particular factor (< 0.50) or had cross-loadings. Thus, these items were deleted, and the remaining 33 items retained.

Reliability analysis (i.e., Cronbach's alpha (α)) of the extracted nine factors were then conducted, which exceeded the cut-off value of 0.60 (Nunnally & Bernstein, 1994). Further scale refinement was conducted by examining the corrected item-total correlation to improve reliability. The minimum corrected-item-total correlation was 0.679, fulfilling the cut-off value of 0.40 (Ladhari, 2010). All the items were retained through this procedure. In sum, this study confirmed the operationalisation of a minimum of two valid items for a construct in the exploratory factor analysis (Morgado et al., 2017; Thornton et al., 2014). Table 18 views the results of the exploratory factor analysis of the refined scale.

Table 18. The retained and deleted items for service quality constructs.

Dimensions	Items	New Code	Loadings	Item total correlation	Eigenvalue	Cumulative variation	α
Integrity	IG1	IG1	0.890	0.824	4.051	81.029	0.940
	1G2	1G2	0.922	0.873			
	IG3	IG3	0.919	0.868			
	IG4	IG4	0.894	0.832			
	IG5	IG5	0.875	0.806			
Transparency	T1	TP1	0.901	0.773	2.406	80.191	0.876
	T2	TP2	0.911	0.790			
	T3	TP3	0.874	0.725			
Interactivity	I1	IT1	0.898	0.821	3.965	79.304	0.926
	I2	IT2	0.905	0.845			
	I3	IT3	0.908	0.840			
	I4	IT4	0.883	0.818			
	I6	IT5	0.859	0.712			
Responsivity	R4	RS1	0.887	0.821	3.973	79.456	0.935
	R5	RS2	0.905	0.847			

Dimensions	Items	New Code	Loadings	Item total correlation	Eigenvalue	Cumulative variation	α
Serviceability	R6	RS3	0.880	0.811	3.744	74.886	0.916
	R7	RS4	0.894	0.831			
	R8	RS5	0.890	0.825			
	S2	SV1	0.885	0.812			
	S3	SV2	0.906	0.843			
	S4	SV3	0.886	0.813			
	S5	SV4	0.860	0.776			
	S8	SV5	0.783	0.679			

A hierarchical-reflective construct model has adequately supported the conceptual logic, qualitative findings and factor structures in the pilot study to address the needs to specify the necessary domain of the construct of smart policing service quality (Morgado et al., 2017). The findings of the pilot study have confirmed that smart policing service quality is a higher-order, multidimensional construct. Because of the reflective nature of the items, the dimensions reflect the overall smart policing service quality. Figure 6 shows a hierarchical-reflective smart policing service quality model.

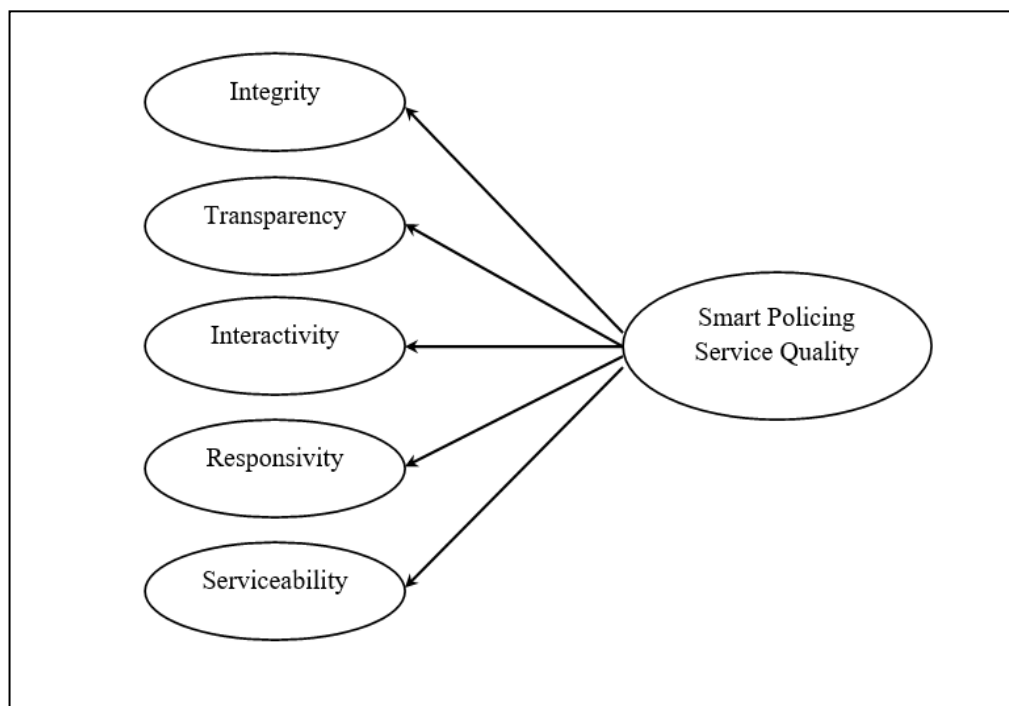


Figure 7. A hierarchical-reflective smart policing service quality model.

6.5 NATURE OF THE OUTCOME CONSTRUCTS

Research strongly suggests for a newly constructed model to be tested with the aid of several proven measures. This is consistent with Chen *et al.* (2017) and Delone and McLean (1992) that tested the newly constructed measurement model by examining the relationship with its theoretically related constructs. In line with this view, this study tests the relationship of smart policing service quality with trust, attitudes and satisfaction scales that serve as a reflective measure in previous works. This study adapted the scales of outcome constructs (i.e., trust, attitudes, and satisfaction)

from previous studies (Aladwani & Palvia, 2002; Bauer *et al.*, 2006; Chen *et al.*, 2017; Cox & Dale, 2001; Kim & Kim, 2016; Lee & Lin, 2005; Loiacono *et al.*, 2002; Sá *et al.*, 2016; Srinivasan *et al.*, 2002; Parasuraman *et al.*, 2005; Prasad & Sharma, 2015; Yang *et al.*, 2014). At this stage, the study conducted EFA using the varimax rotation with the pilot data ($n = 104$) to re-confirm their dimensionality structure and corresponding reliability. These insights will play a critical role in estimating the research model using the confirmatory factor analysis (CFA).

The KMO measure of sampling adequacy and Bartlett's test of sphericity confirmed the appropriateness of the factor analysis. The overall measure of sampling adequacy 0.948, exceeding 0.50 (Sekaran & Bougie, 2010) and Bartlett's test of sphericity gave support to a significant correlation, chi-square (λ^2) = 6275.157, $df = 55$, $p = 0.000$ (Hair *et al.* 2010). The three outcome constructs with eigenvalues greater than 1 and the percentage of the variance of more than 7.0 per cent (Hair *et al.* 2010; Sekaran & Bougie, 2010).

The EFA process found that four items did not load properly on a particular factor (< 0.50) or had cross-loadings. Thus, these items were deleted, and the remaining eleven items had been retained. The α and corrected item-total correlation also met the threshold suggested by Ladhari (2010) and Nunnally and Bernstein (1994). Table 19 displays the results of the exploratory factor analysis of the outcome constructs.

Table 19. Results of exploratory factor analysis of the outcome constructs

Dimensions	Items	New Code	Loadings	Item total correlation	Eigenvalue	Cumulative variation	α
Trust	TR1	TR1	0.907	0.847	2.620	87.328	0.927
	TR2	TR2	0.908	0.846			
	TR4	TR3	0.673	0.861			
Attitudes	A1	AT1	0.881	0.743	2.485	82.825	0.896
	A2	AT2	0.940	0.855			
	A3	AT3	0.908	0.788			
Satisfaction	SF1	SF1	0.870	0.791	3.974	79.488	0.931
	SF2	SF2	0.906	0.844			
	SF3	SF3	0.832	0.746			
	SF4	SF4	0.919	0.865			
	SF5	SF5	0.927	0.877			

6.6 HIERARCHICAL-REFLECTIVE SERVICE QUALITY MODEL

The research model and the findings of the pilot study confirmed that smart policing service quality is a second-order, hierarchical-reflective model, as shown in Figure 7. Research on service quality perception (e.g., Ali et al., 2017; Le et al., 2020) and measurement model specifications (e.g., Chen et al., 2017; Li & Shang, 2020) also support this hierarchical view. As has been discussed, the significant advantage of hierarchical modelling rests in the fact that it allows for more theoretical parsimony and less model complexity (Edwards 2001; Law et al. 1998; MacKenzie et al. 2005). To add, the study adopts the perspective of a reflective model because conceptual logic and findings of the pilot study have verified that all the indicators in the research model are the manifestations of constructs and share a common theme and that dropping an indicator does not bring any change to the conceptual domain of the construct (Jarvis et al. 2003; Petter et al. 2007). Furthermore, the internal consistency is very high among indicators and the correlation between two indicators is highly positive for such a reflective construct (Jarvis et al. 2003; Petter et al. 2007).

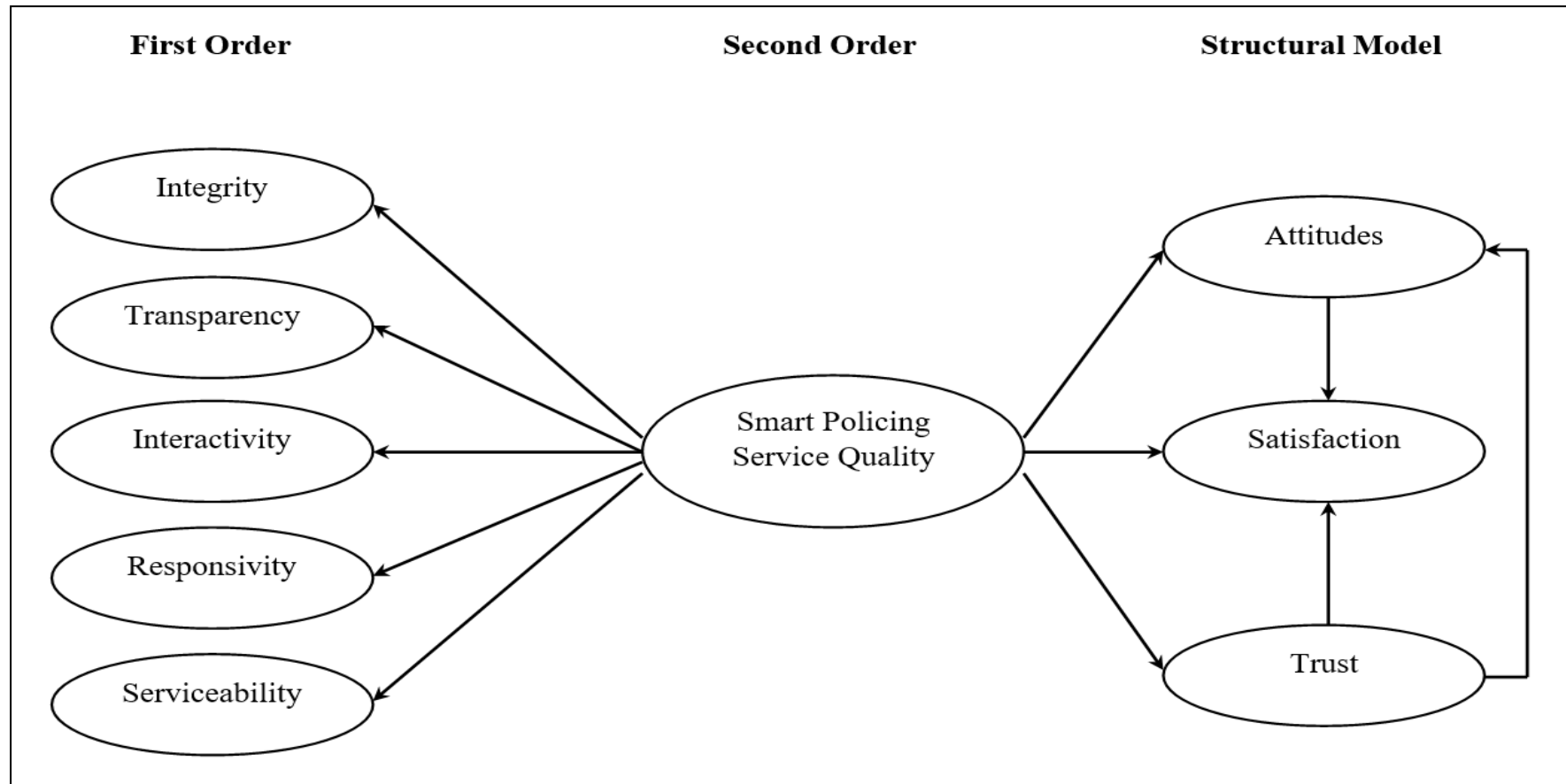


Figure 8. The second order-hierarchical-reflective model of smart policing service quality

6.7 ESTIMATING THE HIERARCHICAL SMART POLICING

SERVICE QUALITY MODEL

This study estimated the second-order, hierarchical-reflective service quality construct model by using all the manifest variables of the underlying first order (i.e., integrity, transparency, interactivity, responsiveness, and serviceability). In this estimation of this hierarchical construct model, this study repeatedly used the manifest variables. Under this technique, the manifest variables were used repeatedly, initially for the first-order latent variables to create primary loadings. This approach was then extended to estimate the second-order service quality construct.

6.7.1 FIRST ORDER MEASUREMENT MODEL

The confirmatory factor analysis (CFA) confirmed that the psychometric properties of the first order measurement models were satisfactory fit to the data (λ^2/df , CFI, TLI, RMSEA, SRMR) (Byrne, 2010; Kline, 2015), and met the threshold in terms of composite reliability > 0.70 (Raykov, 1998), convergent validity; average variance extraction (AVE) and factor loadings > 0.50 (Fornell & Larcker, 1981; Hair et al., 2010), and discriminant validity of ($\sqrt{\text{AVE}} > \text{correlations (r)}$). The first-order model consists of eight constructs in the research model, namely integrity, transparency, interactivity, responsiveness, serviceability, trust, attitudes and satisfaction. Table 20 displays the psychometric properties for first-order constructs, and Table 21 shows the model fit for the first order measurement models.

Table 20.

The psychometric properties for first-order constructs

Constructs	Items	Loadings	CR	AVE
<i>Integrity</i>	IG1	0.886	0.958	0.631
	IG2	0.900		
	IG3	0.893		
	IG4	0.873		
	IG5	0.843		
<i>Transparency</i>	TP1	0.853	0.771	0.706
	TP2	0.882		
	TP3	0.782		
<i>Interactivity</i>	IT1	0.835	0.924	0.710
	IT2	0.867		
	IT3	0.895		
	IT4	0.864		
	IT5	0.744		
<i>Responsivity</i>	RS1	0.856	0.933	0.735
	RS2	0.887		
	RS3	0.852		
	RS4	0.848		
	RS5	0.843		
<i>Serviceability</i>	SV1	0.857	0.917	0.689
	SV2	0.896		
	SV3	0.866		
	SV4	0.813		
	SV5	0.706		
<i>Trust</i>	TR1	0.894	0.928	0.811
	TR2	0.892		
	TR3	0.915		
<i>Attitudes</i>	AT1	0.784	0.899	0.749
	AT2	0.956		

Constructs	Items	Loadings	CR	AVE
<i>Satisfaction</i>	AT3	0.848	0.934	0.740
	SF1	0.811		
	SF2	0.864		
	SF3	0.780		
	SF4	0.912		
	SF5	0.926		

Table 21.

The model fit for the first-order measurement models

Constructs	λ^2/df	CFI	TLI	RMSEA	SRMR
Integrity	3.883	0.997	0.990	0.068	0.008
Transparency	0	1.000	\tli	\rmsea	0.000
Interactivity	1.711	0.999	0.997	0.034	0.008
Responsivity	2.404	0.998	0.995	0.047	0.007
Serviceability	1.122	1.000	0.999	0.014	0.008
Trust	0	1.000	\tli	\rmsea	0.000
Attitudes	0	1.000	\tli	\rmsea	0.000
Satisfaction	0.995	1.000	1.000	0.000	0.056

Correlation matrix fit the data satisfactorily ($\lambda^2/\text{df} = 4.727$, CFI = 0.925, TLI = 0.914, RMSEA = 0.077, SRMR = 0.039). In Table 20, the study calculated the square root of the AVEs in the diagonals of the correlation matrix. These values exceed the intercorrelations of the construct with the other constructs in the first-order model and confirm discriminant validity (Hair et al., 2019; Fornell & Larcker, 1981). This test indicates that the

constructs do not share the same type of items and they are conceptually distinct from each other (Byrne, 2010). In other words, each construct and its measures in the research model work commendably in discriminating themselves from other constructs and their corresponding measures. The study gains further confidence in discriminant validity by examining the cross-loadings, indicating that items are more strongly related to their own construct than other constructs. In other words, each item loads more on its own construct than other constructs and, therefore, all constructs share a substantial amount of variance with their own items (Kock & Lynn, 2012).

All in all, the measurement model was considered to have satisfactory fit (see Table 18) with the evidence of adequate reliability ($AVE > 0.50$, $CR > 0.80$) and convergent validity (loadings > 0.70) in Table 21 and discriminant validity ($\sqrt{AVE} > r$) in Table 22. The first-order measurement model was thus confirmed to be satisfactory and employed for testing the higher-order measurement model and the structural model.

Table 22. Intercorrelation of the first order constructs

Constructs	Mean	SD	RS	IT	SV	TP	IG	TR	AT	SF
RS	5.500	1.348	0.857							
IT	5.492	1.282	0.672	0.842						
SV	5.427	1.335	0.601	0.654	0.830					
TP	5.333	1.373	0.651	0.671	0.654	0.840				
IG	5.601	1.307	0.600	0.690	0.643	0.671	0.794			
TR	5.736	1.421	0.546	0.533	0.488	0.500	0.498	0.900		
AT	5.455	1.305	0.478	0.466	0.522	0.484	0.507	0.468	0.865	
SF	5.509	1.328	0.420	0.552	0.542	0.524	0.659	0.451	0.526	0.860

Note: RS = Responsivity; IT = Interactivity; SV = Serviceability; TP = Transparency; IG = Integrity; TR = Trust; AT =

Attitudes; SF = Satisfaction; $\sqrt{\text{AVE}}$ on the diagonal; all correlated at $p < 0.05$

6.7.2 HIGHER ORDER MEASUREMENT MODEL

At this stage, the study estimated the measurement properties of higher-order constructs, that is, the second-order model of smart policing service quality. The second order smart policing service quality explored integrity, transparency, interactivity, responsiveness, and serviceability. The psychometric properties of the second order measurement model was satisfactory fit to the data ($\chi^2/df = 4.750$, CFI = 0.935, TLI = 0.922, RMSEA = 0.076, SRMR = 0.043) (Byrne, 2010; Kline, 2015), The study confirms that the loadings of the first-order latent variables on the second-order model have exceeded 0.50 (Fornell & Larcker, 1981; Hair et al., 2010; 2019). Overall, the results confirm that all these loadings are significant at $p < 0.001$. The results also ensure that the CR is greater than 0.70 (Raykov, 1998) and the AVE of the second-order is greater than 0.50 (Fornell & Larcker, 1981; Hair et al., 2010; 2019). These results provide evidence of the reliable and valid higher-order measure. Table 23 tabulates the psychometric properties of higher-order model, and Figure 8 shows the hierarchical-reflective smart policing service quality model.

The degree of the explained variance of the second-order smart policing service quality construct was reflected in its first-order components, that is, responsiveness (82%), interactivity (88%), serviceability (89%), transparency (56%) and integrity (84%). All these path coefficients from smart policing service quality to first-order components were significant at $p < 0.001$.

Table 23.

The psychometric properties of higher order model

Model	Items	Loadings	CR	AVE
Second order	RS	0.905	0.968	0.859
	IT	0.940		
	SV	0.943		
	IG	0.919		
	TP	0.927		

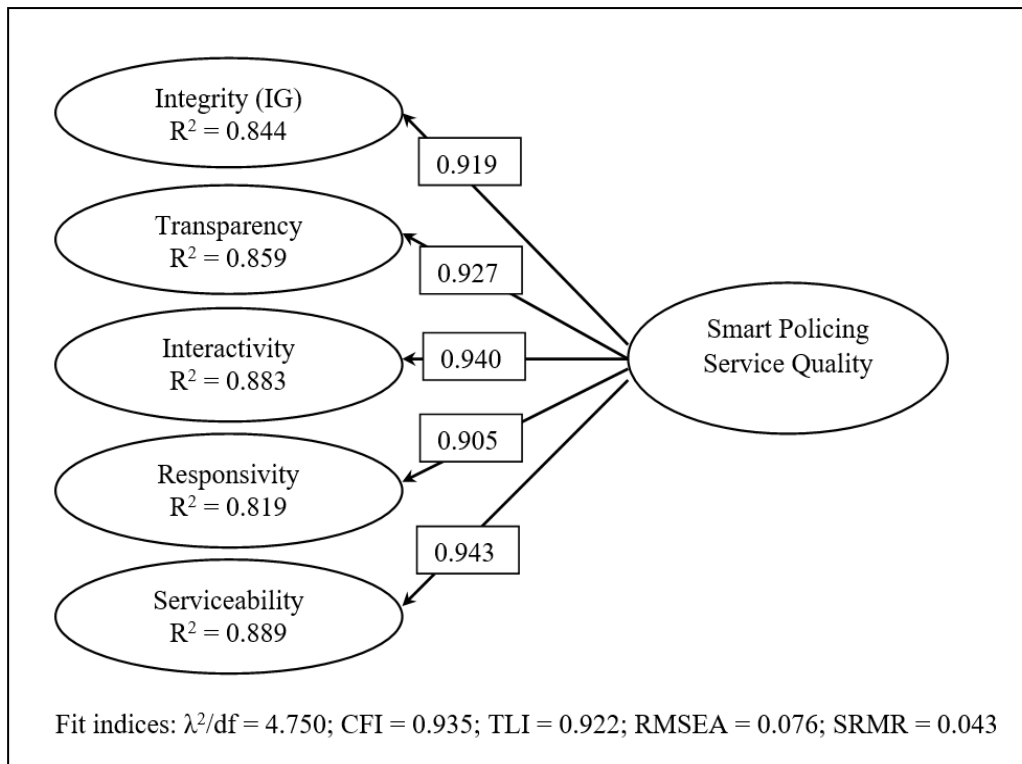


Figure 9. The hierarchical-reflective smart policing service quality model.

6.8 STRUCTURAL MODEL

The six hypotheses formulated on the research model were tested simultaneously using the SEM AMOS path modelling. In the research model, the path significance of the hypothesised associations (beta coefficients) and variance (R^2) explained by each path was examined.

To assess the validity of the structural model, the study estimated the relationship between higher-order model (smart policing service quality), trust, attitudes and satisfaction. In Figure 8, the results establish that the model fits satisfactorily to the data and the significant path coefficient of the main effects model. The standardised beta result found that the smart policing service quality has a significant impact on attitudes ($\beta = 0.833$, $p < 0.001$) and trust ($\beta = 0.896$, $p < 0.001$), but not affecting satisfaction ($\beta = 0.032$, $p > 0.05$). Similarly, the relationship between trust and satisfaction ($\beta = 0.208$, $p < 0.001$), attitudes and satisfaction ($\beta = 0.710$, $p < 0.001$), as well as trust and attitudes ($\beta = 0.133$, $p < 0.05$) are positive and significant. The degree of the explained variance of smart policing service quality, trust and attitudes on satisfaction is 86 per cent ($R^2 = 0.864$), while smart policing service quality and trust on attitudes is 91 per cent ($R^2 = 0.910$). However, the degree of the explained variance of smart policing service quality, on trust is just 83 per cent ($R^2 = 0.834$). The results confirm the significant impact of smart policing service quality on trust and attitudes, but not on satisfaction. The smart policing service quality is confirmed as a significant antecedent for satisfaction, while it functions as the predictor of attitudes and trust. However,

attitudes and trust are confirmed as a predictor for satisfaction. Thus, five out of six hypotheses have been supported.

The results confirmed the impact of smart policing service quality on satisfaction, trust and attitudes. Therefore, this verifies the nomological validity of the overall research model. Table 24 gives the results of the structural model. Table 25 shows the findings.

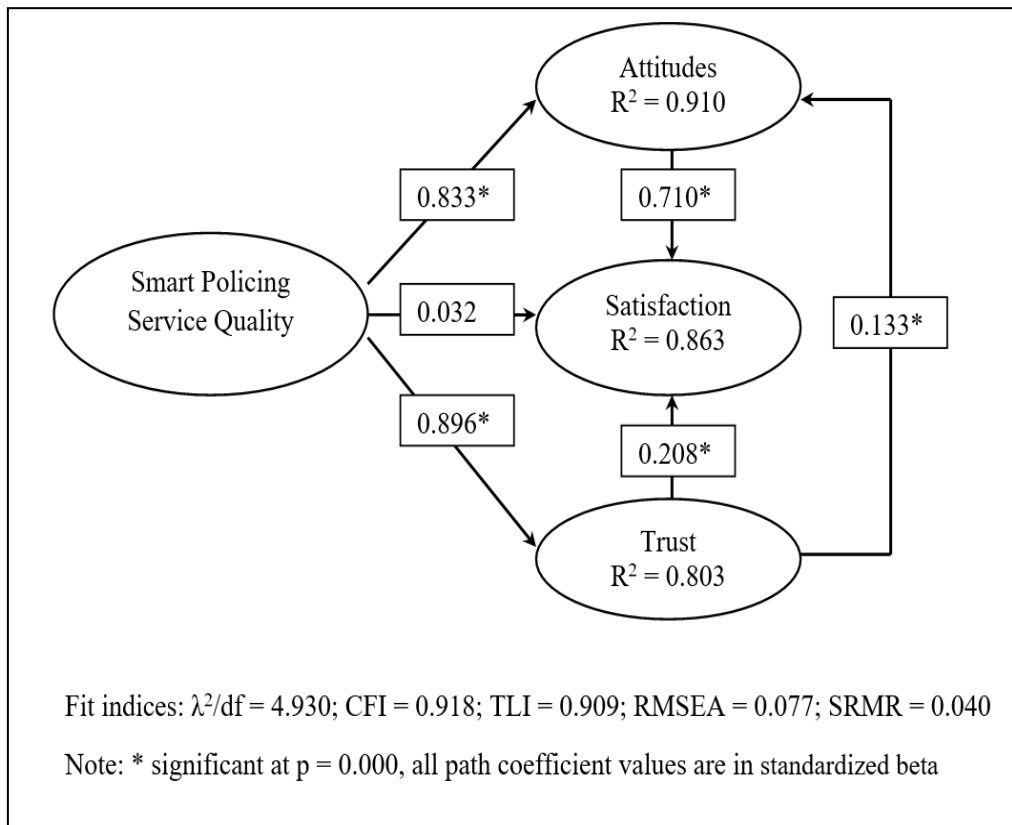


Figure 10. The main effects model.

Table 24.

The results of structural model.

Structural model				Path coefficient	Standardised error	t statistics
Smart policing service quality	→	Satisfaction		0.032	0.170	0.221
Smart policing service quality	→	Attitudes		0.833	0.068	13.108
Smart policing service quality	→	Trust		0.896	0.044	23.894
Attitudes	→	Satisfaction		0.710	0.170	4.574
Trust	→	Satisfaction		0.208	0.060	3.405
Trust	→	Attitudes		0.133	0.052	2.326

Table 25.

Results of hypotheses testing for the main effects model

Hypotheses	Relationships	Results
H1	Smart policing service quality to satisfaction	Not supported at $p > 0.05$
H2	Smart policing service quality to attitudes	Supported at $p < 0.001$
H3	Smart policing service quality to trust	Supported at $p < 0.001$
H4	Attitudes to satisfaction	Supported at $p < 0.001$
H5	Trust to satisfaction	Supported at $p < 0.001$
H6	Trust to attitudes	Supported at $p < 0.05$

6.9 MEDIATION ANALYSIS

Three hypotheses were formulated on the mediation analysis. This analysis is important as it evaluates the role of trust and attitudes as the mediator in the research model. Figure 10 provides the assessment results of the mediation analyses, and Table 26 displays the results of the analyses.

The study has also well confirmed the criteria for mediation analysis (Baron & Kenny 1986) in the main effects model (Figure 9) as follows: firstly, the predictor (smart policing service quality) influenced the mediator (trust and attitudes); secondly, the mediator (trust) influenced the attitudes and satisfaction. To establish the mediating effect of trust and attitudes, the indirect effect of $a \times b$ has to be significant for the TR-SF link and $a \times d$ has to be significant for the AT-SF link (MacKinnon et al., 1995, MacKinnon et al., 2002; Preacher et al., 2016; Zyphur et al., 2019). Since the z-value exceeds 1.96 ($p < 0.05$), the study accepted the mediation hypotheses due to the fact that the results indicate that overall smart policing service quality has an indirect impact on both attitudes and satisfaction through trust and attitudes (Sobel, 1982; 2019).

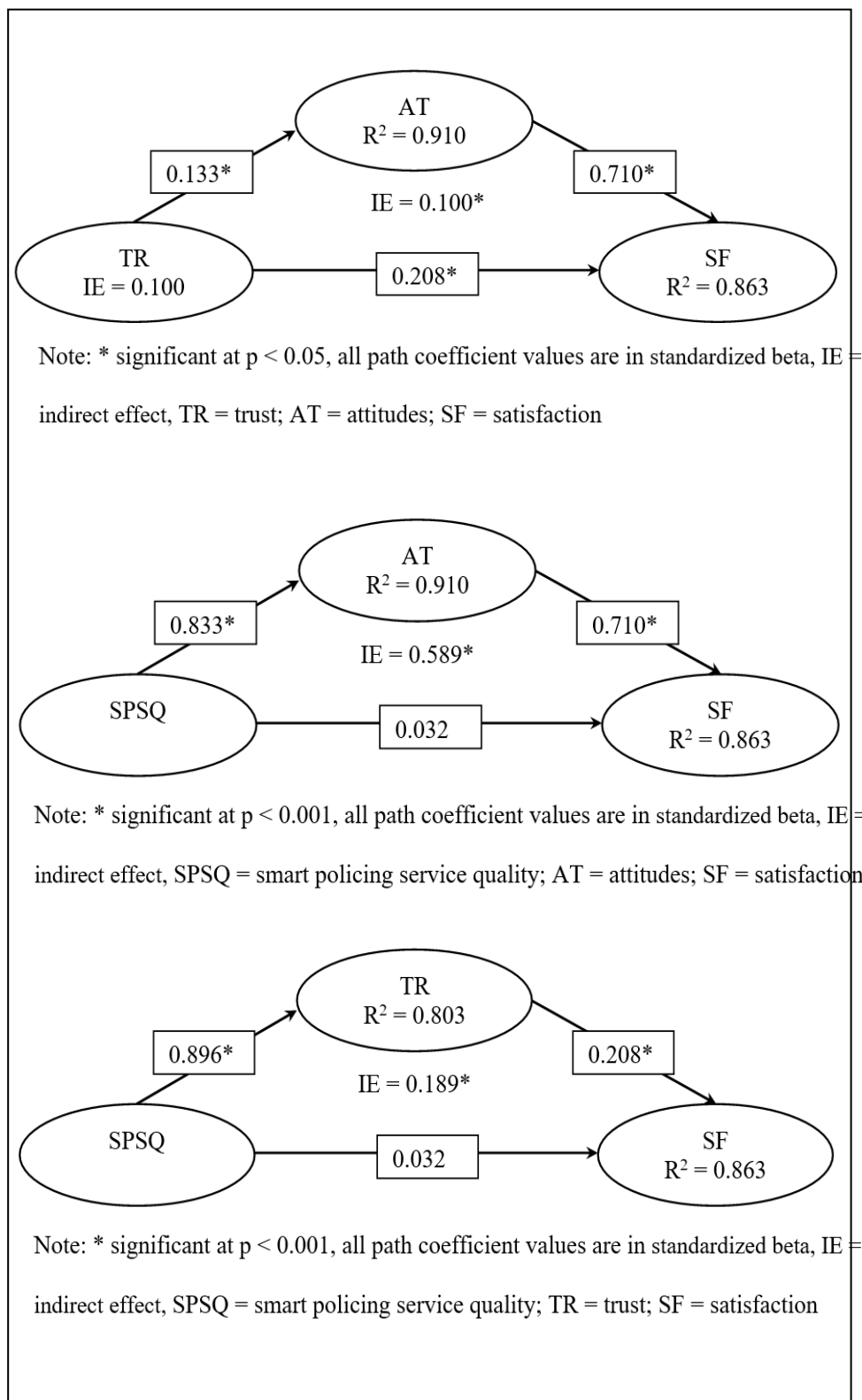


Figure 11. The results of mediation analysis

Table 26.

The results of mediation analyses

Indirect effect	Standardised indirect effect	z statistics	Results
TR → AT → SF	0.100	2.145	Supported at $p < 0.050$
SPSQ → TR → SF	0.189	3.450	Supported at $p < 0.001$
SPSQ → AT → AT	0.589	3.952	Supported at $p < 0.001$

Note: SPSQ = smart policing service quality; TR = trust; AT = attitudes; SF = satisfaction

6.10 OVERALL FINDINGS OF HYPOTHESES TESTING

Despite validating the hierarchical research model by AMOS, and to establish further rigour in such modelling, this study also examined the implications of power analysis, and predictive relevance. The former is essential to establish conjectures, while the latter is vital to measure how well-observed values are reproduced by the model.

Power analysis ($1-\beta$) was carried out to validate the empirical findings derived from the study. The power test is generally defined as the probability of rejecting a false null hypothesis (H_0), or in other words, the probability of obtaining a valid result (Cohen et al., 2007). Therefore, power ($1 - \beta$) refers to the probability of successfully rejecting a null hypothesis (Breur, 2016; Cohen et al., 2007). The power test (post hoc) was run to estimate the statistical parameters' validity. Typically, for behavioural research, a value of 0.80

denotes power (Breur, 2016; Cohen et al., 2007). The study estimated the power of 0.99 for the base model with the sample size of 521 (N), 0.05 significance level (α) and 0.10 effect size. The size of estimated power (0.99) compellingly exceeds the cut-off value of 0.80 (Breur, 2016; Cohen et al., 2007). Thus, high power (> 0.80) confirms that the study produces significant results and the associations become truly significant. In other words, these results are a testament to the fact that the study has adequate confidence in the hypothesised relationships in the research model.

This study made use of the magnitude of R^2 as it has been widely used as a criterion to evaluate the predictive validity of the hierarchical model in service quality literature (Akter et al., 2013; Andronikidis & Bellou, 2010; Carrillat et al., 2007; Chang & Hung, 2018; Dabholkar et al., 1996). This technique shows how well that the data collected empirically could be reconstructed using the model and the parameters (Fornell & Cha, 1994). As suggested by a steady stream of studies in the social sciences, the magnitude of correlations obtained from predictive validity studies is usually low. This was shown in this study.

Echoing Armstrong and Overton (1977), the current study also conducted a non-response bias analysis. As such, in the first round, the study conducted this analysis for the pilot study ($n = 110$) by drawing a comparison between the first and last 20% of respondents for each first-order service quality construct. The results did not come to any significant difference across the constructs, and this implies that there were no problems with the non-response bias in the pilot study. In the second round, the study conducted the

same analysis for the main study ($n = 521$) using the first and last 10% of respondents across the same constructs. Again, the results did not find any significant deviation, which suggests that there were no concerns with the non-response bias in the main study. Finally, the study conducted a comparison test with the data of study 1 (i.e., pilot study) and study 2 (i.e., main study); the chi-squared tests did not present any significant difference ($p > 0.05$). Because the statistical difference is not significant, the preferred model would be a full mediation (Study 1 = Study 2) in terms of demographic characteristics (e.g., gender, age, income level, and location). Table 27 summarises the hypotheses testing.

Table 27.

Summary of hypotheses testing

Effects	Hypotheses	Hypothesised relationships	Results
Main effects model	H1: Smart policing service quality has a significant impact on satisfaction	SPSQ $\rightarrow$ SF	Not supported
	H2: Smart policing service quality has a significant impact on attitudes	SPSQ $\rightarrow$ AT	Supported
	H3: Smart policing service quality has a significant impact on trust	SPSQ $\rightarrow$ TR	Supported
	H4: Attitudes has a significant impact on satisfaction	AT $\rightarrow$ SF	Supported
	H5: Trust has a significant impact on satisfaction	TR $\rightarrow$ SF	Supported
	H6: Trust has a significant impact on attitudes	TR $\rightarrow$ AT	Supported
Mediating effects	H1a: Attitudes mediates the relationship between smart policing service quality and satisfaction	SPSQ $\rightarrow$ AT $\rightarrow$ SF	Supported

H1b:	Trust	mediates	SPSQ → TR → SF	Supported
	the	relationship		
	between	smart		
	policing	service		
	quality	and		
	satisfaction			
H5a:	Attitudes	TR → AT → SF	Supported	
	mediates	the		
	relationship	between		
	trust	has	and	
	satisfaction			

6.11 CHAPTER SUMMARY

The objective of this chapter is to develop an instrument which can be used to monitor and improve the service quality of innovative government initiatives, one of which would be smart policing. The entire scale development and validation process adequately addressed the procedures of MacKenzie *et al.* (2011). The creation process has successfully integrated the suggestions raised by seminal instrument development studies and extended their contribution by presenting a number of sophisticated reliability and validity techniques. The result is a parsimonious 34-item instrument grouped into eight scales with high reliability and validity which is one of the significant study contributions. Secondly, this chapter demonstrates how SEM AMOS can serve to estimate the research model and establish rigour in the data analysis technique. SEM could handle the formulaic complexity to provide robust solutions for a hierarchical-reflective model effectively. The

study demonstrated that this method would be practical in estimating the hierarchical-order, reflective smart policing service quality model as the primary objective surrounds the concept of prediction and the focus rests on justifying the variance of multiple variables. Finally, this chapter confirms the measurement and structural properties of the research model by ensuring adequate reliability and validity. The study also intended to assess the relationships among the constructs in the model and to test six main hypotheses. The next aim of the study is to examine the impact of the mediator (trust and attitudes) on the research model. To meet all these objectives, the study applied SEM AMOS path modelling successfully to estimate the parameters of the research model. The findings of the study supported five main hypotheses (H2-H6) of the main effects model, along with three mediating hypotheses on the research model. Nonetheless, the results did not offer support to the direct effects of higher-order smart policing service quality construct on satisfaction (H1). All in all, the study validated the findings on hypothesised relationships among the constructs by applying the power analysis, and predictive relevance.

CHAPTER 7

DISCUSSION AND CONCLUSIONS

7.1 OVERVIEW

This chapter aims to discuss the empirical findings of the analysis and other findings in terms of the theoretical significance, and practical contribution. It briefly presents the findings addressing the two research questions of the study as proposed in Chapter 1. This chapter also discusses how the results fill the existing knowledge gaps and make significant contributions in smart policing service quality research in the UAE. Specifically, the contributions highlight the fact that the study extends knowledge by reconceptualising the service quality theory, validating a hierarchical model, and providing practitioners with a tool integrated analysis and design of smart policing service quality. Later, this chapter discusses the limitations and future research directions with concluding remarks. Overall, the objective of this chapter is to explain the contributions of the study in terms of the service quality dynamics of smart policing service quality in the UAE.

7.2 RESEARCH OBJECTIVE

This study aims to explore the service quality dimensions of smart policing and to measure the impact of smart policing service quality on trust, attitudes and satisfaction in the UAE in order to fill the knowledge gaps in service quality research. To engage in these objectives, this study utilizes the service quality theories and related concepts from organisational, marketing and information management studies in order to test the hypothetical relationship among constructs. Technology-mediated police service research would benefit from the findings of this study regarding the exploration of the dimensions of service quality and modelling the impact of overall quality on outcome constructs.

7.3 SUMMARY OF FINDINGS

This study developed and validated a context-specific, multi-dimensional, hierarchical service quality for smart policing service quality, and modelled its overall impact on trust, attitudes and satisfaction. The findings of the study are synthesised in the following sections and its implications are discussed.

7.3.1 RESEARCH QUESTIONS 1: WHAT ARE THE DIMENSIONS OF SMART POLICING SERVICE QUALITY IN THE UAE?

To answer this question, this study provided an empirical illustration by developing a second-order, hierarchical-reflective service quality model using

data from the UAE residents in Dubai and Abu Dhabi. The study used the repeated indicators approach where the manifest indicators of the first-order constructs were reused for the second-order constructs (Hair et al., 2019; van Riel et al., 2017). This approach is advantageous as it can estimate the higher-order latent variables and confirm the adequate measurement and structural properties. The study applied covariance-based SEM, or AMOS path modelling in developing and validating the higher-order service quality construct (Ponsignon et al., 2020). This study revealed that service quality is a second-order construct which was adequately reflected by five first-order dimensions (i.e., transparency, integrity, interactivity, responsiveness, serviceability). The findings confirm that serviceability has the greatest reflection of overall service quality, followed by interactivity and transparency. In the following sections, the relationship between smart policing service quality dimensions is discussed with their empirical and theoretical insights.

7.3.1.1 TRANSPARENCY

The empirical findings confirmed the role of transparency as a significant dimension of smart policing service quality in capturing users' perceptions regarding the open flow of information including the information's easy access to the general public and the clarity about government rules, regulations and decisions (Janda et al., 2002; Jansen & Ølne, 2016; Kaptein & Reenen, 2001; Nilashi et al., 2016; Oliver, 2004). The assessment of the association indicated that 85.9 per cent of overall variance (R^2) in transparency

was explained by the smart policing service quality. This association highlights that transparency contributes to the overall smart policing service quality. This finding goes hand in hand with the studies that consider transparency an important component of service quality in private and public sectors (Joshi, 2013; Kim & Kim, 2016; Prasad & Sharma, 2015; Sá et al., 2016; Tyler et al., 2015), in particular for police services in digital discourse (Yamin et al., 2020). Transparency is also found to be an important component of service quality in private and public sectors (Joshi, 2013; Kim & Kim, 2016; Prasad & Sharma, 2015; Sá et al., 2016; Tyler et al., 2015), in particular for police services in smart context (Yamin et al., 2020) and is considered the critical component of good governance in China (Wu et al., 2017).

Overall, the findings confirm transparency as a significant dimension of the overall service quality in smart policing service in the UAE. These findings reflect that a smart policing service quality with better transparency should be perceived as highly capable of delivering police services to the users with the clarity of information. Consistent with the suggestion by Kaptein and Reenen (2001) transparency is the core component in the technical quality of police-user interactions. As such, the findings suggest that smart policing providers should emphasize on information openness to users in order to improve the perception of transparency as well as the overall service quality.

7.3.1.2 INTEGRITY

The empirical findings confirm integrity as a significant dimension of smart policing service quality as it explained 84.4 per cent of overall smart policing service quality variance (R^2). The findings indicate that smart policing service provider has the ability to meet users' needs, interest and concerns through policing services over a smart platform. The study finding is consistent with the suggestion by Johnson and Silvestron (1995) to include integrity as an additional service quality determinant. This also reflects on Karssing's (2007, p.3) insights on public services that "... required to perform tasks in a professional manner, adequately, carefully, and responsibly, while taking into consideration all relevant interests." This finding is consistent with the literature indicating that user perceptions of overall smart policing service quality are influenced to a large extent by the degree of honesty, justice, fairness and trustworthiness and security as being concerned with feeling of safety and the maintenance of confidentiality by the provider (Bauer et al., 2006; Chen et al., 2017; Cox & Dale, 2001; Lee & Lin, 2005). It also indicates good governance of public services in meeting users' needs, and the ability to provide customised attention to the security domain of public services is critical to improving integrity in smart policing.

Overall, the findings support integrity as a significant dimension of overall smart policing service quality in the UAE. These findings are consistent with the literature which indicates that the level of honesty, justice, fairness and trustworthiness and security that takes place during service consumption largely influences the overall service quality perception

(Loiacono et al., 2002; Santos, 2003; Parasuraman et al., 1988; Wolfinbarger & Gilly, 2003; Yen & Lu, 2008).

7.3.1.3 INTERACTIVITY

The results of the study support interactivity as a significant dimension of smart policing service quality by explaining 88.3 per cent of variance (R^2). This relative importance of interactivity in smart policing implies the key features of public services-users' reciprocal activities using a smart-enabled platform (Arcand et al., 2017; Elnaghi et al., 2018). The findings also indicate that the capacity of consistency in the communication medium of smart policing is critical in forming the overall service quality perception. These findings support Accenture (2013) that smart policing can revolutionize public safety outcomes, providing data-driven insights to guarantee public safety and centralising and integrating smart technology to generate savings and drive values for the public. This is consistent with the findings of Arcand et al (2007) who argue that smart technology has pushed users into a social era, and the society has actively interacted through smart technology (Al-Hubaishi et al., 2017). A recent study evidenced users as social thrivers and favoured the use of interactive smart-based features to interact socially (Ekaabi et al., 2020a). Thus, this finding supports the research that establishes the need for social interaction as the dimension of measure service quality of self-service technology, including smart policing services (Al-Ibrahim, 2014; Lian, 2015; Rahman et al., 2017; Shareef et al., 2016). These are consistent with studies that recommend virtual elements providing the ability for meaningful

interactivity between users and service providers (Flavian et al., 2006; Santos, 2003), and that interaction creates a form of social capital for police which can boost the relationship quality by enhancing the perceived benefits of long term relations with a smart policing entity (Bullock, 2017).

Overall, the findings suggest that interactivity is a critical component of smart policing service quality in the UAE. These findings are consistent with the literature that points out that interactivity clarifies the ability of the police service provider to respond to user's demand that consequently offers social benefits derived from interacting with others via smart devices. In the smart environment, connectedness enables users to actively interact with a service representative whenever they perceive the need to do so, while interacting with others relates to policing services, also offering relevant users testimonials on smart platforms. Therefore, interactivity enhances a user's perception of smart services (Chen, 2014).

7.3.1.4 RESPONSIVITY

The empirical findings confirm the role of responsivity as a significant dimension of smart policing service quality in capturing users' perceptions regarding the swiftness and the agility of police services to accommodate problem-solving in unanticipated situations as well as the role of troubleshooting (Candiello et al., 2012; Giovannini et al., 2015; Menezes et al., 2016). An assessment of the association indicated that 81.9 per cent of overall variance (R^2) in responsivity was explained by service quality. Hence, incorporating responsivity is an integral component of smart policing service

quality. This association is strongly supported by the theory which highlights that a significant portion of overall service quality in smart policing is explained by responsiveness. The finding is consistent with the extant literature that the proposed responsiveness is part of the functional quality in the digital technology-mediated platform (Bauer et al., 2006; Madu & Madu, 2002; Van der Heijden et al., 2003; Venkatesh, 2000). In the smart government context, this study supports previous research that argues that responsiveness increases usage due to the perceived quality from the services, and thus indicates the effectiveness of police services (Bauer et al., 2006; Giovannini et al., 2015). This contention is consistent with the suggestion by Candiello et al. (2012) that responsiveness met the perceived-expected performance area of service quality because the responsiveness toward activities offered requires information maintenance to verify service scalability and application of users.

Overall, the findings confirm responsiveness as a critical dimension of overall service quality in the smart policing service quality in the UAE. These findings reflect that any fast reaction on services' activities can have a significant positive impact on responsiveness. Similarly, smart policing service with better responsiveness should be perceived as public-policing as sequential activities are required to enable meaningful responsive actions. As such, the findings suggest that smart policing providers should provide a seamless service experience that shows a swift reaction on services' activities in order to improve the perception on responsiveness as well as overall service quality.

7.3.1.5 SERVICEABILITY

The empirical findings confirm serviceability as a significant dimension of smart policing service quality because it explained 88.9 per cent of overall smart policing service quality variance (R^2). This association highlights that serviceability is the most important component among functional quality and among the five first-order components. The findings indicate further that the smart policing service provider has the ability to meet users' needs of ease of access to smart-based content and functions. This finding reflects Karjaluoto *et al.* (2018) that describe serviceability as a composite of the perceived usefulness and ease of use of content and function by the users of technology-enabled devices. This study also supports the arguments that serviceability supports the hypertextual/hypermedia nature of smart environments, where information and function are intertwined as smart-content (Aladwani & Palvia, 2002; Ekaabi et al., 2020a; Loiacono et al., 2002; Wojdyski & Kalyanaraman, 2016; Yuen & Chan, 2010). Therefore, consistent with the human-computer interaction literature, serviceability encompasses the ergonomic criteria used for interface design and inspection to the extent of user-oriented and support interactivity to enhance self-efficacy with the medium.

Overall, the findings support serviceability as the most critical dimension of overall smart policing service quality, incorporating practicality, ease-of-use and timeliness of a service's content and function as the relevant elements of public-police interaction in the smart policing service in the UAE. The findings also suggest that serviceability deserves equal attention in the

smart policing service quality context in the UAE because the finding shows that serviceability is the core component in the public-police interaction.

In general, the findings suggest that five first-order dimensions (i.e., transparency, integrity, interactivity, responsiveness, serviceability) are critical components of smart policing service quality in the UAE. Although the result shows varying impacts of these dimensions, it is noteworthy that the differences in magnitude were small and all the components were proven significant. Thus, the results confirm that the smart policing service quality should be based on a robust platform, vibrant and dynamic interactions, and meaningful outcomes to satisfy the public-police relations.

7.3.2 RESEARCH QUESTION 2: IS THERE ANY INFLUENCE OF OVERALL SMART POLICING SERVICE QUALITY ON USERS' TRUST, ATTITUDES AND SATISFACTION IN THIS CONTEXT?

To answer this research question, this study modelled the impact of overall smart policing service quality on the endogenous constructs; which are trust, attitudes and satisfaction. The results of the study confirm positive and significant relationships among the latent variables, except between smart policing service quality and satisfaction in the structural model, and thus proving only five out of six hypotheses in the base model. Moreover, the study has examined and reported the critical findings on the mediating effects of trust, and attitudes on the research model. In the following sections, the significance of all these findings is discussed.

7.3.2.1 SMART POLICING SERVICE QUALITY EFFECTS ON SATISFACTION (H1)

The results of the study found that the second order smart policing service quality construct is insignificantly related to satisfaction ($\beta = 0.032$, $p > 0.05$). This insignificant relation between higher order smart policing service quality (cognitive belief) and satisfaction (affect) shows that the theory of service quality has argued that satisfaction is not defined by the difference between perceptions and expectations of the services. It indicates that the increase in smart policing service quality may not affect the users' satisfaction level. This suggests that the higher order service quality model does not directly impact user satisfaction because the expectation confirmation theory indicates that satisfaction is directly influenced by the disconfirmation of beliefs.

Earlier studies found that police service quality was linked to satisfaction (e.g., Accenture, 2013; Chen et al., 2014; Ekaabi, et al., 2020; Jansen & Ølnes, 2016; Zakzak & Salem, 2019). However, the result of this study is consistent with the argument that satisfaction is an affective response (Wang et al., 2019), fulfilment response (Oliver, 1997), an overall evaluation (Verschelde & Rogge, 2012), a psychological state (Suhartanto et al., 2020), a global evaluative judgment (Brida et al., 2020) and a summary attribute phenomenon (Wang et al., 2018); thus, it requires behavior stimulus in the ICT-human interaction process. This aligns with the affective response model that argues that the inconsistent conclusion and contradictory advice stem

from affective concepts and their relationships in the ICT context (Zhang, 2013).

This finding is consistent with Oliver (1977; 1980) with the argument that disconfirmation of beliefs (i.e., trust and attitudes) mediates the relationship between expectation (smart policing service quality) and satisfaction. In fact, Verkijika (2020) suggested that emotion-based variables are widely under-represented in the extant literature on the technology-led service quality system. Similarly, a critical review by Dahlberg *et al.* (2015) found that none of the smart-based service quality system studies has adopted the emotion-based variable to measure satisfaction. Therefore, this result is consistent with the argument raised in recent research that studies have over-emphasised rational and logical aspects while paying insufficient attention to affective factors (Ding, 2018; Koenig-Lewis *et al.*, 2015; Verkijika, 2020).

The relationship between smart policing service quality and satisfaction must be mediated by disconfirmation of beliefs or emotion-based variables (i.e., trust and attitudes) to enable user evaluations with respect to smart policing services quality. In this regard, the evaluations are made based on the comparison to the users' expectation on the quality of smart policing services. Thus, the findings underscore the highly underexplored role of trust and attitudes in helping users to make service quality decisions in order to formulate the satisfaction in smart policing service in the UAE.

7.3.2.2 SMART POLICING SERVICE QUALITY EFFECTS ON ATTITUDES (H2)

The findings confirm the smart policing service quality as a significant predictor of attitudes ($\beta = 0.833$, $p < 0.001$) because it explained 91.0 per cent of overall smart policing service quality variance (R^2). This relationship indicates that overall smart policing service quality is one of the major drivers of attitudes, thus a high level of smart policing service quality perception is critically important (Shahzad et al., 2020; Wang et al., 2020). In addition, this relation proves on users' concern about overall service quality due to its direct impact on attitudes in the smart policing environment. The findings suggest that the suitability of smart policing platform in the UAE will be depending on users' perception and their disconfirmation of beliefs which are the key to smart public safety and security domain in the smart government framework (Guenduez et al., 2020; Valle-Cruz et al., 2020).

This is consistent with cumulative findings of earlier research that indicates that attitude is linked to the cost-benefit paradigm in which the decision-making is based on subjective perceptions of the individual about performance and expectation (Bourne, 2016; Ekaabi et al., 2020a; Jansen & Ølnes, 2016). Furthermore, literature also has evidenced that the critical role of disconfirmation of beliefs (Mustafa et al., 2020; Zhu et al., 2018) for predicting human behaviours in IT adoption has been empirically proven and has gained general acceptance in the smart government, service quality and policing literature (Chatfield & Reddick, 2019; Ekaabi et al., 2020a; Eom et al., 2016; Wirtz et al., 2019).

Therefore, in public-police interaction of smart policing services, it is essential to assure adequate quality perception at every single touchpoint in order to influence user attitudes.

7.3.2.3 SMART POLICING SERVICE QUALITY EFFECTS ON TRUST (H3)

The results find that smart policing service quality is a significant predictor of trust ($\beta = 0.896$, $p < 0.001$), in which smart policing service quality contributes as much as 80.3 per cent (R^2) in trust. This findings indicate that overall smart policing service quality is one of the major drivers of trust. As a consequence, a higher level of smart policing service quality creates a greater user trust on smart policing services (Chatfield & Reddick, 2019; Ekaabi et al., 2020a; Mergel et al., 2018). The results propose that this depends on users' perceptions of smart policing service quality. Scholars evidence that users' experience of service quality supports the level of trust (Chatfield & Reddick, 2019; El-Haddadeh et al., 2019; Wirtz et al., 2019). These interlinks are due to better user quality experience of police services that lead to the belief of the ability of the service to meet user expectations (Candiello et al., 2012; Ekaabi et al., 2020a; Mergel et al., 2018).

Following the findings in the literature, this study also found that trust supports the perception of trustworthiness in overall smart policing service quality because of its effectiveness and consistency in task performance that meets users' interest (Chatfield & Reddick, 2019; Kankanhalli et al., 2019; Wirtz et al., 2019). This is consistent with recent studies that have empirically

proven the critical role of disconfirmation of beliefs (Abu Salim et al., 2020; Mustafa et al., 2020) for predicting human behaviours in smart technology adoption. Therefore, this study suggests trust as a critical success factor in smart government, service quality and policing literature.

As such, the results of this study identified trust as a necessary condition for user satisfaction in the smart policing context. Consequently, the smart policing service provider should consider service quality and trust as strategic objectives in order to sustain smart policing in smart government in the UAE.

7.3.2.4 ATTITUDE EFFECTS ON SATISFACTION (H4)

The findings confirm that attitudes are a significant predictor of satisfaction ($\beta = 0.710$, $p < 0.001$) by explaining 86.3 per cent of (R^2). The findings indicate that attitudes contribute to user satisfaction in the smart policing context. This relationship is predominantly relevant in smart policing where there is an interactive nature of the disconfirmation of beliefs (Santa et al., 2019; Zhang et al., 2019) on affective response (Harris & Jones, 2020; Lai & Zhao, 2010). This study identifies satisfaction as the overall discretionary behaviour driven by users' feelings at the time they use the system, rather than the impact of the system (Arcand et al., 2017; Silva et al., 2017). Therefore, it confirms the instrumental role of attitudes in shaping the positive outcome of satisfaction. As technology-enabled service quality receives much focus to improve satisfaction in safety and security domain of smart government (i.e.,

policing) (Yamin et al., 2020), this study confirms the relation between attitudes and satisfaction in the UAE.

The findings demonstrate how smart-led service platform has an effect on attitudes leading to increased user satisfaction. As such, satisfaction is considered as post-adoption, that reflects on users' conditional behavior built on feelings-based evaluation of service requirements (Ives et al., 1983; Thakur, 2014). Studies propose that smart policing service quality success is dependent on the understanding of the needs and expectations of the end-users (Chui et al., 2019; Lytras et al., 2020). As many have suggested, end-users' perspective addresses the need for a more integrated and holistic understanding of users' perceptions about smart policing service quality relating to their psychological and social beliefs based on consumption experiences (Chatfield & Reddick, 2019; Ekaabi et al., 2020ab; Ismagilova et al., 2019). From a complementary perspective, it is also crucial in ensuring the uniqueness of smart policing services that aims to match the individual needs of the end-users. Therefore, users' attitudes are the key determinants of users' satisfaction. In the social cognitive theory, attitudes constitute a significant determinant of behavioural changes (Rana & Dwivedi, 2015). As such, in smart policing service quality, attitudes are likely to strengthen a user's satisfaction level in using the system (Chatfield & Reddick, 2019; Ismagilova et al., 2019). Also, in police services, quality perceptions and attitudes have a strong influence on one's inclination to be satisfied in using such services (Ekaabi et al., 2020a).

Most importantly, the findings show how smart-led service platform increases the attitudes of its user and drive users' satisfaction. In other words, users' feelings or attitudes measure satisfaction during the time they use the system, rather than the impact of the system (Arcand et al., 2017; Silva et al., 2017). Therefore, the findings confirm a richer understanding of the role of attitudes in improving users' satisfaction that offers the social benefits of smart government, in particular in the security domain (Chatfield & Reddick, 2019; Ekaabi et al., 2020a; Ekaabi et al., 2020b; Ismagilova et al., 2019; Ranchordás & Goanta, 2019).

7.3.2.5 TRUST EFFECTS SATISFACTION (H5)

The results support trust as a key predictor of satisfaction ($\beta = 0.208$, $p < 0.001$), explaining 86.3 per cent of (R^2). This relationship suggests that an increase in trust will enhance satisfaction. Consequently, this relation demonstrates the significant impact of trust on the level of users' satisfaction. This finding indicates that users' feelings in the UAE are much affected by their consumption experiences on the smart policing service quality. The more they experience positive feelings on smart policing service quality, the more they are satisfied with the smart policing service quality.

This finding is consistent with the extant literature which supports the relationship between attitudes and satisfaction (Venkatesh et al., 2016; Wang et al., 2020). As the goal of the smart policing provider is to increase users' engagement (i.e., trust), the understanding of smart-led dynamics will change and have an effect on engagement in this context (Ahmad & Khalid, 2017;

Chatfield & Reddick, 2019; Gil-Garcia et al., 2019; Ismagilova et al., 2019). In the same vein, in fulfilling the safety and security needs of residents and citizens, users' expectations will be met. Policing services' ability to meet users' expectation, may, in turn, increase the tendency for users to respond favourably, thus increase the possibility that users' needs will be more satisfied. (Bouranta et al., 2015; Elnaghi et al., 2019; Kuo & Lord, 2019). Aligned with other studies that identify satisfaction as an outcome variable of overall service quality and trust, this study has verified how smart policing service quality contributes to relationship quality outcomes (trust and satisfaction). In the police service context, research has established the positive link between trust and satisfaction (Chen et al., 2014; Kuo & Lord, 2019; Lai & Zhao, 2018; Madan & Nalla, 2015; Sarrico et al., 2013; Tyler et al., 2015; Vuorensyrjä, 2018). This is consistent with scholars that suggest that disconfirmation of beliefs (Abu Salim et al., 2020; Mustafa et al., 2020) governs affective response (Criado & Gil-Garcia, 2019; Lopes et al., 2019) in predicting human behaviours in smart technology adoption. To conclude, the study suggests trust as a critical element in measuring user satisfaction.

Therefore, this finding suggests that the outcome of smart policing service quality should be viewed in terms of trust and satisfaction derived from consumption. In addition to trust, it is necessary to integrate the degree of perceived improvement in the satisfaction level as a critical service outcome of smart policing service quality performance evaluation in the UAE.

7.3.2.6 TRUST EFFECTS ATTITUDES (H6)

The findings of the study examine and confirm trust affecting users' attitudes ($\beta = 0.133$, $p < 0.001$), explaining 91.0 per cent of (R^2). The overall results found that perceptions of overall smart policing service quality and trust affect attitudes. Meanwhile, satisfaction represents the discretion of evaluation from the experiences of smart policing service quality, trust and attitudes represent the engagement level further enabling evaluation. This finding indicates that an increase in the perception of trust also increases the degree of attitudes (Dagger et al., 2007). The findings suggest that it is important to understand how trust evaluation affects users' psychological feelings. This is important as disconfirmation of beliefs is proven to strengthen and deepen the relationship within the relationship quality in smart policing service quality in the UAE.

Earlier studies evidenced attitudes and trust as the behavioural mental structure that may successfully define the service performance of public services (Argento et al., 2019), in particular smart policing services (Ekaabi et al., 2020a). This study has bridged the gaps of previous research and found trust and attitudes to be the service quality consequences and outcomes as part of the relationship quality. Consistent with the suggestion by Moon and Armstrong (2020) and Vesel and Zabkar (2010), the result of this study confirmed attitudes as a critical component of relationship quality as the organisation-users relationship is unique in various settings.

Therefore, it is essential to frame attitude and trust as antecedents to further understand users' perceptions and expectations regarding smart

policing service quality. Clearly, this understanding makes an important contribution to the service quality, police services and smart government theory by recognising the impact of service quality that eventually promotes sustainability, as well as the utilisation of social and relational capitals that require modern, progressive, and contemporary policing services (Hu and Lovrich, 2019; Liou, 2019).

7.3.2.7 TRUST AND ATTITUDES AS MEDIATOR (H6)

The findings of the study also investigate and confirm the mediating role of trust and attitudes on satisfaction. The findings evidenced that trust explained 86.3 per cent of the total effect of service quality on satisfaction. As such, a strong mediating role of trust was found between smart policing service quality and satisfaction, confirming that it is important to measure trust separately from smart policing service quality when modelling the effects of quality and outcome constructs. This relationship suggests that trust directly increases with the perceived service quality, which in turn is critically crucial for forming and influencing satisfaction.

The findings support the mediating role of attitudes that explained 86.3 per cent of the total effect between service quality on satisfaction, and between trust and satisfaction. The result has proven that a strong mediating role of attitudes was found between service quality on satisfaction, and between trust and satisfaction, confirming that it is crucial to distinctly evaluate attitudes apart from the smart policing service quality when modelling the effects of quality and outcome constructs. This relationships suggest that attitudes

directly improve with the perceived service quality, and trust, that are significantly important for influencing satisfaction.

These findings also support the main effect model (refer Figure 9) which confirms that smart policing service quality has a direct effect on trust and attitudes as well as an indirect impact on satisfaction. The result is consistent with the theory of reasoned action (Fishbein & Ajzen, 2010), and the theory of planned behavior (Ajzen & Fishbein, 1980) that highlight the important role of trust and attitudes as the mediator between service quality (e.g., cognitive beliefs) and satisfaction (e.g., affective). The disconfirmation of beliefs (Abu Salim et al., 2020; Mustafa et al., 2020) on the role of trust and attitudes in predicting human behaviors has shed some light in psychology (Fishbein & Ajzen, 2010), marketing (Zeithaml et al., 2020), and information management literature (Ahmad & Khalid, 2017; Almutawa et al., 2018; Chatfield & Reddick, 2019; Elkaabi et al., 2020a; Elkaabi et al., 2020b) in smart-mediated adoption of police services. These are aligned with the research that suggest that relationship quality encompasses satisfaction, trust and attitudes (Boonlertvanich, 2019; Ekaabi et al., 2020a; Prentice et al., 2019).

Therefore, findings of this study lend support to the extant literature with the argument that trust and attitudes are the major drivers of positive satisfaction perception (Bordoloi et al., 2019; Oliver, 1997). Overall, the results of this study highlight the importance of these effects in the smart policing service quality context using the higher order service quality model.

7.4 CONTRIBUTION OF THE STUDY

The section discusses the theoretical and practical contributions of the generated findings. Theoretically, the study extends the service quality research by reframing the concept as a reflective hierarchical construct and modelling its impact on trust, attitudes and satisfaction in smart policing service quality in the UAE. Practically, the study provides managers with a service quality model for conducting an integrated analysis and design of service delivery systems. Overall, the study offers a significant contribution to support social services, public sector services, better public safety and security, and improved smart government services in the UAE.

7.4.1 CONTRIBUTION TO THEORY

Previous studies in policing have mostly employed the SERVQUAL scale that focuses on users' perceptions of quality and the measurement of quality as a single entity. Other relevant issues in policing, such as integrity and transparency, have received far less attention. This study's outcomes contribute to the research on the measurement of smart policing service quality and form the basis for future studies within this context.

First of all, this study adds to the existing literature by defining policing service quality in smart services. Specifically, smart policing service quality is defined by a group of constitutive elements that may vary in their service quality. The smart policing user perceives and organises the policing service quality as a hierarchical structure with a multidimensional construct

comprising of five dimensions. This study extends the service quality research in the police services domain by developing and validating a higher-order smart policing service quality model on five primary dimensions (i.e., integrity, transparency, interactivity, responsiveness and serviceability). By encompassing the combined explanatory power of each component, the smart policing quality model advances the service quality theory in organisational, marketing and information management research while presenting a parsimonious structure. Scholars suggest that this method enhances the qualities of completeness, rigorousness, and thoroughness to the theoretical work (Crittenden et al., 2020; Marsh et al., 2020). Specifically, the study contributes in several ways to service quality research in the police services domain. This study has defined the domain of five primary smart policing service quality constructs. Notably, this study is the first study which attempts to assess smart policing from an e-service quality perspective using measures that differ from SERQUAL (Parasuraman et al., 1991) and e-service quality (Parasuraman et al., 2005). This study, therefore, provides a foundation for further development of the constructs under focus. This study suggests on the conceptualisations of smart policing quality which need to be expanded through further research. As the nature of smart policing quality is, necessarily, citizen-centric for user satisfaction, it is recommended that these constructs should be redefined according to the increasing sophistication of devices, mobile applications, and network technologies; all of which are important to increase the smart platform visibility which is now strategically imperative for policing.

Secondly, the theoretical concepts discussed in this study demonstrate the evolution of dual-service quality concepts for technical and functional qualities (Grönroos, 1984). However, from an empirical basis, the present study supports arguments by researchers to advance integrity and transparency components into technical quality due to the distinct central values of ethics between the public and private service sectors (Huberts, 2018; Kaptein & Avelino, 2005; Van der Wal et al., 2006). This is critical in order to match the citizen-centric context of smart policing. The importance of integrity and transparency in police services is thereby brought to the fore, along with other issues relating to the unique citizen-centric context. It is believed that this perspective is particularly important due to the inherent intangible nature of smart policing. In other words, smart policing services are, in this way, subject to evaluation in terms of the quality of experience of the users. Furthermore, this study is also the first to introduce a theoretically well-grounded and relevant conceptualisation of smart policing service quality dimensions. The instruments of integrity, transparency, interactivity, responsiveness, and serviceability, as defined in this study, should offer direction for consequent investigations. Being able to measure smart policing service quality, this proven scale can potentially inspire future research and advance the understanding of smart policing service quality which extends beyond attitudes to technology and adoption of mobile capability (short-term), effectively assessing the impact of smart policing service quality on long term relationships. It is hoped that this measure will contribute to a dynamic theory of service management.

Thirdly, for a proper assessment of smart policing service quality, the instruments offered by this study should provide direction for subsequent investigations. Of course, it should be said that robust next-generation mobile networks and technology which offer higher user mobility, the internet of things, extreme real-time communication, ultra-reliable, and lifeline communication platforms, and broadcast-like services may ultimately be overwhelming and can cause disruption if managed poorly. As such, an IS success model (Delone & McLean, 1992) may offer an extended framework that relates directly to the net system benefits. This model proposes that service quality, system quality, and information quality are the antecedents to usage intention and user satisfaction which directly affect net system benefits. As a result, the gap between robust next-generation mobile networks and technology and service quality can be bridged and further understood. Therefore, this study presents a theoretically sufficient and relevant conceptualisation of smart policing service quality with an adequate measurement scale. By providing a scale for measuring policing service quality, this study encourages future studies aimed at understanding and enhancing the smart policing service quality. The results obtained in this study may also pave the way for academicians to investigate methods of improving the policing service quality within smart services. The expanding role of smart devices will likely lead to the improvement of policing service quality. This study will also assist researchers in studying smart policing service quality and its correlation with the general views on smart government service quality.

Next, the study has identified a comprehensive, yet parsimonious, set of dimensions that helps predict the quality of smart policing services and their association with the outcome constructs (i.e., trust, attitudes and satisfaction). The study adds novelty to the theory by modelling the association between overall smart policing service quality and relationship quality (i.e., trust, attitudes and satisfaction) which has not been investigated before. The study has framed trust and attitudes as disconfirmation of beliefs and satisfaction as the affective response of smart policing services. These conceptualisations and evaluations are important in understanding the role of smart policing service quality in social and financial benefits through trust, and attitudes in measuring the satisfaction of users. Given the importance to evaluate satisfaction in order to identify and replicate the best practices around the world, this evaluation can ensure acceptable social and economic returns to smart policing service platform in the UAE, which is required for its scalability and sustainability. This assessment is a direct contribution to the theory as it examines the factors that influence engagement in user behavior.

Thus, this study extends the scope of service quality research in this new domain by modelling the impact of service quality-relationship quality interaction in the smart-mediated platform. The uniqueness of the theory also lies in assessing the smart policing of an innovative service quality artifact in a new research setting (i.e., the UAE, high emerging economy) based on the evidence of users' perceptions. Although police services quality research has proven to be instrumental for the success of technology-mediated service platforms in the emerging economies, a lot of studies have focused on

innovations in policing, but less on scalability and sustainability of the police services (Yamin et al., 2020). Thus, in focusing on an innovative service quality of safety and security domain of smart government in the high-emerging countries such as the UAE, this study develops and validates a smart policing service quality model for a new setting. Research indicates that the common element in advancing the theory development is by applying it in new settings, where this new application should enrich the tool, not just confirming its utility (Akhtar et al., 2012; Bouranta et al., 2015; Donnelly et al., 2003; Sarrico et al., 2013). This study considers that the proposed theoretical framework makes a significant contribution to knowledge as most of its constructs and their relationship have not been the subject of prior theorising in this context. Therefore, smart policing service quality sheds light on a more dynamic and holistic smart government framework, in particular for public safety and security domain, where it will bring a fascinating new perspective to the field. This is consistent with scholars who mention that once a theme has been introduced into the field, the resonance of the theme within the field would encourage new work (Ausloos et al., 2019; Straub, 2009).

7.4.2 CONTRIBUTION TO PRACTICE

Service providers, police forces, and public-sector services can benefit from the findings of this study. Firstly, defining smart policing service quality allows the manager or the police officer supervisors to understand comprehensively and systematically the factors comprising policing service quality within the context of smart services, thereby avoiding managerial

infelicities and improving service quality in policing activities. Additionally, the proposed scale can be employed to assess other domains of the smart government systems, such as health care, energy, and utilities.

Secondly, the results indicate that users evaluate the service quality of smart policing collectively, encompassing the subdimensions of integrity, transparency, interactivity, responsivity, and serviceability. The managers of smart policing services should therefore focus on improving the quality of the services they provide across the basic components. For example, managers could improve users' perceptions of integrity by improving the elements of honesty, justice, fairness, trustworthiness, and security by being concerned with the feeling of safety and the maintenance of confidentiality among users.

Thirdly, the proposed model of smart policing service quality provides managers with a tool for conducting an integrated analysis and design of the service delivery model. It underscores that simply having a good functional platform (e.g., relevance, fulfilment, accessibility) is inadequate for delivering the desired levels of safety and security domains of service quality. Thus, managers need to address the quality of user-provider interaction and, above all, the quality-of-service benefits associated with the service quality. This provides a road map for making interventions in the smart policing service quality model that can target the improvement of a particular quality dimension at different levels. How an individual perceives smart policing service quality dimension and overall smart policing service quality was found to be a product of interaction between harnessing trust, attitudes, and

satisfaction upon which the scalability of this smart policing service quality paradigm can be initiated.

Fourthly, the findings shed light for managers in the public sector, particularly policing managers, on the value of the power of technical factors (i.e., integrity, transparency) for smart policing platforms. These dimensions, and their strategic relation to satisfaction mediated by trust and attitudes, are often overlooked in the public sector and are particularly important for maintaining long-term relationships with residents, a sector in which users are believed to be mostly driven by functional motives. The model presented by the study is adequate and useable for the public-sector organisational root case analysis. The smart policing service quality dimensions can be used to measure the expected-performance relationship of a public-sector organisation, offering information for further understanding of deficiencies, such as why quality or service deviations happen, and how to improve these deficiencies and deviations to improve customer satisfaction. Therefore, a more complex approach can be pursued based on dynamic domains to replace domains that may now be outdated and irrelevant due to the dynamic changes in public-sector organisations.

Fifthly, various smart government domains and relevant organisations may also utilise smart policing service quality as an indicator of performance, measuring the overall improvement of smart government services. The hope is that the hierarchical structure and the smart policing service quality scale proposed in this study will be used as diagnostic tools to help government organisations identify both smart services areas in which the use of the tools is

feasible as well as the areas that need improvement. Managers can adapt the scale to measure and manage smart services according to the specific needs of the respective domains. Finally, by utilising the smart policing service quality scale, sources of smart services and design management strategies can be identified to address the security and sustainability issues that persist in smart services. Managers will be able to implement efficient strategies to improve the perception of smart services quality based on objective measurements.

Overall, the findings on smart policing service quality dynamics will help practitioners improve the smart policing services in the United Arab Emirates (UAE) as a high-emerging country by facilitating the service perception, enhancing workflow, and promoting evidence-based practice to make informed and effective decisions directly based on users' insights.

7.5 LIMITATIONS

Firstly, only the relevant dimensions to the population of this study were considered because many participants may have experienced limited exposure to smart services; their responses may have excluded certain dimensions that would have been meaningful to smart policing service quality. Furthermore, the categories of some constructs (e.g., integrity, serviceability) are entirely based on the research context of the study; that is, smart policing service quality in the UAE. Future research can further explore and differentiate such constructs from other related constructs (e.g., sociability) or add some new constructs based on the dynamics of the research context.

Secondly, the sample only represents users from a high per capita income and emerging country ranked as the third safest country in the world (Al Serkal, 2020; Reynolds, 2020), thereby giving a limitation regarding the generalizability of findings to other users in developed and developing countries. As such, this research was conducted within the specific domain of the smart policing service quality and in the UAE. Although service quality research by its nature is context-specific, replications in other contexts would increase the confidence in the research model. There might be variation in perceptions of the components and consequences of smart policing service quality in Eastern and Western countries, or between developing and developed nations, or between those with low and high income per capita.

Thirdly, this study is restricted to be a cross-sectional study of smart policing user perspectives. Thus, the study contains typical limitations associated with this type of research methodology. For example, the model represents the static nature of service evaluation, as the findings are confined to a single point in time. Future studies could undertake a longitudinal approach to evaluate users' perceptions and evaluations of smart policing service quality over time. The heterogeneity of the target respondents makes the satisfaction level more dispersed and, consequently, more difficult to measure objectively. It would be interesting to test this framework for the effects of gender, age group, nationality, and household income perspectives to offer a further understanding of how variability in service quality expectations can affect the variability of user satisfaction levels.

Methodologically, although the study applied AMOS (SPSS Amos, IBM Corp., Armonk, NY, USA) path modelling to estimate a hierarchical model, AMOS path modelling needs to address some critical challenges to gain its full benefits as the best technique for complex hierarchical modelling. First, AMOS or a covariance-based approach should offer the flexibility of using smaller sample sizes; it should also be a more sensitive measure that enables performance review in a more effective way, allowing for more precise measurements due to the use of several criteria per dimension (Hair et al., 2019). Second, this approach should be able to handle multicollinearity in the data to deliver more robust results (Henseler et al., 2016). Third, a covariance-based approach should have less statistical restriction to assess the level of measurement, and the distribution of residuals to enable a prognosis of the change of the dependent variable (Sarstedt et al., 2019). This study challenges the suitability of AMOS as a predominant paradigm for complex hierarchical modelling.

7.6 FUTURE RESEARCH DIRECTIONS

Future research could take several new directions. Firstly, future studies should consider adopting the scales developed in this study to measure other policing services. Rather than studying residents only (as in this study), future studies might investigate the responses of expatriates or citizens to provide evidence that supports the generalisation of the generated findings. Studying stratified samples from diverse geographical locations, and with varying income per capita status, should be considered in order to provide more

insights about smart policing service quality. These factors include the level of education and communication systems, technological sophistication, and the level of service expectation (Chatfield & Reddick, 2019; Ekaabi, et al., 2020b; Yamin et al., 2020; Zeithaml et al., 2020). Information on these differences across cultures might be of considerable interest and significance to both researchers and practitioners for critical managerial decision making. However, the consistency in instrument development and validation, response bias as regards measurement equivalence, the demographic profile of respondents and response style.

Secondly, this study can be complemented with the impact evaluation of the antecedent factors of smart policing service quality: the model of citizen's adoption and use of e-government proposed by Venkatesh *et al.* (2016) with the inclusion of experiences and personal needs as additional moderating variables. Indeed, the combination of information technology models can provide a better understanding of how to support the IS success model theory. This may serve as a stepping stone for future inquiry into the emerging area of the management of public sector service quality.

Thirdly, the newest industrial revolution took place in the UAE, and the global landscape is marked by emerging technologies which are transforming the entire system of governance. To that end, it is suggested that future research measures the level of smart policing service quality across time and examines whether the variables in this study change at multiple stages of robust next-generation mobile network and technology. This is crucial because

smart policing is still relatively new and represents an emerging trend in the UAE.

7.7 CONCLUSIONS

The objective of this study is to identify the dimensions of smart policing service quality and model the impact of overall smart policing service quality on trust, attitudes and satisfaction, in the UAE. To serve the objective, a systematic literature review of service quality and police services was undertaken. Underpinning the literature on service quality, trust, attitudes and satisfaction, a conceptual framework and a set of hypotheses were developed. The research model was specified as a hierarchical-reflective model which was then tested in smart policing service quality in the UAE. A total of 110 samples were analysed to develop and validate an instrument and 521 samples were analysed to test the conceptual model. The study applied AMOS path modelling, a covariance-based approach to estimate the hierarchical model and test the relationships among constructs. The findings of the study confirm the adequate measurement and structural properties of the research model, accepting five main hypotheses. In addition, the study confirms the direct impact of smart policing service quality on trust and attitudes as well as the significant impact of trust and attitudes as a mediator on satisfaction. However, the study does not support the direct relation between hierarchical smart policing service quality construct on satisfaction.

The most significant contribution of the study lies in providing critical insights in service quality research in the smart policing service model by

reframing the service quality as a second-order, hierarchical reflective construct and modelling its overall effects on individual trust, attitudes and satisfaction outcomes. These relationships of the research model are based on adequate logical (i.e., a theory is internally consistent), epistemological (i.e., rigour in research design) and empirical (i.e., robust findings) evidence. The findings of the study are highly valuable to managers to capture users' smart policing service quality perceptions which have been evidenced as hierarchical, multidimensional and context-specific. This knowledge provides an important step on the path to providing conceptual clarity and practical solutions to the service quality challenges of smart policing service quality service model in the UAE. Although proposed in smart policing services, this model may be of interest to any public service quality management model under the umbrella of smart government. The study hopes that this research will serve as a catalyst for action by encouraging both researchers and practitioners to embrace service quality as a core concept in public service systems research.

Overall, the findings have made it evident that smart policing service quality will be beneficial to address the pressing safety and security needs of users. However, the overall development of this ubiquitous smart policing platform will be driven by service quality perception and its effects on trust, attitudes and satisfaction of users. As such, the findings of the study suggest an integrated quality assessment approach in order to create an empowering safety and security domain of the smart governance environment for smart policing service quality in the UAE. In this regard, the smart policing service

quality model will play an instrumental role in evaluating users' trust, attitudes and satisfaction in the UAE. Overall, it is believed that the findings will help transform the smart policing service quality model in the UAE and other emerging countries.

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APPENDIX 1. English Questionnaire

Impact of Smart Policing



جامعة أبوظبي
ABU DHABI UNIVERSITY

Section A: Demographic Profiles

What is your gender? *

- ☐ Male
- ☐ Female

What is your age group? *

- ☐ 18 - 23 years old
- ☐ 24 - 29 years old
- ☐ 30 - 35 years old
- ☐ 36 - 41 years old
- ☐ 42 - 47 years old
- ☐ 48 - 53 years old
- ☐ 54 years and above

Which Nationality best describes you? *

- ☐ Emirati
- ☐ GCC Nationals - Non Emirati
- ☐ MENA Nationals - Non GCC
- ☐ North America
- ☐ South America
- ☐ Asian
- ☐ European
- ☐ African
- ☐ Other:

How frequent do you use the MOI Mobile Apps: Police-Related matters? *

- ☐ Once a year
- ☐ 2 - 5 times a year
- ☐ 6 - 10 years a year
- ☐ 11 and more a year

Section B

Please indicate the extent to which you agree or disagree with each of the following statements. Kindly choose one of the number in the following statements that best reflects your degree of agreement or disagreement according to the following scale.

Responsivity

R1. The apps enable quick completion of transaction *

1 2 3 4 5 6 7

Strongly Disagree

☐☐☐☐☐☐☐

Strongly Agree

R2. The apps are fast *

	1	2	3	4	5	6	7	
Strongly Disagree	☐	☐	☐	☐	☐	☐	☐	Strongly Agree

R3. The apps are simple to use *

	1	2	3	4	5	6	7	
Strongly Disagree	☐	☐	☐	☐	☐	☐	☐	Strongly Agree

R3. The apps are simple to use *

	1	2	3	4	5	6	7	
Strongly Disagree	☐	☐	☐	☐	☐	☐	☐	Strongly Agree

R4. The apps make it easy to find what I need *

	1	2	3	4	5	6	7	
Strongly Disagree	☐	☐	☐	☐	☐	☐	☐	Strongly Agree



R5. The apps are easy to navigate *

1 2 3 4 5 6 7
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree

R6. The apps are well organized *

1 2 3 4 5 6 7
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree

R7. The apps are high performing *

1 2 3 4 5 6 7
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree

R8. The apps are consistent *

1 2 3 4 5 6 7
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree

INTERACTIVITY

I1. The apps are appealing *

	1	2	3	4	5	6	7	
Strongly Disagree	☐	☐	☐	☐	☐	☐	☐	Strongly Agree

I2. The apps have relevant content *

	1	2	3	4	5	6	7	
Strongly Disagree	☐	☐	☐	☐	☐	☐	☐	Strongly Agree

I3. The apps add the most value *

	1	2	3	4	5	6	7	
Strongly Disagree	☐	☐	☐	☐	☐	☐	☐	Strongly Agree

14. The apps adapt to user's needs *

1 2 3 4 5 6 7
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree

15. The apps access to data and information from any location *

1 2 3 4 5 6 7
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree

16. The apps capture real-time evidence *

1 2 3 4 5 6 7
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree

17. The apps enable real-time communication *

1 2 3 4 5 6 7
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree

I8. The apps allow real-time collaboration *

1 2 3 4 5 6 7
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree

SERVICEABILITY

S1. The apps are compatible with mobile platform *

1 2 3 4 5 6 7
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree

S2. The apps provide helpful customer support *

1 2 3 4 5 6 7
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree

S3. The apps offer relevant testimonials *

1 2 3 4 5 6 7

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree

S4. The apps provide constantly new updates *

1 2 3 4 5 6 7

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree

S5. The apps do not crash *

1 2 3 4 5 6 7

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree

S6. The apps offer live chat for immediate customer service *

1 2 3 4 5 6 7

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree

S7. The apps provide reliable service *

1 2 3 4 5 6 7
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree

S8. The apps secure communications *

1 2 3 4 5 6 7
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree

TRANSPARENCY

T1. The apps performance is constantly updated *

1 2 3 4 5 6 7
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree

T2. The apps transparently disclosing the negative testimonials *

1 2 3 4 5 6 7

Strongly Disagree

☐ ☐ ☐ ☐ ☐ ☐ ☐

Strongly Agree

T3. The apps disclose sufficient information *

1 2 3 4 5 6 7

Strongly Disagree

☐ ☐ ☐ ☐ ☐ ☐ ☐

Strongly Agree

T4. The apps provide the contact number of the person in-charge *

1 2 3 4 5 6 7

Strongly Disagree

☐ ☐ ☐ ☐ ☐ ☐ ☐

Strongly Agree

INTEGRITY

IG1. The apps performed as promised *

1 2 3 4 5 6 7
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree

IG2. The apps content is reliable *

1 2 3 4 5 6 7
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree

IG3. The apps content is fulfilled *

1 2 3 4 5 6 7
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree

IG4. The apps are truthful about its offerings *

1 2 3 4 5 6 7
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree



IG5. The apps provide personal data protection *

1 2 3 4 5 6 7
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree

TRUST

TR1. The apps are trustworthy *

1 2 3 4 5 6 7
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree

TR2. The apps are competent *

1 2 3 4 5 6 7
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree

TR4. I trust the apps *

1 2 3 4 5 6 7
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree

ATTITUDE

A1. The apps are ideal *

1 2 3 4 5 6 7
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree

A2. The apps provide pleasant experience *

1 2 3 4 5 6 7
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree

A3. The apps are convenience *

1 2 3 4 5 6 7
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree

SATISFACTION

SF1. The apps satisfied my needs *

1 2 3 4 5 6 7
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree

SF2. I intend to continue using the apps *

1 2 3 4 5 6 7
Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Strongly Agree

SF3. I put effort to update the apps whenever needed *

1 2 3 4 5 6 7

Strongly Disagree

☐ ☐ ☐ ☐ ☐ ☐ ☐

Strongly Agree

SF4. The apps met my expectation *

1 2 3 4 5 6 7

Strongly Disagree

☐ ☐ ☐ ☐ ☐ ☐ ☐

Strongly Agree

SF5. The apps met the expected performance *

1 2 3 4 5 6 7

Strongly Disagree

☐ ☐ ☐ ☐ ☐ ☐ ☐

Strongly Agree

END OF SURVEY

THANK YOU FOR YOUR PARTICIPATION

APPENDIX 2. Arabic Questionnaire

تأثير جودة الخدمة الشرطية الذكية على الثقة والمواقف والرضا في دولة الإمارات العربية المتحدة
:عزيزي المشارك

اسمي مريم احمد محمد عقابي (رقم الطالب: 1054859) ، وأنا طالبة دكتوراه في جامعة أبوظبي. أدعوكم للمشاركة في استطلاع للتحقيق في تأثير جودة خدمة الشرطة الذكية على الثقة والمواقف والرضا في دولة الإمارات العربية المتحدة. تم اختيارك للدراسة لأنك مواطن / مقيم في دولة الإمارات العربية المتحدة ، وموقفك وثقتك ورضائك في استخدام الشرطة الذكية أمر بالغ الأهمية ، وأنا أدعوك للمشاركة في هذه الدراسة البحثية من خلال استكمال الاستبيان

إذا اخترت المشاركة طوعية ، فإن إكمال الاستبيان سيظهر موافقتك على موافقتك على المشاركة ، ويمكنك رفض المشاركة في أي وقت. سيكون من دواعي تقديرك أن تتمكن من الإجابة على جميع الأسئلة بأمانة قدر الإمكان. يجب أن يستغرق المسح حوالي 5 إلى 7 دقائق. لا يوجد تعويض عن الاستجابة ولا توجد أي مخاطر معروفة. للتأكد من أن جميع المعلومات ستبقى سرية ، يرجى عدم تضمين اسمك

شكراً لك على الوقت الذي قضيته في مساعدتي في مساعي التعليم. إذا كنت بحاجة إلى معلومات إضافية أو كانت لديك أسئلة ، فيرجى الاتصال بي على عنوان البريد الإلكتروني المدرج أدناه. إذا لم تكن راضياً عن الطريقة التي تُجرى بها هذه الدراسة ، فيمكنك الإبلاغ (بشكل مجهول إذا اخترت ذلك) عن أي شكوى إلى الدكتور خالزاني خالد ، رئيس اللجنة khalizani.khalid@adu.ac.ae

بإخلاص

مريم احمد محمد الكعبي

1054859@studentsaduac.onmicrosoft.com

القسم أ : التوزيع الديموغرافي

يرجى اختيار إجاباتك ذات الصلة

* الجنس؟ -1

☐ ذكر

☐ أنثى

* ما هي مجموعتك العمرية؟ -2

☐ 18 - 23 سنة

☐ 24 - 29 سنة

☐ 30 - 35 سنة

☐ 36 - 41 سنة

☐ 42 - 47 سنة

☐ 48 - 53 سنة

☐ 54 سنة فما فوق

3- * الجنسية ؟

- ☐ إماراتي
- ☐ مواطني دول مجلس التعاون الخليجي
- ☐ الدول العربية - غير دول مجلس التعاون الخليجي
- ☐ أمريكا الشمالية
- ☐ أمريكا الجنوبية
- ☐ الآسيوية
- ☐ أوروبي
- ☐ أفريقي
- ☐ أخرى

4- * عدد مرات استخدامك للتطبيقات الذكية الخاصة بوزارة الداخلية : المتعلقة بالمسائل الشرطية ؟

- ☐ مرة في السنة
- ☐ 2 - 5 مرات في السنة
- ☐ 6 - 10 مرات في السنة
- ☐ 11 و أكثر في السنة

القسم ب

. يرجى إدراج رأيك سواء (موافق) أو (غير موافق) و مدى موافقتك على العبارات التالية

الاستجابة

* يمكن من خلال خدمات التطبيق الذكي لوزارة الداخلية الانتهاء من المعاملات بشكل سريع -1

1 2 3 4 5 6 7

غير موافق بشده

☐☐☐☐☐☐☐

موافق بشده

*** التطبيق الذكي لوزارة الداخلية سريع -2**

	1	2	3	4	5	6	7	
غير موافق بشدة	☐	☐	☐	☐	☐	☐	☐	موافق بشدة

*** سهولة استخدام التطبيق الذكي -3**

	1	2	3	4	5	6	7	
غير موافق بشدة	☐	☐	☐	☐	☐	☐	☐	موافق بشدة

*** سهولة عملية البحث -4**

	1	2	3	4	5	6	7	
غير موافق بشدة	☐	☐	☐	☐	☐	☐	☐	موافق بشدة

*** سهولة عملية التنقل -5**

	1	2	3	4	5	6	7	
غير موافق بشدة	☐	☐	☐	☐	☐	☐	☐	موافق بشدة



* التطبيق الذكي منظم بشكل جيد -6

	1	2	3	4	5	6	7	
غير موافق بشدة	☐	☐	☐	☐	☐	☐	☐	موافق بشدة

* التطبيق الذكي عالي الأداء -7

	1	2	3	4	5	6	7	
غير موافق بشدة	☐	☐	☐	☐	☐	☐	☐	موافق بشدة

* التطبيق الذكي متناسق -8

	1	2	3	4	5	6	7	
غير موافق بشدة	☐	☐	☐	☐	☐	☐	☐	موافق بشدة

التفاعل

* التطبيق الذكي يجذب المستخدمين -1

	1	2	3	4	5	6	7	
غير موافق بشدة	☐	☐	☐	☐	☐	☐	☐	موافق بشدة

* التطبيق الذكي لديه محتويات ذات صلة -2

	1	2	3	4	5	6	7	
غير موافق بشدة	☐	☐	☐	☐	☐	☐	☐	موافق بشدة

* التطبيق الذكي يعطي قيمة للمتعامل -3

	1	2	3	4	5	6	7	
غير موافق بشدة	☐	☐	☐	☐	☐	☐	☐	موافق بشدة

* التطبيق الذكي مبني على تلبية حاجات المستخدمين -4

	1	2	3	4	5	6	7	
غير موافق بشدة	☐	☐	☐	☐	☐	☐	☐	موافق بشدة

* إمكانية الوصول للمعلومات و البيانات من أي مكان في التطبيق الذكي -5

	1	2	3	4	5	6	7	
غير موافق بشده	☐	☐	☐	☐	☐	☐	☐	موافق بشده

* التطبيق الذكي يزودنا بالأدلة الحقيقة -6

	1	2	3	4	5	6	7	
غير موافق بشده	☐	☐	☐	☐	☐	☐	☐	موافق بشده

* التطبيق الذكي يمكننا من التواصل بشكل حقيقي -7

	1	2	3	4	5	6	7	
غير موافق بشده	☐	☐	☐	☐	☐	☐	☐	موافق بشده

* يتيح لنا التطبيق الذكي التعاون في الوقت الفعلي -8

	1	2	3	4	5	6	7	
غير موافق بشده	☐	☐	☐	☐	☐	☐	☐	موافق بشده



قابلية الخدمة

* التطبيق الذكي لوزارة الداخلية متوافق مع أجهزة الهواتف المحمولة -1

1 2 3 4 5 6 7
غير موافق بشدة موافق بشدة

* يوفر تطبيق الذكي لوزارة الداخلية خاصية دعم العملاء -2

1 2 3 4 5 6 7
غير موافق بشدة موافق بشدة

* يوفر تطبيق الذكي لوزارة الداخلية شهادات ذات صلة بالمستخدمين -3

1 2 3 4 5 6 7
غير موافق بشدة موافق بشدة

* يوفر التطبيق الذكي لوزارة الداخلية تحديثات جديدة باستمرار -4

	1	2	3	4	5	6	7	
غير موافق بشدة	☐	☐	☐	☐	☐	☐	☐	موافق بشدة

* التطبيق الذكي لوزارة الداخلية لا يحدث فيه تدخل للمعلومات -5

	1	2	3	4	5	6	7	
غير موافق بشدة	☐	☐	☐	☐	☐	☐	☐	موافق بشدة

* يتوفر في التطبيق الذكي لوزارة الداخلية خدمة التحدث الفوري للعملاء -6

	1	2	3	4	5	6	7	
غير موافق بشدة	☐	☐	☐	☐	☐	☐	☐	موافق بشدة

* يقدم التطبيق الذكي لوزارة الداخلية خدمات ذات ثقة -7

	1	2	3	4	5	6	7	
غير موافق بشدة	☐	☐	☐	☐	☐	☐	☐	موافق بشدة



الشفافية

* يوفر التطبيق الذكي لوزارة الداخلية اتصال آمن -8

	1	2	3	4	5	6	7	
غير موافق بشدة	☐	☐	☐	☐	☐	☐	☐	موافق بشدة

* يتم تحديث أداء التطبيق باستمرار -1

	1	2	3	4	5	6	7	
غير موافق بشدة	☐	☐	☐	☐	☐	☐	☐	موافق بشدة

* التطبيق الذكي لوزارة الداخلية يفصح بشفافية عن الأعطال و التعليقات السلبية -2

	1	2	3	4	5	6	7	
غير موافق بشدة	☐	☐	☐	☐	☐	☐	☐	موافق بشدة

* يكشف التطبيق الذكي لوزارة الداخلية عن المعلومات بشكل كافي -3

	1	2	3	4	5	6	7	
غير موافق بشدة	☐	☐	☐	☐	☐	☐	☐	موافق بشدة

* يوفر التطبيق الذكي لوزارة الداخلية رقم التواصل للشخص المسؤول -4

	1	2	3	4	5	6	7	
غير موافق بشدة	☐	☐	☐	☐	☐	☐	☐	موافق بشدة

النزاهة

* يوفر التطبيق الأداء المطلوب -1

	1	2	3	4	5	6	7	
غير موافق بشدة	☐	☐	☐	☐	☐	☐	☐	موافق بشدة

* يوفر التطبيق محتوى موثوق -2

	1	2	3	4	5	6	7	
غير موافق بشدة	☐	☐	☐	☐	☐	☐	☐	موافق بشدة

* يوفر التطبيق محتوى كافى -3

	1	2	3	4	5	6	7	
غير موافق بشدة	☐	☐	☐	☐	☐	☐	☐	موافق بشدة

* التطبيقات صادقة في عروضها -4

	1	2	3	4	5	6	7	
غير موافق بشدة	☐	☐	☐	☐	☐	☐	☐	موافق بشدة

* التطبيق الذكي يوفر خاصية الحماية للبيانات الشخصية -5

	1	2	3	4	5	6	7	
غير موافق بشدة	☐	☐	☐	☐	☐	☐	☐	موافق بشدة



الثقة

* التطبيق الذكي جدير بالثقة -1

غير موافق بشدة موافق بشدة

1	2	3	4	5	6	7
☐	☐	☐	☐	☐	☐	☐

* التطبيق الذكي متخصص ومؤهل -2

غير موافق بشدة موافق بشدة

1	2	3	4	5	6	7
☐	☐	☐	☐	☐	☐	☐

* أنا أثق بالتطبيق الذكي لوزارة الداخلية -4

غير موافق بشدة موافق بشدة

1	2	3	4	5	6	7
☐	☐	☐	☐	☐	☐	☐

السلوك

* التطبيق الذكي مثالي -1

	1	2	3	4	5	6	7	
غير موافق بشدة	☐	☐	☐	☐	☐	☐	☐	موافق بشدة

* التطبيق يوفر تجربة ممتعة -2

	1	2	3	4	5	6	7	
غير موافق بشدة	☐	☐	☐	☐	☐	☐	☐	موافق بشدة

* التطبيق سهل الاستخدام -3

	1	2	3	4	5	6	7	
غير موافق بشدة	☐	☐	☐	☐	☐	☐	☐	موافق بشدة

الرضا

* التطبيق الذكي يلبي كافة احتياجاتي -1

	1	2	3	4	5	6	7	
غير موافق بشده	☐	☐	☐	☐	☐	☐	☐	موافق بشده

* أراغب بالاستمرار في استخدام التطبيق الذكي -2

	1	2	3	4	5	6	7	
غير موافق بشده	☐	☐	☐	☐	☐	☐	☐	موافق بشده

* أقوم بتحديث التطبيق الذكي حين يتطلب ذلك -3

	1	2	3	4	5	6	7	
غير موافق بشده	☐	☐	☐	☐	☐	☐	☐	موافق بشده

* التطبيق الذكي يتوافق مع توقعاتي -4

	1	2	3	4	5	6	7	
غير موافق بشده	☐	☐	☐	☐	☐	☐	☐	موافق بشده



* التطبيق الذكي يحقق الأداء المتوقع -5

1

2

3

4

5

6

7

غير موافق بشدة

☐☐☐☐☐☐☐

موافق بشدة

نهاية الاستبيان

شكرا لك لمشاركته القيمة

APPENDIX 3. IRB Approval

RE: MY IRB FORM - Message (Plain Text)

FileMessageHelp

Tell me what you want to do

Ignore

Delete

Archive

Junk

Reply

Reply All

Forward

More

Meeting

Move

OneNote

Actions

Rules

Mark Unread

Categorize

Follow Up

Translate

Find

Related

Select

Read Aloud

Zoom

Delete

Respond

Move

Tags

Editing

Speech

Zoom

RE: MY IRB FORM

ED

Essam Dabbour

To Maryam Ahmed Mohamed Ekaabi

Cc Khalizani Khalid

IRB Close Out Form.doc

IRB Protocol Modification Form (Final).doc

Reply

Reply All

Forward

Wed 3/6/2019 5:54 PM

Dear Ms. Maryam

Based on the expedited review of your IRB application, I am pleased to inform you that the application is now approved. Please make sure that you adheres to the policy as well as to the approved protocols and questionnaire forms that were submitted. In case if you will need to make any changes to the protocols or the questionnaire forms, please fill out the attached change form and send it to me for approval prior to making those changes. Once the data collection process is completed, please fill out the attached closing form and return to me. Thank you and good luck in your research

Regards