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Smart Communication under Transforming Lifestyles:
User Study of Smart Mobile Devices among Hong Kong Youth

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Nowadays, people rely on smart mobile devices to coordinate their everyday lives. This thesis explores how Hong Kong's young generation is using smart mobile devices and how they have been integrated into people's everyday lives. By taking people, society, device, and service (PSDS) model into account, this research aims to better understand smart communication and how people use smart mobile devices in the information age. Utilising the findings from an empirical study on smart mobile devices and emotion communication among the young generation in Hong Kong, this study reveals six characteristics of smart communication – security, mobility, efficiency, coordination, sociability and enjoyability. The result illustrates the corresponding types of behaviour of young people in Hong Kong and their causes in smart communication. This research suggests a framework that contributes to the development of user experience design in smart communication, which provides references for smart mobile device manufacturers to design better mobile devices and user experiences for the future market.

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SMART COMMUNICATION UNDER TRANSFORMING LIFESTYLES: USER STUDY OF SMART MOBILE DEVICES AMONG HONG KONG YOUTH

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Smart Communication under Transforming Lifestyles: User Study of Smart Mobile Devices among Hong Kong Youth

CHEN Xin

A thesis submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy

August 2016

CERTIFICATE OF ORIGINALITY

I hereby declare that this thesis is my own work and that, to the best of my knowledge and belief, it reproduces no material previously published or written, nor material that has been accepted for the award of any other degree or diploma, except where due acknowledgement has been made in the text.

_____ (Signed)

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ABSTRACT

Social and individual lifestyle patterns are currently undergoing rapid changes, and with the advent of the mobile Internet, an increasing number of people are using smart mobile devices to coordinate their everyday lives. In Hong Kong, for example, smartphones have become widespread and young people have become dependent on them. From basic communication to searching for information on the Internet, shopping online and even hailing taxis, smartphones can help people to achieve their goals. Smart mobile devices have already made people's traditional lifestyles more intelligent, diversified, and convenient. This thesis explores how smart mobile devices are being used by Hong Kong's young people and to what extend they have become integrated into people's everyday lives.

This study considers the people, society, device, service (PSDS) model, which can help us to better understand the context of smart communication and how people use smart mobile devices in the information age. Questionnaire, observation and focus group interview research methods were used to compare preferences and user scenarios with regard to various smart mobile devices. Based on case studies of smart mobile devices and emoticon communication among Hong Kong's young people, an analysis of user behaviour and design directions was conducted. The study considers not only the current market, but also potential and future markets. In the context of developing diverse cultures, the trend of smart communication is leading to a new lifestyle in Hong Kong, which brings opportunities and challenges.

The study findings reveal six characteristics of smart communication – security, mobility, efficiency, coordination, sociability and enjoyability – and indicate the significant factors that influence these six characteristics, providing insights into the participants' personal device usage, experiences, feelings and emotions. The positive and negative effects of smart communication are discussed. The study analyses how the smart mobile device, as an information provider, can support people's daily lives, and how smart communication can both decrease and increase the distance between people. The findings show what smart communication characteristics can assure the quality of user experience. A framework inspired by the paths and cycles of smart communication was generated to probe the

underlying meaning of smart communication in terms of culture and technology, and to stimulate new ways of thinking about the interaction between culture and technology in an information society.

This study attempts to explain the different types of behaviour exhibited by young people in Hong Kong and the causes of their behaviour. It also suggests criteria for improved user experience design in the field of smart communication. The research outputs provide references for smart mobile device manufacturers, helping them to better understand users and thus design better mobile devices and user experiences for the future market.

LIST OF PUBLICATION

Chen, X., & Siu, K. W. M. **(**2017). Exploring user behaviour of emoticon use among Chinese youth. *Behaviour & Information Technology*, 36(6), 637-649.

Chen, X., & Siu, K. W. M. (2016). The influence and challenge of smart communication on the creative industry management in the big data age. In L. Ye, Y. Xiang & S. F. Chen (Eds.), *Peking University cultural industries review2014* (pp. 281-291). Beijing: Sino-Cutlure Press. (ISBN: 978-7-5075-4498-5)

Chen, X., & Siu, K. W. M. (2015). Smart communication in lifestyles under transformation: Exploring smart mobile devices user experience among youth in Hong Kong. *MobileHCI '15: 17th International Conference on Human-Computer Interaction with Mobile Devices and Services Adjunct Proceedings* (pp. 888-889). New York: Association for Computing Machinery (ACM).

Chen, X., & Siu, K. W. M. (2015). Smart communication in the context of lifestyle transformation: A case study of smartphone user behaviour among Hong Kong's young people. *The International Journal of Interdisciplinary Studies in Communication*, 9(2), 13-28.

Chen, X., & Siu, K. W. M. (2015). Exploring the smart communication trends from the mobile lifestyle among Beijing and Hong Kong youth. *Journal of Nanjing Arts Institute (Fine Arts & Design)*, 2015(2), 156-159.

Chen, X., & Siu, K. W. M. (2015). User experience design for the Hong Kong public transportation in the context of smart communication. In X. D. Zhao, J. J. Zhang & H. J. Han (Eds.*), Proceedings of QUIS14: Accelerate the Impact of Service Research* (pp. 928-938). Shanghai: QUIS14. (ISBN: 978-0-692-46156-3)

Chen, X., & Siu, K. W. M. (2014). Quality assurance of user experience design for smart communication in the context of lifestyle transformation. In S. M. Dahlgaard-Park & J. J. Dahlgaard (Eds.), *Proceedings of QMOD 2014* (CD-ROM). Lunk, Sweden: Lund University Library Press. (ISBN: 978-91-7623-086-2)

Chen, X., & Siu, K. W. M. (2013). Smart mobile devices in lifestyles under transformation: A comparative study of smart communication among youth in Hong Kong and Beijing. In: *Proceedings of 5th International Conference*, CCD 2013, Part II. New York, NY: Springer-Verlag, pp.383–392.

Li, Y. Z., **Chen, X**., Liu, G. Z., & Siu, K. W. M. (2013). Identifying design opportunity through group innovation: Extended thought of the workshop focusing on smart communication lifestyle. In J. Cai, T. Lockwood, C. S. Wang, G. Y. L. Tong & J. K. Liu (Eds.), *2013 Tsinghua International Design Management Symposium Proceedings* (pp. 37-43). Beijing: Beijing Institute of Technology Press.

(Above papers are generated during the PhD study. Parts of those papers are included in the thesis. Longer sentences and phases are referenced.)

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LIST OF ABBREVIATIONS

HCI	Human-Computer Interaction
ICTs	Information and Communication and Technologies
LBS	Location Based Service
MTR	Mass Transit Railway
OFCA	Office of the Communications Authority
OLS	Ordinary Least Square
SMS	Short Message Service
SNS	Social Networking Service
SSD	Self-Service Devices

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CHAPTER 1 INTRODUCTION

1.1 Background

The invention of the smart mobile device has brought about a tremendous transformation in our lifestyles (Agger, 2011), especially among young people who are keen to adopt new technology. As a smartphone is essentially a microcomputer, users have a mobile office in their pocket, and office mobility has increased at a dizzying pace. Mobile life has changed the way we communicate. It has added a freedom of movement and ease of use that provides a seamless connection to the social world (Kayastha et al., 2011). The everyday lives of the younger generation are undergoing drastic change and the mobile communication of young people represents a modern and fashionable lifestyle. An increasing number of new technologies have stimulated development requirements that advance this lifestyle. The mobile phone is not only a simple communication tool (Kim et al., 2012). Smart mobile devices have brought us great convenience and have met the demands that other tools have been unable to fulfil. Nowadays, perpetual contact is a trend in people's lives, and the smart mobile device can be seen as a dictator of this phenomenon (Katz & Aakhus, 2002).

The mobile phone has already changed social patterns and community organisation (Green, 2002; Janelle & Gillespie, 2004; Ling, 2004; Thulin & Vilhelmson, 2009). Smartphones, the new generation of mobile phones, exemplify the ubiquity of computing technology and the attention to user experience (Swallow et al., 2005).Most previous studies focused on the role of the mobile phone in instigating the concept of 'perpetual contact' in interpersonal communication (Katz & Aakhus, 2002; Licoppe, 2004; Ito & Okabe, 2005; Arminen & Weilenmann, 2009; Rice & Hagen, 2010; Schroeder, 2010). Mobile communication has changed the way we coordinate our interactions, allowing meeting times and locations to become more flexible. Indeed, communication technology has allowed people to overcome the barriers of time and space with ease (Haddon, 2004; Haythornthwaite & Wellman, 2002; Humphreys, 2010; Ling, 2004), resulting in 'more spontaneous or impulsive decision making – at least among young people' (Thulin & Vilhelmson, 2009, p. 142, cited in Ling & Haddon, 2003; Ling & Yttri, 2002). McCarthy and Wright (2004, p. 2) highlighted the fact that 'we don't just use technology, we live with it. Whether we are charmed by it or indifferent, technology is deeply embedded in our ordinary everyday experience.'

In recent years, smart mobile devices such as smartphones, tablets and e-readers have been assimilated into people's everyday lives. Such devices have gained popularity among a wide variety of users. Summers (2013) reported that 'The IDC's Worldwide Quarterly Mobile Phone Tracker expects 918.6 million smartphones to be sent out over the course of 2013, equal to 50.1% of total mobile phones shipped by vendors.' People now tend to use smartphones more than PCs. According to a survey by Compete, a web analytics company, around 65% of people use smartphones to read news feeds, post status updates, reply to messages and share photos (Mohan, 2014). The number of smartphone users is ever-growing and has surpassed desktop users in the past decade. Meanwhile, the multifunction characteristics of smartphones give users more power in handling their daily life business (Sarwar & Soomro, 2013). The development and increasing popularity of smartphones are changing the nature of interpersonal communication and gradually reshaping social relationships. Therefore, it is important and necessary to understand the shifts in social networking in the context of smart mobile devices.

The culture of Hong Kong can be described influenced by British colonialism on a foundation that began with China. Since the 1997 transfer of sovereignty to the People's Republic of China, Hong Kong has continued to develop an identity of its own (Lilley, 1998). Kam (2010) noted that 'it is a cliché to say that Hong Kong today benefits from the economic growth in China, without the political restrictions the rest of China has to operate under'. Under the 'one country, two system' framework, Hong Kong's cultural scene is diverse and polyphonic. In this cultural hub, Cantonese culture has also flourished along new cosmopolitan lines to build a modern, outward-looking character. In combination, each of these interactions has worked together to produce Hong Kong's unique culture (Kam, 2010). Under this diverse cultural background, a hybrid of east and west, Hong Kong ranks first in the global index of economic freedom. It is an open city of different cultures, which gives young people many lifestyle choices.

1.2 Objective of the Study

The key goal of this study was to improve understanding of Hong Kong's youth and their lifestyle in relation to the use of smart mobile device. User experience is an important concept in user study, it focuses on the quality of interactive technology, which poses

challenges for humans while simultaneously driving positive experiences for ‘smart communication’.

Smart communication is a new paradigm for how people communicate using digital devices, and how people communicate with each other through services and with the rest of society in this information age. Smart communication is a concept that is based on but goes beyond mobile communication. It is associated with intelligent products and mobile Internet. Smart communication is not just a means of communication, but also a new lifestyle that has changed people’s everyday lives gradually, and provided different kinds of information that have facilitated people’s work and study. Smart communication has brought new user-centred products, experiences and services.

This study specifically focuses on communication media usage among Hong Kong’s young people. Therefore, the findings presented reflect the Hong Kong or Chinese cultural context. Certain more general processes identified in this study can be applied more broadly. From a practical perspective, this study provides valuable information to companies that are considering the Hong Kong market. The outputs presented here can be used as references for understanding the effects of user behaviour and preference on smart mobile devices in target countries.The findings are expected to help design products or services with improved user experience

1.3 Scope and Research Questions

This study focuses on Hong Kong young people with the aim of understanding the lifestyle transformation brought about by smart communication. The study is based on the survey of Hong Kong young people in the years of 2012 to 2016. The young people in Hong Kong have diverse backgrounds, they could have some intersection with other young people in different countries. The sample of Hong Kong youth is therefore a good sample to this study. The results from this sample could be generalised to other samples. The reasons for choosing young people as the study’s target are elaborated in section 2.2.2. Young people are grouped according to particular interests, providing a dynamic insight. Young people are among the major consumers of mobile phone technology and are often considered to be forerunners in its adoption and evolution (Thulin & Vilhelmson,

2009).Karim and Oyefolahan (2009) discussed the different behavioural intentions that attract users to mobile phones according to individual characteristics such as gender, age and occupation. They found that the influence of age ‘was significant on almost all the common purposes of use and frequently used features and services identified’ (p.278), and that different age groups had different habits and use patterns. The youth comprise a large and major group for study, as ‘young people who go off to work in cities can stay in touch with their rural relatives and families scattered around the world’ (Rheingold, 2002). Most mobile communication research focuses upon young people (Ling & Yttri 2002; Larsen et al., 2008). Young people have already shown a great dependency on mobile phones (Rice & Hagen, 2010), using them primarily to sustain and enhance their social network (Srivastava, 2005). Some Norwegian youth have said that they could not imagine what would happen if they had to live without mobile devices (Haddon, 2004). Osgerby (2004) singled out the mobile phone as an important means through which young people mediate their social relationships.

Rapid advances in information and communication technologies (ICTs) have brought a new dimension to daily life through the increasingly important role of personal smart mobile devices (Tong et al., 2015), including smartphones. Halewood and Kenny (2007) conducted research on ICT facilities in developing countries and argued that young people are often ‘first adopters’ of new technologies, and this appears to be the case with ICTs. In Hong Kong, most young people are eager to know of the latest ICT facilities and related news. Taking advantage of the port, Hong Kong’s young people have easy access to the latest products. Hong Kong was one of the top three countries in the world in 2010 for number of mobile phones per capita, after Taiwan and Luxembourg (Moran, 2010).

Hong Kong is a design hub with a strong design industry. As a special administrative region of China, Hong Kong combines Eastern and Western cultures; the city is open to the world and has close contacts with many Asian cities, and also offers diverse characteristics. Hong Kong is considered to be ‘one of the most sophisticated and successful telecommunications markets in the world’ (OFCA, 2016), and the data lends support to this claim (Chu, 2010). As of September 2016, there were 15,625,822 subscribers to 2.5G and 3G/4G mobile services (OFCA, 2016). According to Internet World Stats, Hong Kong’s internet penetration rate ranks first in Asia and ninth in the

world and in March 2015, there were 31,879 public Wi-Fi access points. In addition to internet connectivity, Hong Kong enjoys an impressive penetration rate of 228.4% for mobile subscriptions, meaning that there are 16.38 million mobile subscriptions in a population of just seven million. According to the Information Services Department (2004), mobile density in Hong Kong was among the highest in the world (106.3%), because free Wi-Fi connections are available in most public places and on public transport (such as parks, streets, Mass Transit Railway (MTR) stations and buses). A TNS study also revealed that *Facebook* is the most popular digital platform in Hong Kong: the 2014 *Hong Kong People on Facebook TNS Insights Report* found that 91% of survey respondents used *Facebook* more than any other digital network (Lorase, 2014). Wang and Law (2007) reported that young people with higher household income in Hong Kong are more likely to be ICT users. Their study findings also indicated that people who use ICT have more time for outdoor recreation activities and travel, as well as an increased propensity to make trips. Hong Kong is thus a suitable location for a case study exploring smart communication in the information age.

A ‘smart mobile device’ is a mobile terminal with a system that can be updated to enhance the user experience, and on which applications can easily be installed to add more functions. Smart mobile devices, which include smartphones, tablets, e-readers, smart watches and smart bands, were chosen as the objects of study because of their growing popularity. Because phones are such important communication tools, the different phases of the evolution from telephone to mobile phone, to smartphone, reveal differences in how people communicate with each other. Thus, of all smart mobile devices, smartphones, which are widely used in the smart mobile devices field, were selected as the major object of study. ‘Smart communication’ is communication that is digital, intangible, fast and effective. It is no longer communication in the traditional sense. This study focuses on the social behaviour of Hong Kong’s younger generations, in the context of how they use smart mobile devices for smart communication and how they adapt to them.

In an attempt to address the issues, the following research questions are formulated.

(1) What roles do smart mobile devices, especially smartphones, play in young people's daily lives?
(2) How have smart mobile devices changed communication patterns and how does this affect the use of existing media?
(3) How do smart mobile devices mediate personal relationships among young people?

1.4 Significance of the Study

Based on the user study of smart mobile devices among Hong Kong's young people, an analysis of the user behaviours and design directions was conducted. The study considers not only the current market, but the potential and future markets as well. Inspired by the revolution of the information age and people's desire for a digital life, this study proposes the term '*smart communication'*. Smart communication is a new paradigm for how people communicate with digital devices, how people communicate with each other through service and with the rest of society in this information age. Within the relationship of people, society, devices and service, user experience becomes an important feature in the concepts of creativity, innovation, context, and quality of design product. This study attempts to explain the different behaviours exhibited by young people and the causes of those behaviours; it also provides criteria for an improved user experience design in the field of smart communication.

This study provides empirical findings on user behaviour and user preferences among Hong Kong's young people. It examines users' needs and preferences for smart mobile devices. What kinds of user experience are good for users, and which mobile functions reflect users' true needs? The research outputs provide references for smart mobile device manufacturers, helping them to understand users and thus design better devices and experiences for the future market. Next, a conceptual model is proposed that describes smart communication as consisting of four elements – people, society, device and service – in a dynamic structured relationship. The six characteristics of smart communication are examined and the significant factors that influence these six characteristics are revealed to give a better understanding of smart communication among young people in Hong Kong. Finally, some insights from smart communication are summarised in a framework relating culture and technology.

Most previous studies on mobile phone use and interpersonal communication focus on two aspects: the difference between mobile phones and other forms of communication, such as face-to-face, mail, the Internet, etc. (Boase, 2008; Utz, 2007), and the role of the mobile phone in instigating the concept of 'perpetual contact' in interpersonal communication (Katz & Aakhus, 2002; Licoppe, 2004; Ito & Okabe, 2005; Arminen & Weilenmann, 2009; Rice & Hagen, 2010; Schroeder, 2010). However, little research has been done to explore the lifestyle changes of smart mobile devices' young users and to understand the relationships among people, society, devices and services. This study focuses on Hong Kong's young people with the aim of understanding the lifestyle transformation brought about by smart communication, as well as user behaviour related to the quality of interactive technology, which drives positive experiences of smart communication. The study findings are expected to help product or service designers understand smart mobile device users' needs and preferences, such that they can develop a better user experience. This study proposes the term 'smart communication' and analyses in depth six characteristics of smart communication that have significance for the field.

1.5 Outline of the Study

First, some research issues of the information age are identified. Next, a theoretical discussion of terms related to the research topic is presented. This discussion includes a review of the concepts of communication, mobile communication, smart communication and cultural studies in Hong Kong. The evolution of communication is considered in terms of reviewing the past, analysing the present and forecasting the future. These reviews provide a general overview of communication development and help us to narrow down the research scope and identify specific research problems. After defining the research problem and questions, the research method is designed according to the research focus. Based on preparatory work, qualitative research is chosen as the core approach, complemented by additional quantitative research (data collection and analysis). During the process of collecting and analysing the data, it is better to continually review the research problem to ensure the coherence and the wholeness of the research topic.

Finally, going a step further, the research discussion is organised to find some future direction for related research areas. Figure 1.1 shows the outline of the study.

A brief outline of each chapter follows.

Chapter 1 outlines the background of the study and presents the research questions and the scope of the research. This chapter draws the overall picture of the thesis and presents the relationships between subsequent chapters.

Chapter 2 is a literature review. It defines the terms of the research topic and identifies the research content and scope. It also presents a historical review of the evolution of communication, in addition to an overview of the current situation and issues.

Chapter 3 proposes the people, society, device, service (PSDS) model, which gives an in-depth description of the context of smart communication and the relationship among people, society, devices and services. A deep understanding of the background of smart communication is useful for conducting further research about young people's user behaviour and analysing social phenomena.

Chapter 4 discusses the research methodology applied in the study, which included both quantitative and qualitative methods. This study focuses on understanding user scenarios and user behaviour. Qualitative methods are used along with complementary quantitative methods to produce valid, reliable findings. Questionnaires are based on a standard format to obtain mostly quantitative responses.

Chapter 5 presents the findings of the empirical study in two parts. One part concerns smart communication and the other concerns emoticon communication. This chapter presents the data from questionnaires and focus group interviews.

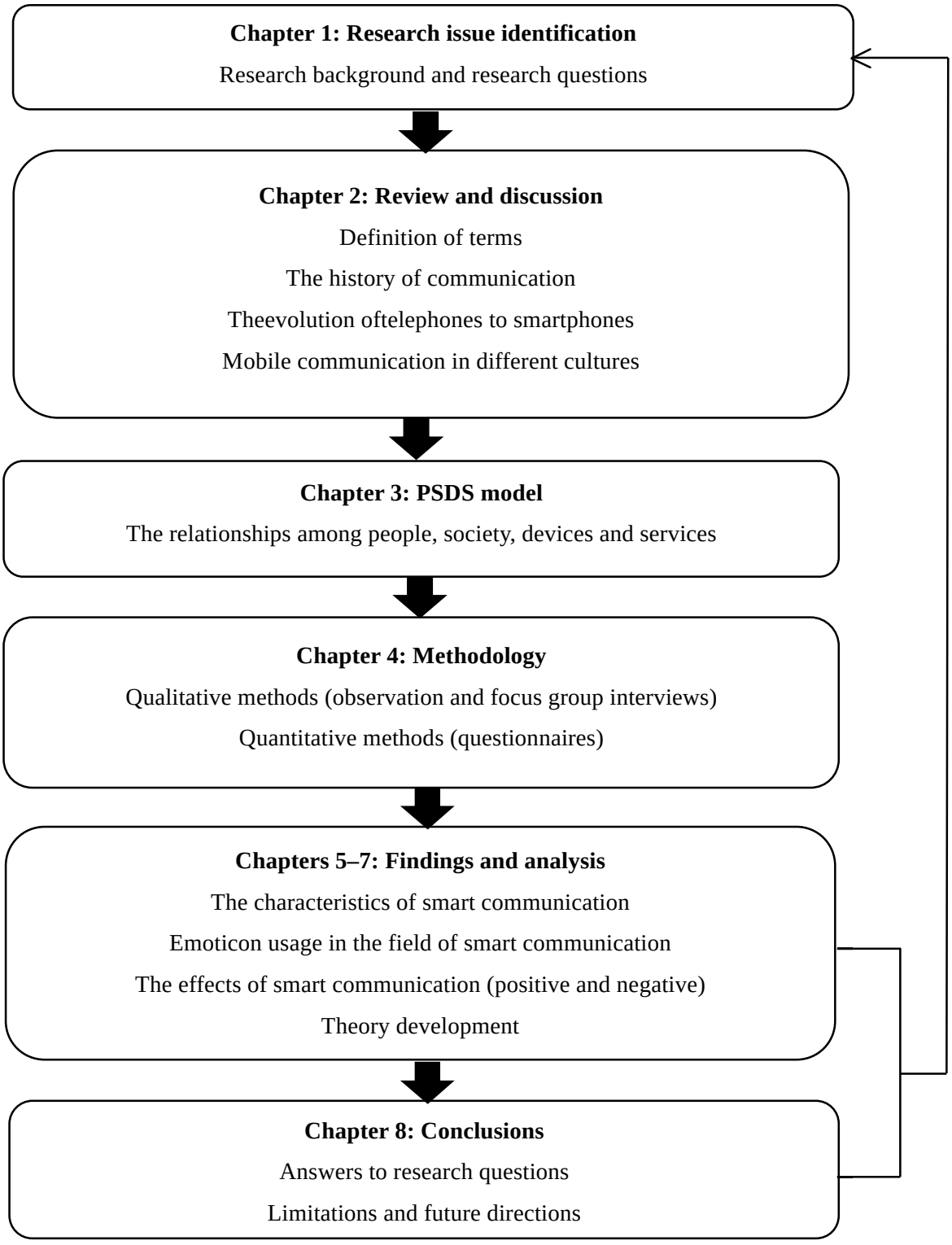

Figure 1.1 Outline of the study

Chapter 6 presents the analysis and discussion of the study. First, the effects of smart communication are considered from positive and negative perspectives. Smart communication is analysed as an information provider that can support people's daily lives, and consideration is given to how smart communication brings people closer and how it makes them more distant. This chapter also discusses the six characteristics of smart communication – security, mobility, efficiency, coordination, sociability and enjoyability –based on the findings of the survey and focus group interviews. Statistical analyses are included to support the findings of the characteristics of smart communication in Hong Kong's young generation and how these factors affect user experience.

Chapter 7 discusses the challenges and inspiration of smart communication, and some existing design solutions. A systematic framework inspired by smart communication is presented.

Chapter 8 presents the conclusion of this study, answers the research questions in the first chapter and suggests possible directions for further research into smart communication. The study's limitations are discussed in this chapter.

1.6 Summary

This chapter outlines the rationale and background of the study. It states the significance of the study and the scope of the study, which is helpful to understand the context of the study. The transformation of lifestyles through smart communication constitutes the main research topic for the current study. The following sections present the research methods. This begins with a review of the literature on communication, user behaviour and user experience. The characteristics of smart communication are summarised from the empirical data captured from documentary investigation and focus group interviews. Several possible solutions and recommendations are suggested for optimising the usage of smart mobile devices. As a special kind of communication, emoticon usage among young people in the field of smart communication is discussed. Finally, this study draws some inspiration from smart communication, which is summarised in a framework.

Although the study was conducted in a single region, it is hoped that the results will be beneficial to the development of smart communication worldwide.

CHAPTER 2 REVIEW OF THE LITERATURE

2.1 Preamble

This chapter defines the terms related to the topic, and considers the evolution of communication with particular reference to mobile communication and smart communication in the context of lifestyle transformation. This literature review provides overall impressions of the research topic, the development of communication and the typical cultural behaviour in different countries and regions, which helps to narrow down the research scope and identify the specific research problems.

This study focuses on smart communication, which is based on traditional mobile communication with newer media developments. This chapter first briefly reviews the evolution of communication and then defines the terms and scope of analysis in this study; the reasons for choosing to study young people's smart communication, lifestyle and user experience are also discussed. Next, it moves on to discuss the evolution form mobile phones to smartphones. Finally, a general review of cultural behaviour in America, Europe, Japan and China is presented.

2.2 Definition of Terms and Scope of Analysis in this Study

2.2.1 Smart Communication

Inspired by the revolution of the information age and people's desire for a digital life, this study proposes the term *smart communication*. Smart communication is a new paradigm for how people communicate with digital devices, and how people communicate with each other through Internet services and with the rest of society in this information age, this term first proposed by Chen & Siu in 2013.

Smart communication is a way for people to communicate on mobile devices based on the development of mobile Internet. It is different from traditional communication. Like traditional face-to-face communication, most device-based communication has had a relatively fixed location, fixed time or stable environment. For instance, making a call in the office, surfing the Internet at home or using a fixed terminal in a public space to communicate with others. This kind of communication was very convenient in the past,

but smart communication has changed a lot, and is now completely different. Smart communication is anytime, anywhere and freewheeling; the communication is more proactive, can assist smart decisions and is characterised by fast reactions, multiple channels and access to and integration of all kinds of information. The smart mobile device is the tool for smart communication, and intelligence and mobility are its most outstanding characteristics. Such a mode of communication brings revolutionary changes. This kind of revolution did not exist in agricultural society, industrial society or even the PC era of the information society. Smart communication is making the world more open, linkable, emotional and informationised, substantially reforming the way that human beings communicate with each other.

Smart communication is beyond verbal communication. It is more focused on information exchange based on the mobile Internet. It should be noted that information communicated is not limited to calls or messages; services based on smart mobile devices and mobile Internet are included as well. Smart communication is a new kind of lifestyle in the information age. It is shaping new interactions among people, society, devices and services, enhancing communication among users and leading to the development of more accessible technologies at both individual and social levels.

Due to the prevalence of networked mobile technologies, the design and evaluation of mobile services, such as facilitating accessibility and usage of virtual information in any setting, have become the important business arena for the IT and telecommunications industries. Ubiquitous mobile technology in a sustainable web of work and leisure creates smart communication (Höök, 2009).

2.2.2 Youth

There was little literature on the social uses of mobile communication among young people until 2000. Since then, a growing number of studies have focused on this area (Haddon & Green, 2010, p. 1). Geographically, European studies have been predominant in this field, with many significant contributions also made in Asia and the US (Haddon & Green, 2010, p. 10). Recently, research endeavours in this area have become much more widespread.

What is youth?

This study targeted youth between the ages of 18 and 30. Different sources have defined 'youth' in a variety of ways: the United Nations classifies youths as individuals aged 15–24; the United Nations Educational Scientific and Cultural Organisation considers the age range 16–45; and the Youth Union defines youths as individuals aged 18–40, a range also specified by Outstanding Persons of the World. The June 2013 Pew Internet survey found that 56% of American adults are now smartphone owners and smartphone adoption rates vary depending on age, with the main users of smartphones aged between 18 and 34 (Smith, 2013). In this study, the age range of 18–30 was chosen, to include those who are keen to adopt new technology. This demographic includes college students, individuals who have just started work, individuals in their first relationships or marriage and fledgling users who have experienced changes to their everyday lives courtesy of smart mobile devices. Previous research has indicated that 'a large portion of the early adopters of smartphones are college students' (Lee, 2014, p. 308). This group of young people who have started work also have sustainable income growth and can afford to spend on new technology. Additionally, the young generation aged between 18 and 30 already knows how to distinguish beneficial and harmful things, and how to take responsibility for themselves.

Why study youth?

The reason for focusing on young people when exploring mobile technology usage and adoption is that young people are typically assumed to be at the cutting edge of applying smart mobile devices. The early use practices found among young people become, to a certain extent, indicative practices and influence other user groups in the long run (Bertel, 2013a). Targeting a study of media usage on the young generation enables us to understand the current opportunities and threats related to the new technology, as well as the potential future trends. Ling (2004) noted that young people were early adopters of mobile telephony and their usage behaviour was unexpected. They were the driving force toward mass adoption of the technology and mass usage behaviour. Koskinen (2007) indicated young people are symbolic mobile phones users. Castelle et al. (2007)

supported this view and argued that young people were more frequently and better in using new technologies, and they can quickly adapt the new technology. Furthermore, the culture of young people is considered as staying at thefrontiers of technological innovation such that young people are more willing to try new things without much prejudging of the merits of the innovation (ibid.). Young people also have a high level of smartphone ownership and are rich users of the new technology (Walsh et al., 2010). In South Korea, students use mobile devices more than the general public population, and junior high-school students are the most avid user group among students in general (Srivastava, 2005).

However, the assumption that young people's use of technology is equally heavy and competent may be questioned in terms of generalisation. In fact, the empirical evidence suggests much more complex and fluid patterns of media use and competencies between generations (Livingstone, 2009; Loos et al., 2012). Therefore, we should not simply apply the concept of intergenerational digital groups that divide people into younger 'digital natives' and older 'digital immigrants' (Prensky, 2001). When we study the youth group, we cannot apply 'youth' as a general concept; rather, the endogenous and exogenous differences between young people need to be considered to understand the inter-group differences. Endogenous factors may include, for instance, individuals' knowledge and competence in terms of access to technology, which may influence the configuration of the wider context of their individual lives (Buckingham, 2008). Personal interest and the motivation to adopt certain new technologies can be another endogenous factor. Young people who master certain technologies may not necessarily need to master all other technologies (Loos et al., 2012), and young people who are innovative in certain technologies may be rather conservative in other technologies (Fornäs, 1995). Some exogenous factors, such as different life phases, should also be considered to understand the differences within the youth group, such as the fact that working youth have be shown to use mobile email more heavily than student youth have (Bertel, 2013b, p. 301).

2.2.3 Lifestyle

The concept of 'lifestyle' originated from market research and consumer behaviour (Wei, 2006), and popular consumer society. It is concerned with 'how people live, how they

spend their money and how they allocate their time', as well as their patterns of activities (Pingree & Hawkins, 1994). Zablocki and Kanter (1976) defined lifestyles as 'a given collectively' based on shared preferences or tastes, in which people share a lifestyle that otherwise lacks social and cultural identity (p. 270). Peter and Olson (1994) define lifestyle as 'the manner in which people conduct their lives, including their activities, interests and opinions' (p. 463).

In 1963, William Lazer introduced the concept of 'lifestyle pattern', defining it as 'a distinctive mode of living, which objectifies the patterns derived from the dynamics of living in a society' (Lazer, 1963, p. 33). According to this view, 'lifestyle' refers to the manner or way of living. For people in a certain class, their lifestyle manifests their individuality and sense of style. Lifestyle as commonly referred to continually changes with the changing economic and social context.

Lifestyle pattern analysis begins with people, their lifestyles and motivation (Plummer, 1974). Therefore, the cultural environment is important for understanding lifestyle patterns. Vittorio Colao, the CEO of Vodafone Group, has claimed that 'culture influences the lifestyle, and the lifestyle influences the way we communicate' (*The Economist,* 2009). In this view, people communicate in different ways in different countries, and we should understand users' cultural behaviour first to satisfy customers' needs.

Featherstone (1987) claims that lifestyle is associated with aesthetic experiences and enjoyment, and connotes individuality, self-expression and a stylistic self-consciousness. Style, taste and personality can be explored through multiple indicators, such as a person's body, clothes, style of conversation, leisure time arrangements, holiday activities, dietary choices, home decoration and car selection, to name a few (Featherstone, 2007).Leung (1998)indicated that lifestyles meaningfully affect innovativeness, it could be helpful in giving clues in devising promotion strategies for products.

A number of concepts and issues arise from a review of the literature on lifestyle. The most widely used approach to lifestyle measurement has been 'AIO', which measures activities, interests and opinions (Plummer, 1974). According to Peter and Olson (1994, p. 463) 'lifestyle' can be defined as 'the manner in which people conduct their lives,

including activities, interests, and opinions'. Information regarding lifestyle is useful and helpful for product positioning and market segmentation, as well as for multinationals to understand local consumers beyond the cultural context (Vyncke, 2002, cited in Plummer 1974, 1977). Three spellings of lifestyle are used in the literature: (1) two words, life style; (2) a hyphenated word, life-style; and (3) a single word, lifestyle. This study uses the one-word spelling. Related terms used in the literature include way of life, style of life, leisure style, culture, sub-culture and, in the field of market research, psychographic (Veal, 1993).

Johansson and Miegel (1992) developed an analysis based on three levels: structural, positional and individual. Based on this analysis, Jensen (2007, p. 65) proposed a plural definition of the concept of lifestyle in four different levels: (1) the global level, (2) the structural or national level, (3) the positional or sub-cultural level and (4) the individual level. According to Jensen, lifestyle should be analysed starting from the global level and ending with the individual level. When we talk about the concept of lifestyle, we should be clear about which level the analysis is on, and at what level we may expect a problem to be solved.

In this study, 'lifestyle' indicates an attitude to life, and a transformation of lifestyle influences people's identities, behaviourpatterns, and networks in the context of smart communication. Smart communication presents a new lifestyle among young people, and it is not limited to a means of communication anymore. With the help of smart communication, non-intelligent information through three channels of perception (i.e., context awareness, conscious awareness, and emotional awareness) generates intelligent information, and thus helps to understand people's identities, behaviourpatterns, and networks, which are three key elements of lifestyle. Normally, among Hong Kong people, the young generation shows the biggest change in consumption attitudes when compared with other age groups. One important difference in their purchasing attitude is a greater willingness to spend money as they earn it, rather than arrange their finances. Many young people spend what they earn. This behaviour may be tied to the anxiety over 1997 that led them to feel that the future remains problematic. Another difference in their purchasing attitudes is that fashion and trendiness are more important than quality (Tai & Tam, 1996).

2.2.4 User Experience

In recent years, besides considering form and function, designers have strived to assure and promote a positive user experience. An understanding of user behaviour can facilitate the design of a better user experience. This study attempts to compare the different preferences and user scenarios with regard to various smart mobile devices. User study helps researchers understand the users' lifestyle, and it is a key issue for understanding people before design for people. Thus, researchers can give prompt feedbacks based on users' needs, and improve the user experience. User behaviour, local culture and individual preferences significantly affect design practice.

Understanding user experience is critical for a variety of professions, especially design (Forlizzi & Battarbee, 2004). User experience when a user interacts with a certain product or service, and experience without the product or service should be excluded. The concept of user experience refers to all aspects of the user's interaction process (Park et al., 2013b). User experience is currently a key consideration for individuals, and influences users' choices directly. Although experience always takes place in the context of a past and future, in the information age, lifestyles are becoming mobile and the smartphone has an irreplaceable role in our lives as an important information carrier. Therefore, an increasing focus is placed on user experience derived from sensations and emotions as well as perceptions and behaviour in everyday life. Experience factors are difficult to analyse due to the complexity of the concept. User experience is a popular concept widely applied in human–computer interaction (HCI) research in the past 10 years, which reflects comprehensive aspects of interaction between the user and the product (Alben, 1996; Arhippainen & Tähti, 2003; Forlizzi & Ford, 2000; Kuniavsky, 2007; Park et al., 2013a). A common strategy used in most studies is the reduction of experiences into a number of process-related factors (Hassenzahl, 2003; Norman, 2004). Although such a method may be useful for experimental analysis, those studies overlook some of the available insights (McCathy & Wright, 2004). Clearly, a user-centred approach is required, especially for interactive communication. Thus, the focus of this study is not based on determining working solutions to problems; instead, it is based on interpreting the ways in which a method is related to design issues. Another way to understand user experience is in terms of 'having' an experience, in the sense of philosopher John Dewey (1934). From this

perspective, an experience contains a beginning and an ending, changes the user, and to some extent, the context of the experience as a result. Battarbee (2003)focuses on co-experience related to the social aspects of user experience.Battarbee and Koskinen (2005) broke down this big word into three typical stages: (1) lifting up experiences,(2) reciprocating experiences, (3) rejecting and ignoring experiences. To analyse these aspects, they have approached the sample data comprehensively and quantitatively by three means: measuring, empathic and pragmatist. They also provided an example of how they approached data with their divergent methodologies to interpret user data deeply, innovatively and comprehensively. Such user data is a great prototype for researchers from another region in the world.

Since the end of the twentieth century, ‘experience’ has become a popular term in design. Experience is an elusive concept that resists specification and finalisation. Taking experience into account in the relationship between people and technology is a recognised approach in academic research. In framing the theory of experience, it is important to create a fundamental understanding of experience without confusing it with subjective feelings, behaviour, social practices, activities and knowledge. Inspired by the theory of Dewey (1934; 1925), design should integrate both hedonistic and pragmatic user experience considerations. In other words, it should not only focus on the users’ physical experience (i.e., tangible features), but also on sources of resonant emotional experience.

When people are getting used to a new device, their experience can change over time due to scalability issues (Karapanos et al., 2009). Such changes are best understood through time-based investigations of devices based on usage within a real or realistic context (Forlizzi & Battarbee, 2004). For current marketing needs, to better understand the interactive experience between people and smart mobile devices, creating a social presence in online environments iskey. A social presence in daily life not only concerns situations in which behaviour is homogeneous and routine, but also reveals the nature of the user experience, which provides a new perspective on the study of smart communication among youth in the context of lifestyle transformation. In the field of smart communication, the user experience becomes even more important than the products, because user experience actually reflects design issues in the interactions among people, devices, society and services. An increasing number of studies are starting to

focus on the importance of providing a quality experience, because experience creates a certain impression for smart communication, and therefore determines whether the design will remain with the user and assist in improving smart communication every day. Forlizzi and Battarbee (ibid.) also noted that design research related to understanding user experience is unique because it is focused on the interactions between people and products, and the experience that results. In short, the concept of user experience, derived from a wide range of meanings, can inspire research into smart communication.

2.3 A Brief Review of User and Communication Evolution

In this section, common themes within the long and complex history of communication are extracted in an attempt to provide a complete picture of how the means of communication emerged, how tools were developed, how societies were influenced and how they further exerted influence upon subsequent generations.

Communication has been defined as the transmission of messages (Shannon & Weaver, 1949). Indeed, the history of technology, including Internet technology, shows that people and organisations end up using tools for purposes other than the original purpose conceived by the designer of the tools. Furthermore, the more interactive the technology, the more likely it is that users can play the roles of producers in practice (ibid.). In this sense, Shannon and Weaver (1949) emphasised the role of information technology in the communication process (see Figure 2.1). Their model, expressing communication as the transmission of messages, improved communication scholars' understanding of the role of information technology in the communication process. During the communication process, technical, semantic and effectiveness aspects are crucial for successful communication (Fiske, 1990). The following subsections briefly review information technology in the communication development process.

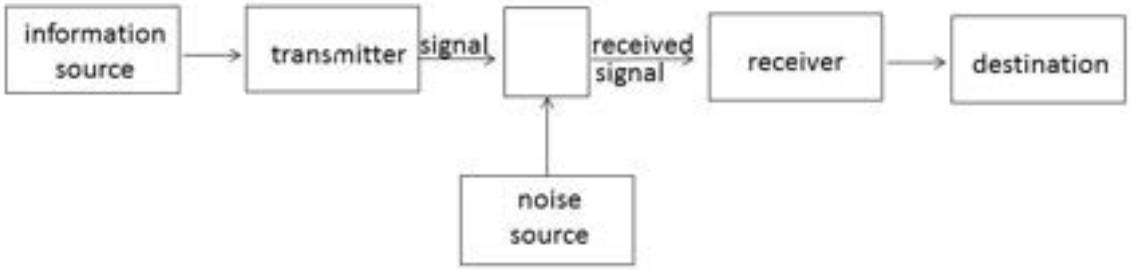

Figure 2.1Shannon and Weaver's model of communication (Shannon &Weaver, 1949)

Gardiner (2006) used a 2 × 2 matrix to depict four generations of media (see Figure 2.2), reflecting the fact that we can store and transmit extragenetic information (not included in the genetic code but still inside the body) and extrasomatic information (outside the body). This matrix is another way to understand the history of media. The four generations are memory and speech, print and film, telephone and television, and multimedia and Internet.

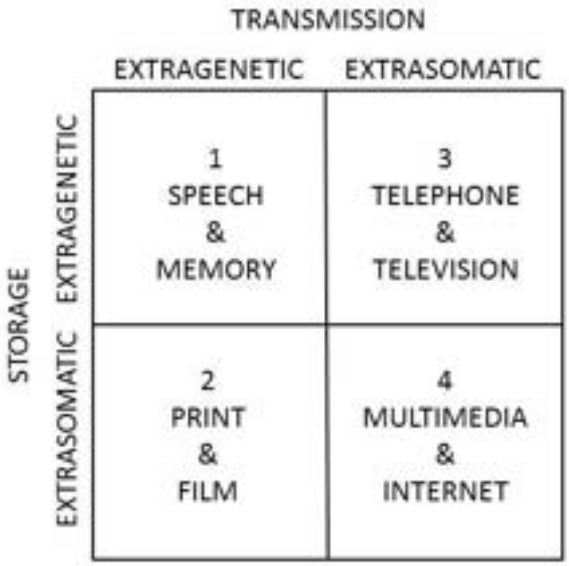

Figure 2.2The four generations of media (Gardiner, 2006)

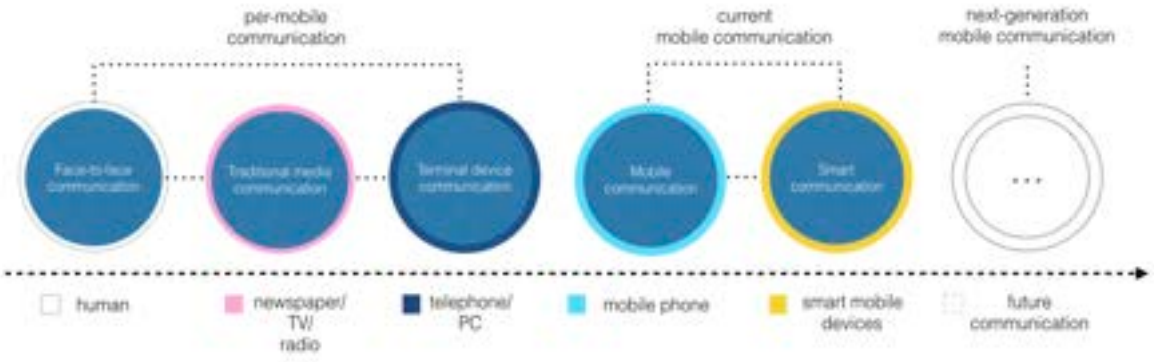

Figure 2.3 The means of communication based the category of carriers

In order to better understand the development of communication discussed in the literature review of this study, Figure 2.3 presents the means of communication based the category of carriers. Specifically, different carriers arecategorized into three classifications: per-mobile communication, current mobile communication and next-generation mobile communication.

The basic means of communication is face-to-face communication which is happened between human. The carriers of the tradition media communication are the newspaper, television, radio, etc. The terminal device communication refers to the communication via telephone, computer or other fixed devices. We summarized the above three means of communication as ‘per-mobile communication’, which is discussed in section 2.3.1. The ‘current mobile communication’, as comprehensively discussed in section 2.3.2, is the main part of this study. It consists of the mobile communication and smart communication conducted via mobile phones and smart mobile device. The ‘next-generation mobile communication’ refers to the future communication with unpredictable and changeable carriers. We provide detailed discussion in section 2.3.3.

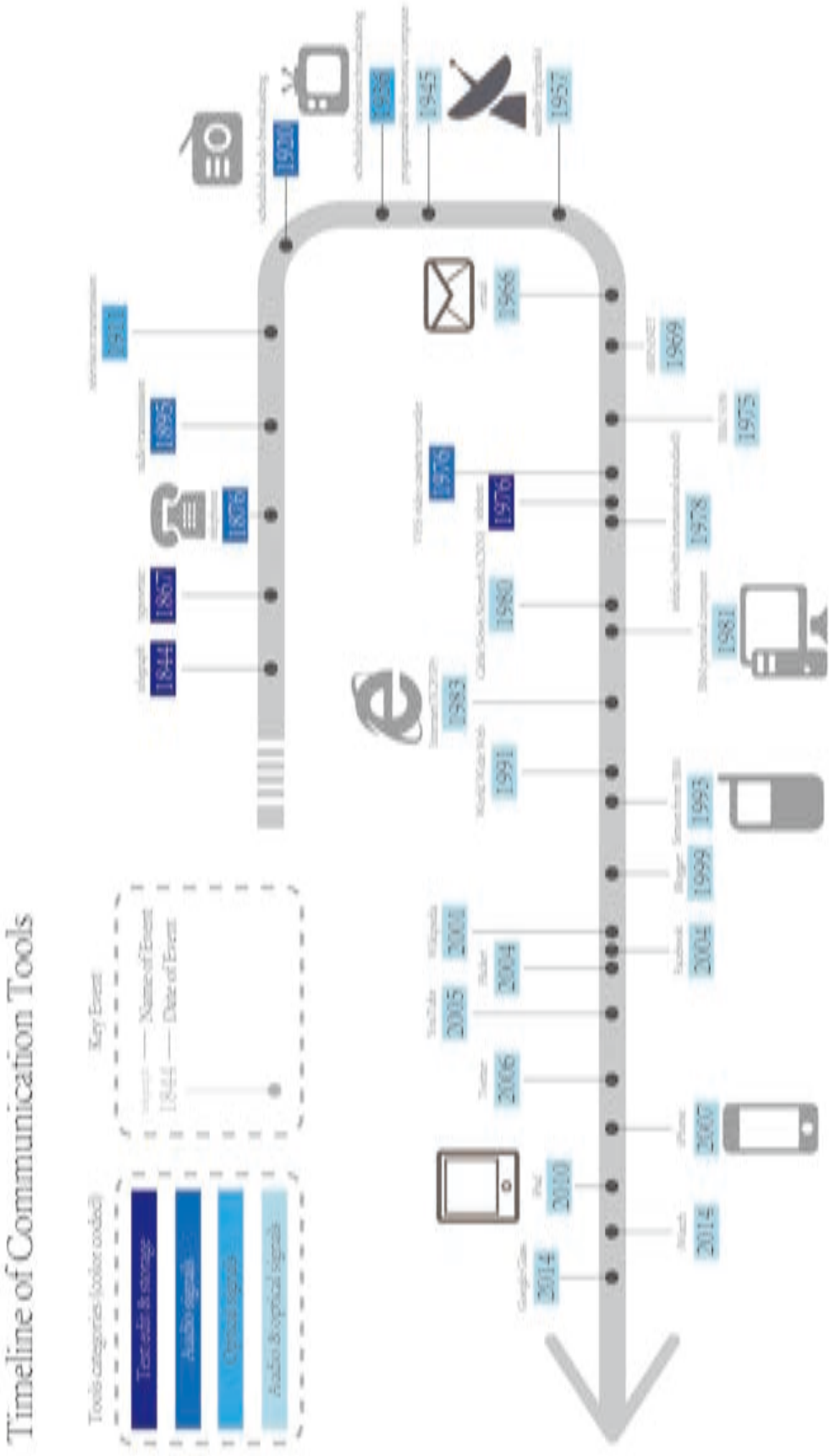

Figure 2.4 Timeline of communication tools

Figure 2.4 presents a timeline of communication tools, divided into four parts: text edit and storage, audio signals, optical signals and audio and optical signals. This timeline shows communication tools from the telegraph in 1844 to Google Glass and the iWatch in 2014.

Thousands of years ago, the transmission of information through media had already started, via smoke signals and drums in Africa, America and Asia. The electric telegraph was initially developed and patented by Samuel Morse in the US in 1837. The Morse code signalling alphabet was developed by his assistant Alfred Vail and the first telegram was sent by Morse through 3 kilometres of wire at Speedwell Ironworks in New Jersey, US on 11 January 1838. In 1844, he sent the message ‘What hath God wrought?’ from Washington to Baltimore (Wikipedia, 2016b).

In 1966, email became another milestone in the history of communication. Nowadays, the email services of Internet companies can easily combine text, audio and visual messages, which is far more helpful than the limited amount of text of the 1960s.

Another ground-breaking communication technology was the development of the personal computer (PC). IBM is the pioneer company that developed the first PC and compatible PC hardware platform (model No.5150) in 1981.

The term ‘personal computer’ was applied to Xerox PARC’s Alto in 1972 and was widely used until 1981. The huge success of the IBM Personal Computer in the market made ‘PC’ a concept that refers to a desktop microcomputer compatible with IBM’s PC products. Benefited from a series of technology diffusion, including the peripheral devices, expansion cards and proliferated software provided by third party suppliers, ‘IBM compatible’ became a driving force for the sales growth and earned substantial market shares from competitors. Apple Macintosh product family is the only exception that is not compatible with IBM PC but remained the remarkable market share(Wikipedia, 2016c).

With the help of the personal computer, the Internet also enjoyed rapid growth in 1983. The first smartphone in the market was ‘Simon’ from IBM in 1993 (Sarwar & Soomro,

2013). The 2000s saw a booming of Internet services, including Blogger (1999), Wikipedia (2001), Facebook (2004), Flicker (2004), YouTube (2005) and Twitter (2006).

To date, the most significant communication device is the iPhone that uses Apple's iOS mobile operating system. Apple released its first generation iPhone in 2007. The iPhone's user interface is designed as a multi-touch screen with a virtual keyboard. The iPhone has a Wi-Fi function to connect with cellular networks. It can play music, record notes, shoot video, send texts, receive visual voicemail, send and receive email, do mathematical calculations, take photos, browse the Internet and navigate using GPS (Huffington Post, 2013). The iOS system is an open system that allows convergence of mobile apps installed on it and enables other functions, including social networking, reference works and video games. According to Apple Inc. (2013), in October 2013, the App Store contained over 1000 apps published by Apple and other developers.

The iPhone introduced the era of the modern smart mobile device, and with the release of the iPad in 2010 and the iWatch in 2014, Apple has led the smart device market. Even though Google Glass has not received a booming market response for several reasons, the development of smart mobile devices is an irresistible trend and they will become even more popular in future.

2.3.1 Information Technology in Pre-mobile Communication

Fang (1997) describes the history of information technology and communication in terms of six information revolutions. During this development process, the means of communication permanently affected entire societies, as new information media became part of the changing society. The new media provide new means for communication to be disseminated within societies undergoing change. According to Fang's (1997) classification, writing was the first media revolution for information storage and sharing; then the printing revolution and further mass media revolution, such as newspaper and magazine publication, enhanced information transfer; the entertainment revolution involved information technology that could capture, store and share sound and image information, adding an entertainment element to previous literacy information; and further information technology revolutions have occurred with home-centred

communication tools and the information highway. These six eras of information revolution are considered in detail below.

The first information revolution is characterised as the writing revolution, which started in Greece in the eighth century BC with the convergence of the phonetic alphabet (Gnanadesikan, 2011). The writing revolution's contribution to knowledge storage meant that the human mind would no longer be constrained by the limits of experience and memory. Therefore, knowledge could be boundless.

The second information revolution was the printing revolution, beginning in the second half of the fifteenth century in Europe with the emergence of paper (Fang, 1997). Printing technology contributed to the spread of information through broad layers of society, which influenced political, religious, economic, educational and personal issues, to name a few.

The third information revolution was the mass media revolution that began during the middle of the nineteenth century in Western Europe and the eastern US with the convergence of advanced technologies in paper production and printing, and the invention of the telegraph. At this time, the public could access textual and visual information from newspapers, magazines and photos.

The fourth information revolution was the entertainment revolution. It began at the end of the nineteenth century in Europe and America with the development of technologies such as stored sound, affordable cameras and motion photography (Crowley & Heyer, 1999). Taking advantage of the industry revolution, people could read stories and listen to the radio and other information communication channels more cheaply and easily. These entertainment products opened the minds of people accessing information.

The fifth information revolution was the creation of the so-called 'communication toolshed home', beginning in the middle of the twentieth century with the development of the telephone, broadcasting, recording, printing and universal mail services (Fang, 1997). In this period, the public could receive information and enjoy entertainment at home

rather than public places and use more convenient and cheaper methods of communication.

The sixth information revolution was the information highway, which began with the convergence of computer, broadcasting, satellite and other visual technologies. On the one hand, people, especially the 'information-elite', could now leave behind transportation for work, study and entertainment and live anywhere without disrupting their work and life. On the other hand, work and life became more closely linked as a result of communication technologies.

The information technology and media revolutions appear to share certain characteristics. First, the information technologies tend toward some levelling of conditions for those who participate in them, and a greater degree of democratisation or sharing of influence than previously existed. Second, each revolutionary change in information technologies includes both hardware components and software components, that is, physical tools and process changes. Third, the tools of communication changes lead to social changes and are themselves given a forward thrust by those changes. One important social change is the reduction in the need for physical transportation to send information as communication technologies replaced the transportation of messages. A side effect of this is heavy personal use of the tools of communication leading to less social activity, and social dysfunction may result in an extreme case. Last but not least, as each new tool of communication runs its course, more tools of communication lead more producers to send a greater amount of information on a greater variety of subjects over more channels (Fang, 1997). Meanwhile, new literacies have arisen to accommodate the new communication technologies, from the phonetic alphabet of the first revolution to the computer codes of the latest. The average citizen thus relies less and less on the political and economic rulers who dominated the media before, and has access to broader channels to receive multiple communication information. Overall, information communication in the pre-mobile communication stage developed more variety, channels and speed and led to the decentralising of information communication, as well as empowerment of the public engaging in mass communication.

2.3.2 Information Technology in Current Mobile Communication

The telephone system has been an increasingly useful element of communication from 1877 until the present day. For telephone service providers, it is quite easy to transmit and receive signal utilising transceivers, twisted pairs, repeaters and other sophisticated communications devices and equipment. Users find the telephone has the advantages of convenience and economy, which allow people to keep in touch closely even when they are separated (Geminiano & Geminiano, 2013). Phones and smartphones are both important communication tools that people rely on to interact with others, do business and exchange emotions. However, different communication technologies have different functions and limitations. Users adapt to these characteristics and create particular habits when they interact with others. Therefore, when reviewing people's use of phones and mobile phones, it can be seen that people using a telephone have specific communication habits, which differ when they are using a mobile phone. From phones to mobile phones, and mobile phones to smartphones, users' communication behaviour is different. In considering young people's smart communication lifestyle, this study first reviews the mobile phone phase in the relationship between technology and interpersonal communication, to understand how people use phones and mobile phones to interact with others. Based on this, a further exploration is made of users' social activities using smartphones.

2.3.2.1 Mobile Phones and Mobile Communication

Mobility is the greatest advantage of the mobile phone, which exceeds the experience of the landline phone. People do not need stay in one place to send or receive information; mobile phones allow information to be sent or received anywhere. This mobility can primarily be defined as spatial mobility, and physical travel is its most obvious feature. People still remember a time when they stayed at home for an entire day to wait for an important call.

The first commercial mobile phones were introduced in 1984, but they did not become popular until 1995. By 2005, the number of new mobile phones had exceeded the number of landline phones in the US (Hanson, 2007). Motorola was one company that took the lead in developing the US market and invested close to 100 million US dollars in the

development of the cell phone between the late 1960s and the early 1980s. The first Motorola phone weighed about two pounds (Levinson, 2004).

After the mobile phone was invented, people could send messages to each other without having to actually make the physical trip to the interlocutor. The condition on fixed locations for sending and receiving equipment was removed. A person interested in sending a message became, within some very broad boundaries, free to choose where they initiated the communication (Ling & Haddon, 2003). Park (2005) noted that the mobile phone 'is an extraordinary medium, people can communicate with each other without time and space restrictions'.

Huge advances in technology have undoubtedly played a role in the rapid and unprecedented take-up and widespread availability of mobile communication (Lacohée et al., 2003). The miniaturisation and improvements in battery technology enabled the mobile device to become small and light enough to carry around (Agar, 2013).

There is no need to know the location of the person to whom you want to speak; with their mobile phone number, you can find him/her. Ling and Haddon (2003) noted how the development of mobile telephony thus 'softens time' in that one does not necessarily need to make an absolute point in time, because time can be coordinated through a mobile phone anytime, anywhere. As Stald (2008) wrote in *Mobile Identity*, we can conclude that the mobile phone plays an important role in society, especially among young people. It is not only a functional communication tool, but also an identifier of youth:

> *The mobile is the glue that holds together various nodes in these social networks: it serves as the predominant personal tool for the coordination of everyday life, for updating oneself on social relations, and for the collective sharing of experiences. It is therefore the mediator of meanings and emotions that may be extremely important in the ongoing formation of young people's identities.* (Stald, 2008, p. 161).

Most studies on mobile phone use and interpersonal communication focus on two aspects: the difference between mobile phones and other forms of communication, such as face-to-

face, mail and the Internet (Boase, 2008; Utz, 2007), and the role of the mobile phone in instigating the concept of ‘perpetual contact’ in interpersonal communication (Katz & Aakhus, 2002; Ito & Okabe, 2005; Arminen & Weilenmann, 2009; Rice & Hagen, 2010; Schroeder, 2010).

Mobile phones have significantly changed traditional behaviour, attitudes and values in their short history, more than any other technology or service (Hanson, 2007). They have blurred the boundary between public and private, and have been considered a form of coordination and multitasking (Rice & Hagen, 2010). Communication technology changes our lifestyles at an unconscious level. Kasesniemi and Rautiainen (2002) suggest that the existing culture is shaped by mobile phone users and mobile communication services usage, which may even create a new lifestyle. Green (2003) indicated the social value of mobile technologies among young people. Mobile devices’ symbolism of membership and exclusion shifts teenagers’ relationships within their social groups, as well as leading to the dynamically changing forms of the devices themselves. The opportunity, access and connection with friends the mobile devices represent creates an identity for mobile device users that is distinct from friends and others (e.g., family members), thus creating social value.

Since the late 1990s, mobile phones have rapidly become a popular and important part of everyday life (Ishii, 2006). Ling and Campbell (2009) argued that ‘mobile communication influences our understanding of time and space in the way that we coordinate with one another’. Regardless of where we are and who we want talk to, it is possible to make contact. Mobile communication has changed the way we coordinate our interactions, allowing meeting times and locations to become more flexible. Communication technology has allowed people to overcome the barriers of time and space with ease (Humphreys, 2010), with ‘more spontaneous or impulsive decision making – at least among young people’ (Thulin & Vilhelmson, 2009, p. 142, cited in Ling & Haddon, 2003; Ling & Yttri, 2002).

2.3.2.2 Smartphones and Smart Communication

A smartphone is a mobile phone with converged features offering advanced PC-like functionality, as well as the ability to download apps, which goes beyond the telephone functions of the phone such as making phone calls and sending text messages (Sarwar & Soomro, 2013). It is a portable, well-connected device that provides information in a relatively cheap way (Lee & Anderson, 2008).

Smartphones, tablets, e-readers, smart watches and smart bands are examples of smart mobile devices that are used in smart communication. The small size enables users to enjoy mobile communication everywhere, connect with Wi-Fi and perform a variety of activities. Although many mobile communication inventions enabled communication and information access, it was a terminal combine different functions in a small, single and networked device, ready to be used anywhere and anytime that set current mobile communication technologies apart from previous inventions. Larivière et al. (2013) categorised five characteristics of current mobile communication devices: portable, personal, networked, textual/visual and converged. Brown and Duguid (2002) mentioned ‘synchronised’ as another important characteristic. ‘Portable’ refers to the enabling aspect of mobile computing platforms when the device can be carried anywhere and used whenever needed. Of course, portability depends on the size and weight of the device. ‘Personal’ refers to the fact that customers tend to use mobile devices constantly as they store a large amount of personal information on their mobile devices. Also, it has been very common for customers to personalize mobile devices, as evidenced by the remarkable growth of the industry for accessories such as cases and skins. ‘Networked’ refers to mobile devices is the quick accessibility of various information source. A wireless connection to the mobile devices largely facilitates individual’s daily lives. The ability to communicate through different mediums, is another important characteristic of mobile devices. Convergence of technologies refers to users’ ability to access a wide array of functions and services through apps on their single device. Last but not least, smart mobile devices can achieve instant data synchronisation with other devices and desktop computers and the information applied in the smart mobile device can be synced between different mobile apps. This study focuses on smartphones, which are one outcome of the evolution of mobile communication.

The history of smartphones can be divided into three main phases. In the first phase, smartphones were corporation oriented, and their embedded features and functions represented corporate requirements. The first smartphone in the market was ‘Simon’ from IBM in 1993 (Sarwar & Soomro, 2013). In the second phase, smartphones were enterprise oriented (Reed, 2010; Niccolai & Gohring, 2010; Wikipedia, 2016a). The Blackberry was the representative smartphone in this second phase. It was a revolutionary device that introduced many features including email, mobile Internet, fax, web browsing and a camera. In the third phase, smartphones became public citizen oriented. The iPhone, which introduced several revolutionary innovations including a multi-touch screen and the App Store, is representative of the modern smartphone phase. Agar (2013) claims ‘smartphone were not invented by Apple, but they were defined by Apple’ (p. 181). In this phase, smartphones were equipped with a large high-resolution display, multi-sensory screen and a wide array of computer functionalities and features (Persaud & Azhar 2012). This study avoids using a technology-based definition of smartphone because that form of definition risks being both arbitrary and rapidly outdated (Bertel & Stald, 2011).

Traditional mobile communication most often happens between two individuals at a time, but smartphones allow for smart communication patterns beyond one-to-one communication. This includes various forms of ‘mass self-communication’ (Castells, 2009) occurring in many-to-many communication flows. The traditionally functioning mobile phone used voice calls and SMS (short message service) texting for strong ties (Ling et al., 2012). The smartphone nowadays can be used to support a larger network of weaker ties (Bertel, 2013a).Goggin (2006) indicated that the smartphone has become not merely a daily communication device, but more importantly, it has become a unique central cultural technology. Thanks to the support from mobile Internet technology, the devices virtually support both interpersonal interaction (Katz, 2006) and mobile multimedia (Koskinen, 2008) all the time. Therefore, from the smart mobile devices, users can experience a new type of computer mediated communication – smart communication. In addition to making the communication more convenient, smart communication affects every aspect of people’s lives, especially it improves the quality of lives.

Short, Williams and Christie (1976) define social presence as the ‘degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationships’ (p. 65). In other words, it is the degree to which a person is perceived as a ‘real person’ in mediated communication. Compared with face-to-face communication, communication via telephone and mobile phone lacks interactions such as gestures or poses and the conversation is conducted mainly through sound (Cyr et al., 2007). The presence of smart mobile devices in our daily lives, with video chat, audio chat or instant messaging with emoticons and pictures available at any time, has remedied the defects of long-distance communication, meaning that social presence has become deeper and more diverse than ever before.

Focusing on people’s need for and usage of social media, Petrič et al. (2011) identified four main social uses of interpersonal communication technologies:

1. Information-cooperative: as a communication tool for social use, to exchange information with others and stay in touch with the world.
2. Relational: for maintaining social relationships, interpersonal norms and other aspects of interpersonal relationships; giving and receiving social support, friendship and so on.
3. Expressive: relating to the subjective world of personal experience; expressing one’s desires, beliefs and self-identification; presenting oneself and communicating intimately about one’s inner states.
4. Strategic: usually to achieve personal goals through effective communication manifested in the achievement of practical goals.

The rise of social media has already affected human behaviour patterns. The younger generation no longer relies on face-to-face communication, focusing more on mobile and SNS (social networking services) anytime, anywhere (Green & Singleton, 2007). Therefore, this study aims to develop a deeper understanding of user behaviour and social relationships conducted through smart mobile devices.

The flow of information has become all-pervasive throughout the world. Communication has been consistently redefined with the development of newer technology and lifestyles. The ubiquitous availability of communication has made smart mobile devices a

significant part of our lives. Mobile social networks are already creating new forms of social behaviour that blur the distinctions between online and real-world interactions (Ziv & Mulloth, 2006). As many sociologists and design researchers attest, no other invention in human history has drawn us closer than the mobile phone. It allows us to connect with people anytime and anywhere in a virtual world (Park, 2005). The mobile revolution can feel overwhelming, as new apps spring up in our daily lives and change the way we live.

Mobile technology supports and amplifies social relationships and helps people and organisations become more productive (Ling & Donner, 2009). We have come to prefer using smartphones for most purposes, and have become accustomed to the mobile lifestyle. Mobile technology makes us believe that technology can suit our needs anywhere.

Without communication, people may feel hopeless (Enez Darcin, 2016). Sixty-four percent of American adults own a smartphone, and 46% of these owners emphasised that the smartphone is a part of their lives (Pew Research Center, 2015). Mobile technology, telephony, radio, TV broadcasting and other communication systems make people's daily lives feel significant, and people increasingly rely on these tools to communicate with others. A smartphone is like a microcomputer; users have a mobile office in their pocket, causing office mobility to grow at a dizzying pace.

2.3.2.3 Emoticons Usage in Smart Communication

Everyday face-to-face communication incorporates various modalities, such as speech, gesture, facial expression and stance, which together help us to express our thoughts as accurately as possible (Bavelas and Chovil, 2000; Ledbetter and Larson, 2008). However, these modalities are not available in mediated communication, and the intended message may be lost. Emoticons overcome some of the shortcomings of mediated communication by enabling users to include facial expressions in their messages (McDonagh et al., 2009; Churches, 2014). The combined use of text and emoticons can enhance information transmission because emoticons make it easier to understand what the other person is trying to communicate.

Instant messaging relies on text to deliver information. In the absence of facial expressions, body language or other physical cues to convey meaning, emoticons substitute for non-verbal behaviour, making communication more explicit. The word ‘emoticon’ is a portmanteau of ‘emotion’ and ‘icon’. Emoticons can be categorised as either ‘static’ or ‘animated’. Static emoticons are most common in text-based instant communication. They are usually displayed as a combination of numbers, letters, punctuation marks, mathematical operators and/or other special signs. For example, :-) indicates that the ‘speaker’ is happy or pleased. Animated emoticons, such as GIFs, incorporate motion. Emoticons can be further categorised as either ‘system-defined’ or ‘user-defined’, depending on their source; as ‘human body’ or ‘non-human body’, depending on their content; and as ‘emotional’, ‘behavioural’ or ‘narrative’, depending on their function.

Instant messaging is now the most popular way for young people to communicate with friends, surpassing face-to-face communication, email and voice calls (Lenhart et al., 2010a). Previous studies have indicated that users include emoticons within text messages to provide an emotional context for their communication (Tossell et al., 2012). Indeed, emoticons are a valuable addition to existing communication modalities, as they carry specific kinds of information (Huang et al., 2008). Many researchers have argued that emoticons enhance written communication in the same way that body language supports verbal communication (Derks et al., 2008; Rezabek and Cochenour, 1998).

The emoticon was defined in *The Hacker’s Dictionary* as ‘[a]n ASCII glyph used to indicate an emotional state in e-mail or news’ (Raymond, 1994, pp. 162–163). Since Scott Fahlman first used punctuation marks to form the emoticon ‘:-)’ on a Carnegie Mellon University bulletin board on 19 September 1982, emoticons have become an important symbol of the Internet age (Garber, 2012). Fahlman’s emoticon was designed to prevent a misunderstanding. To ensure their messages were not misconstrued, the scientists at Carnegie Mellon University decided that they needed a way to distinguish jokes from other types of message content (Garber, 2013). Thus, the first emoticon was developed as a simple textual portrayal of the writer’s mood or facial expression (Tossell et al., 2012). The practice of using emoticons to symbolise emotions soon became widely adopted.

The earliest emoticons comprised punctuation marks, and had to be read by turning the page sideways or by tilting one's head to the left. New emoticons continue to be developed according to users' needs, with significant design improvements and ever-greater diversity. Emoticons have become increasingly elaborate, representing realistic faces with a range of emotions that can be used for more specific and rich purposes in information transmission. These more dynamic emoticons have replaced basic text symbols and enabled more complex sentiments such as humour, sadness and teasing/sarcasm to be conveyed. Most recently, larger-scale emoticons and 'stickers' have become popular. For example, the instant-messaging application *Line* provides much more realistic emoticons with anthropomorphic features to help stimulate more personal and lively social interaction among friends. Many of the popular large-scale emoticons and stickers available in this kind of application also attract users, as they build a link between emoticon use and information richness. Compared with simple blocks of text, stickers communicate emotions more visually. They are typically available in packs of up to a dozen, most of which are free to download and use. More unusual emoticons can be bought for $1 or $2 in premium packs, or customised for brands or special events (Russell, 2013). Users are now able to choose from an increasingly wide variety of emoticons – from textual to pictorial, from static to animated, and from the default little yellow faces to cartoon stickers.

Figure 2.5shows some of the emoticons in *QQ* (a well-known instant messenger application in China) and *Line* to illustrate the development of the emoticon from simple to complex. This evolution did not involve simply replacing earlier versions, as the older styles of emoticons are compatible with the newer ones. Today, people use both static and animated emoticons to communicate online, depending on their mood and the context of the conversation.

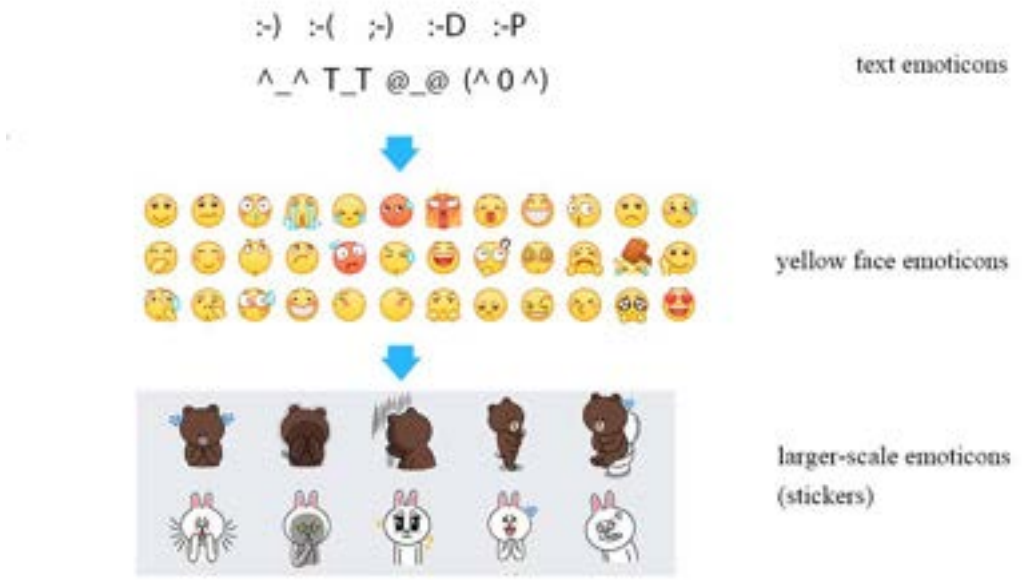

Figure 2.5 Development of emoticon

Once downloaded, emoticons become available to use in an application. The developers of *Line* claim that the application offers more than 250 stickers, offering users the opportunity to communicate mood changes within a single sentence or throughout the day. In light of this, one of the goals of the current study was to identify the relationship between the changes in emoticon use and the daily lives of young people.

The first question was as follows: what kinds of emoticons do users prefer? Students are the main users of emoticons, as they spend a lot of time on their smartphones every day and are greatly concerned with making their online communication funnier, richer and livelier. One factor affecting users' choice of emoticons is the desire for more interesting and richly expressive communication. Efficiency and convenience are also valued, especially by young white-collar workers. The goals of this study were to provide a new perspective on the relationship between emoticon use and young people's communication, and to show how emoticon use offers in-depth insights into the lifestyle of young people. The study also investigated changes in the emoticons available on mobile devices and users' preferences for basic, default or larger emoticons. The opportunity to customise emoticons for brands or special events was also found to attract users to specific

applications, while simultaneously conveying propaganda to maximise profit from the target audience(Chen & Siu, 2016).

2.3.3 Information Technology in Next-generation Mobile Communication

Referring to ‘next-generation’ mobile communication, Ryu et al. (2005) provide a good model that connects the *mobile communication system* and *mobile services,* they predicted at that time, and some of capabilities exist now. The characteristics of mobile communication systems can differ in terms of ‘increased data speed, use of new spectrum and bandwidth, a multi-mode air interface, availability of mobile multimedia devices, ubiquitous mobile life and new technologies for supporting these characteristics’ (p. 123). Enhanced Internet access speed will support the increasing demand for high speed downloading, browsing and streaming services. The use of a new spectrum and bandwidth also brings the broadband applications and global roaming from fiction to reality. The integrated services from the Internet of things (IOT) are upgraded by multi-mode air interfaces that provide connections among different smart devices. Screen size and shape can be varied based on the user requirements and service capabilities. Moreover, information technologies such as realistic audio and video services, storage capability and multifunctional services will be available with future smart mobile devices. Ubiquitous mobile life will also be possible through personalised and customised next-generation mobile communication.

The future direction of mobile communication is according to technically possible and socially desirable. The possibilitieswere determined bythe development of technology, but users’needs determine which technology will actually break through and remain a facet of people’slife(Tessa, 2012).

The next generation of communication may go in multiple directions. More innovations are expected to be integrated into automated technologies to develop new communication tools, which would simplify or even perform the task that users do not want to do in person. It is possible people will proactively design new communication tools to guide them to understand the reasons for users’ behaviour to measure and evaluate their feelings.

2.3.4 Traditional Media and New Media: Convergence or Replacement?

Changes in the way traditional media is replaced by new media are closely linked to the transformation of communication. The means of communication change with the development of media. The boundary between new media and traditional media (newspapers, television, radio, etc.) has become blurred (Lin, 2013). Although new media such as mobile Internet has taken hold in the information age, traditional media remains important. The traditional media is still authoritative; people are used to finding out the news from these channels. However, new media spread information faster than traditional media, and anyone can be a disseminator of information. It has been argued that journalistic intermediation has less importance in the current communication environment, as more people have the ability and channels to publish on the Internet (Dennis & Merrill, 2006). New media facilitate more people to participate in content creation, which expands the sources of new content (Lin, 2013).

The relationship between new and traditional media has been classified by some Western scholarsin terms of competition, integration and complementariness. To date, no evidence shows that new media has taken usurped traditional media (Neuberger & Nuerbergk, 2010; Phillips, 2010). Rather, traditional media seek to merge with new media resources to create new media content, such as new news content and user-generated content (Bowman & Willis, 2003; Gillmor, 2004).

Before the information age, to know a person, it was necessary to observe them closely, to have direct interpersonal communication or learn of them by word of mouth (i.e., gossip). When we communicate with strangers face-to-face, and on social occasions, we exhibit modelling behaviour; it may be that we do not know well the person we constantly meet, and we rely on our self-judgement about them. In the information age, the Internet is now so advanced that it is possible to know a person just by searching for him or her in social media, (e.g., *Facebook*, *Twitter* or *Instagram*), and sending an email or instant message. Online communication can avoid the embarrassment of face-to-face communication. If we do not really want to get involved with someone face-to-face, we can look at his/her social media pages, blog and photos to find out about his/her personality, hobbies, tastes and whatever we want to know.

In Hong Kong, citizens still can get free newspapers in some public spaces on weekday mornings. Old ladies distribute newspapers to pedestrians on footbridges and at bus stops, and people can take free newspapers from boxes at the metro stations. In the past, this kind of free newspaper would be distributed in the early morning and a lot of people wanted to find out the latest news via newspapers and would take one when they passed by. Nowadays, more and more people choose to read e-newspapers on their smart mobile devices, which is more convenient for reading in a crowded carriage during rush hour and also saves paper. As a result, fewer people read the free newspaper. Nevertheless, in the late morning, at around 11 o'clock, old ladies are still working on distributing the free newspaper.

The traditional media use their official micro blogs, *Facebook* public accounts and *WeChat* public platform to promote activities, interact with audiences and coordinate with their traditional offerings.

2.3.5 Domestication of Media and Technology

Domestication is a theoretical approach in the study of media and technology known from the domestication framework (Haddon, 2003; Silverstone & Haddon, 1996; Silverstone at al., 1992).The framework provides a useful model that integrates a range of assumptions and perspectives in terms of human relationships with ICTs. This theory was initially developed to understand how ICTs find a place in people's lives through the adoption and application of new technology in households (Silverstone et al., 1992). Later, Haddon (2003) developed this framework to address the challenges of the adoption of mobile phones and technology beyond the home context. In the same vein, Lie and Sørensen (1996) claim that the domestication of technology does not only happen within the confines of the home context. Smart mobile devices (e.g., smartphones) are good examples of technology that has breached the walls of the home; people use them not only at home, but also in public space.

Previous research (Frissen, 2000; Stewart, 2003; Hahn & Kibora, 2008) has indicated that the adoption and use of new ICTs, social changes and the emergence of new technologies

have eliminated the traditional boundaries of home, which has posed challenges for social researchers and product designers. New technologies influence the adoption process and domestication processes. ICTs are becoming integrated within social life (Stewart, 2003). Domestication results in possibilities for using mobile device technologies. It also gives mobile devices more social meaning in communication.

In this study, domestication presents in the relationship between devices and people, which determines how people are domesticated by new technology and adapt to it. From the industrial age to the information age, people have been domesticated by new things again and again, as a result of continuous evolution and progress of society.

2.4 Brief Review of General Cultural Behaviour Related to Mobile Usage in Different Countries and Regions

Different countries have different lifestyles based on different cultures. Culture has been found to have a profound effect on the use of smart mobile devices (Lee et al., 2004). For this study, the first thing to understand is the target country or region's culture, in particular, human gestures and actions with regional and ethnic differences, and to interpret the traditional habits and thoughts. Various factors correlate with local culture, including lifestyle, socioeconomic status, education, symbolism and communication behaviour. Cultural study is important in qualitative research because it facilitates conscious and self-reflexive study in theoretical terms and is pragmatic and strategic in its choice of methods. Meanwhile, cultural study has spread a tolerant attitude to the use of different methods that help researchers understand observed phenomena, and find new ways of seeing things. In this sense, cultural study is a form of sociological research. Interdisciplinary cultural studies refer to the postmodern condition (Alasuutari, 1995).

In their paper *Ethnographic Method*, Burke and Kirk (2001) noted that the ethnographic method is a method of observing human interactions and activities in a social context, i.e., in their cultural backgrounds. Some human behaviour is innate, but most is acquired with practice, and as such is inseparable from culture. Smart mobile devices user behaviour is a system that contains a number of factors, not only physiology, but also factors with deep cultural significance, including values, social norms, lifestyle, symbolism and the

information environment. People, culture and the environment make up the social system. Therefore, cultural differences lead to differences in behaviour, something that cannot be ignored when carrying out behaviour observation and design practice. This subsection describes some general status of mobile communication in America, Europe, Japan and China. A review of user behaviour and mobile communication usage in different countries and regions can broaden the research dimension and make it more complete.

2.4.1 Mobile Communication in America

American culture in the postmodern period is fuelled by advanced communication and information technology. Reports by the Kaiser Family Foundation and Pew Foundation, mentioned that media is the most powerful in young people's lives today (Pew Research Center, 2015). Americans spend more than 50 hours in front of a screen each week (Malikhao & Servaes, 2011). Nearly two thirds of Americans have their own smartphones, and most of these devices are regarded as a main entry point to connect to the online world (Smith, 2015). Many studies that explore the new communication technologies tend to focus on the youth demographic in most societies, including America, because young people are generally the early adopters of new technologies and creatively integrate them into their lives (Castells et al., 2004).

In 2015, the number of US mobile Internet usage up to 329 million, almost equal to the size of the national population. Active mobile Internet users reached 160 million people, a penetration rate of 50%. However, due to the more mature mobile Internet and relatively slow growth, growth of mobile device users in 2014 was 0.4%, and the active mobile Internet user growth rate was 4%. Mobile phone average daily usage time is up to 2 hours 27 minutes. According to Blumberg and Luke (2010), more than 50% of American households aged between 25 and 29 use mobile phones rather than traditional landline telephones. Mobile data accounted for 35% of total Internet data, with smartphone mobile data accounting for 25% of all Internet data and tablet PCs for 10%. Mobile e-commerce accounted for 24% of all retail sales of electricity providers, mobile social networks (mainly *Facebook*) accounted for 27%, 22% of mobile games, mobile video accounted for 29%, mobile location-based search services accounted for 20% and mobile banking 24% (Chinese Academy of Telecommunications Industry Development, 2015).

2.4.2 Mobile Communication in Europe

Europe is featured for its large diversity of countries, cultures, religions, and races. While such diversity provides valuable data of hybrid mobile society user behaviours for researchers to study and to mode, it also brings the complexity and thus makes it more difficult for researchers to study mobile communication in European countries. Fortunati (2001) conducted a comprehensive study in five major European countries. He compared the mobile phone with other popular mobile communication technologies such as car phone, computer, and laptops. Moreover, he analysed the user residential mobility with the mobility of their communication device choices. The comprehensive data from his continent-wide interviews has demonstrated an unbeatable popularity and loyalty of mobile phone users among others. It should be noted that the finding from the study of residential mobility was contrary to his initial hypothesis. He carefully selected very representative samples to capture the cross-sectional variance of mobility level, including European people with various education levels, life phases, with or without children and income levels. The results shown little correlation between the residential mobility and diffusion of the mobile phones. This result surprisingly suggests that mobile phone was invented as a ‘mobile’ technology, but it has become a personal device over the decades for all types of user groups. To address user data with high complexity, a few of methodology studies are carried out by European researchers. Koskinen (2007) investigated the impact of multimedia devices on human relationships and society at large. Specifically, he examined methods of expression people use in designing multimedia messages, and how people interact with others via mobile multimedia.When it comes to mobile communication, a hidden premise is the existence of the internet. The study by Fortunati (2005) demonstrated a textbook example of massive data analysis. This work is ambitious as it compares the impact of interneton traditional media, such as television. The author chose a news channel as a stereotype to break through this gigantic topic, and examined and reviewed lots of successful examples of how the internet invades classical new media. The author concluded that the major media is going through the process of internalization, which has a mutual promoting effect on mobile technology. As such, it is undeniable that mobile communication has shown its revolutionary influence on people’s daily life. In other words, to develop products with better user experience, the study of

user behaviour is inevitable, especially in personal space. Some French scholars did a series of studies that focus on the use of new technologies that are collectively employed in smart phones. For example, Relieuet al. (2007) carried out a survey on family activities in domestic environment with the help of video cameras. The use of video cameras unfolds the most authentic interactions of participants in their everyday livings, provides researchers and developers an insightful reference of user's orientations and therefore helps develop a product that can inject to user's daily life not intrusively. Licoppe and Smoreda (2005) further discussed the user behaviour in more general and broad cases in which they studied three years empirical data and developed their hypothesis of social networks' influences on today's people relationship.

2.4.3 Mobile Communication in Japan

Japan, 'nation of mobiles', is one of the most developed countries in the world in terms of mobile Internet. In areas including games, payments, health, e-commerce and TV, Japan has served as a testing ground for the global mobile Internet (Zeng et al., 2014).

The number of Japan population is 126 million (World Population Review, 2016),the number of active mobile Internet users reached 22 million, a penetration rate of 17%. The growth rate is relatively stable at 12% for mobile device users and 15% for active mobile Internet users. Mobile phone usage time is 59 minutes per day on average, far below the US average. Smartphone mobile data accounts for 30% of all mobile data and for 5% of tablet PC data, mobile traffic accounts for 35% of total Internet data, reaching a high level.Mobile e-commerce has developed rapidly, accounting for 40% of all retail sales of electricity suppliers (Chinese Academy of Telecommunications Industry Development, 2015).

Ishii and Wu (2006) noted that selective friendship is the key to understanding the unique mobile culture in Japan. The Japanese Internet culture is more individualised. Young people in Japan tend toward indirect communication, contributing to a unique mobile media culture among Japanese youth. Lu et al. (2013) conducted a survey of Japanese college students using mobile phones and found that on average, they start using mobile phones at 15 years old; spend two and a half hours per week text messaging; check for

text message replies more than 20 times per day; send messages more than 90 times per week; and spend 8000 yen per month.

There are strict rules about Japanese students using mobile phones in school, and they are most frequently used during lunch time and immediately after school, as students contact their friends in haste. Other places that young people frequent have different rules for mobile phone use. In public places such as trains, buses and many restaurants in Japan voice calls are not allowed; only messaging and mobile Internet is available (Ishii, 2006), a result of which is that Japanese young people are crazy about 'thumb movement'. Rheingold (2002) found that most young people in Japan could compose a message with their thumb without looking at it. One interviewee indicated that she exchanged more than 80 text messages a day. Some places in Japan are open to phone calls, but most of these places are quite noisy, so it is hard to have a sustained conversation in these locations (Ito, 2001). In contrast, texting makes it possible for young people to conduct conversations that cannot be overheard. Text messaging is quite popular among Japanese youth (Ishii & Wu, 2006), including SMS communications and emails, and Tokyo texters have been called 'the thumb tribe' (Rheingold, 2002). They use less direct telephone conversation because of the indirectness, asynchronicity of communication and much cheaper cost of messages (Igarashi et al., 2005). Adolescents tend to conform to the norms of the peer groups to which they belong and adjust their behaviour to their environment (Harris, 1999), and this is especially so in Japanese culture (Williams & Sogon, 1984).

2.4.4 Mobile Communication in China

Given China's development in recent years, the power of Chinese communication cannot be ignored. Beijing is an international city that combines traditional character and modern development. It provides a perfect portrait of the everyday citizen's lifestyle model. From its central areas to suburban districts, many different levels and kinds of education, income, attitude and mobile device use can be found. Beijing is also the location for most of China's mobile Internet companies, start-ups and universities. The Zhongguancun High-Tech Zone is known as China's Silicon Valley. Due to the large floating population in Beijing, smartphones have become particularly important to the city's citizens,

especially for young people. Compared with computers and laptops, smartphones are much easier to obtain and have become more useful.

In a previous case study (Li et al., 2013), most Beijing youth were found to be keen to adopt new technology and try new apps, especially those that they felt matched their lifestyles and reflected their image. The owners of smartphones turn them into an expressive marker of identity and status (Westlund et al., 2011). Furthermore, many local mobile Internet companies in Beijing are incessantly developing new apps. Under their influence and promotion in the city, young people can access the latest information and participate in the first trials of new local products. Beijing is an outstanding city in China that embraces mobilecommunication.

On the other hand, Law and Peng (2008) point out that the social lives of the migrant workers, such as those in Guangdong province, will be largely influenced by the rapidly evolving mobile phones. Mobile phones allow them to immediately get connected to their families who are far away in their hometown when they are homesick (Gergen, 2002).

2.5 Summary

This chapter reviews the literature of communication and particular research terms. The literature review mainly focuses on mobile communication and smart communication. It is necessary to consider these issues before conducting research on smart communication user behaviour in Hong Kong, to better understand the background of the study and narrow down the research topic. Reviewing cultural behaviour related to mobile usage in different countries and regions provides a holistic view for this study as well as information useful for conducting comparative studies.

CHAPTER 3 PEOPLE, SOCIETY, DEVICEAND SERVICE (PSDS)IN SMART COMMUNICATION

3.1 Preamble

Around the core concept of smart communication, a people, society, device, service (PSDS) model is proposed, in which ‘people’ form the core; ‘society’ is the users’ community and their relationships with surroundings; ‘device’ is the platform, i.e., the tool for smart communication; and ‘service’ is the process of the user experience. This chapter further defines the meanings of people, society, device and service, and then attempts a conceptual model of smart communication consisting of four parts. It also presents a dynamic structured relationship among people, society, devices and services. This model can help us to better understand the context of smart communication and how people use smart mobile devices in the information age.

3.2 People

The people we define here can be users of a product or customers who enjoy the product service. People’s social attributes are changing all the time, and people born in the 1990s and 2000s, in the information age, grew up with digital products and smart mobile devices already a part of their lives. We can call this generation ‘digital natives’. The social attributes of those born in the 1980s or earlier have changed, as digital entered their lives with the development of technology. We can call them ‘digital immigrants’. In her book *Alone together: Why we expect more from technology and less from each other*, Turkle (2011) illustrates the power of digital devices that change people’s social lives and their business productivity dramatically. The book identifies how technology influences the relationships between friends, lovers, parents and children, and creates new instabilities in terms of privacy and community, intimacy and solitude, which is a reflection of people’s behaviour in the digital age. Prensky (2001) also noted the differences between younger ‘digital natives’ and older ‘digital immigrants’. Both of these groups, which express different evolution and development in the context of the information age, are our targets of study. Carroll (2002) proposed a model of people’s activities and technology relationships in the context of HCI. Figure 3.1shows that requirements for technologies emerge from people’s activities in specific contexts, and, in turn, the technologies provide opportunities to change the activities themselves. This

cycle demonstrates the dynamic development between people's activities and technologies (Benyon et al., 2005).

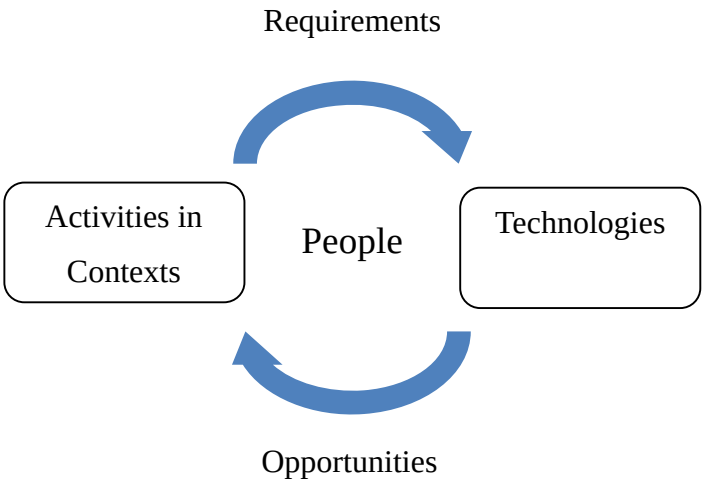

Figure 3.1 Activities and technologies, after Carroll (2002, p. 68).

Because people (users/customers) are an essential part of communication, research should put people first; it should be human-centred. User participation is necessary in the service process – all services need users to participate to make them complete. Communication is a basic human behaviour, which has been developing with technology. Human-centred research areas including human ethnology, human behaviour research and psychology are important for smart communication.

3.3 Society

We live in an information society that is mobile, digital and emotional. Smart mobile devices have the power to dramatically alter our social lives (Turkle, 2011). Society provides a background against which we can understand human behavioural change after the advent of new technology. Webster (2002) distinguishes five definitions of an information society: technological, economic, occupational, spatial and cultural.

Because information technology is used in data production, research and education, health care, business and government management and a wide range of applications for the family, it has had profound economic and social development effects, fundamentally

changing people's lifestyles, behaviour and values.Watts (2004) pointed out that we need a science of networks to help us describe the 'connected age' in a scientific way so as to understand it.

With advances in information technology, and intelligent integrated networks reaching every corner of society, information technology is changing the way people learn, work and play. A new lifestyle based on an information society is being formed. An intelligent integrated network of fixed phones, mobile phones, televisions, computers and other information terminal devices is available throughout the information society. People can get text, sound and image information anytime, anywhere.

Digital production tools and consumer devices are widely used, and people have been living surrounded by a variety of information terminals. Information is becoming an indispensable element of contemporary human life. Some traditional jobs are being eliminated, the labour force is mainly concentrated in the information sector, and new forms of employment and employment structure are being formed. In countries with a high degree of information technology development, information industry employees account for about half of all community practitioners. A large number of new jobs and employment practices have been spawned, such as flexible working hours, home offices, online jobs and flexible employment. Commercial transactions, government management practices and social management structures are also changing.

3.4 Device

Smartphones, tablets, e-readers, smart watches and smart bands are typical examples of smart mobile devices that are widely used in smart communication. These products have relatively small size but largely integrate hardware, software and network technologies. Six attributes of smart mobile devices contribute most when people create values through connecting and interacting with others and society, including portable, personal, networked, multimedia, converged and synchronised (Larivière et al., 2013; Brown & Duguid, 2002).

Portable

Portability, the enabling aspect of mobile computing platforms, measures the extent to which a device can be carried anywhere and used whenever it is needed. Size and weight of the mobile device are two primary determinants of the portability. In this regard, among smartphones, tablets and laptops, smartphones are considered the most portable devices while laptops are the least portable ones. In the past decades, there has been growing interest among customers on the portability of mobile devices. Accordingly, a number of companies have started to interact with their customers through mobile platforms. Notably, according to the *Facebook* newsroom, 600 million out of the one billion monthly active users of *Facebook* use *Facebook* mobile products, indicating the importance of mobile platforms (Spiliotopoulos& Oakley, 2013).

Personal

Mobile devices have become a highly valuable personal asset in customers' daily lives. Customers tend to use mobile devices constantly as they store a large amount of personal information on their mobile devices. Also, it has been very common for customers to personalize mobile devices, as evidenced by the remarkable growth of the industry for accessories such as cases and skins. Moreover, companies also well sensed the intimate relationship between customers and their mobile devices, and therefore introduced the endearing label 'companion device' as a marketing tactic (Fallahkhair et al., 2007).

Networked

One important attribute of mobile devices is the quick accessibility of various information source. A wireless connection to the mobile devices largely facilitates individuals' daily lives. For example, people can access a navigation service by using Google Maps or check the live schedule of metro or bus operation information. Besides, being networked brings about opportunistic demand. People can benefit from networked intelligence for smart travel behaviour, smart purchase behaviour and so on (Tapscott, 1996).

Multimedia

The ability to communicate with multimedia content, such as textual or visual exchanges and sharing, is another important characteristic of smart mobile devices. Mobile devices allow users to access, receive, store and share multimedia data and thus bring in substantial communication chances. It is worth emphasizing that information shared by mobile devices can be extremely broad (e.g., sharing daily activities videos, uploading selfies, discussing shopping experiences), and can be transmitted through more and more mobile apps.

Converged

Convergence of technologies has enabled users to access a number of functions and services in a single device. This innovative function largely improves the user experience. For instance, people can check emails, check their location, watch videos, play games and read news on one device, instead of paying for several types of equipment and switching from one device to another.

Synchronised

This section discusses 'synchronised', another important attribute of today's mobile devices. The meaning of synchronised in this context is two-fold. First, smart mobile devices can achieve data instant synchronisation with other devices and desktops. Therefore, people can collaborate with multiple users on projects or presentations in real time to remove process delays, and continue their business or check their data through multiple devices and desktops at any time and in any location. Second, the information in the smart mobile device can be synced between different mobile apps, enabling people to break down the barriers between different information providers and share information from one source to another. For instance, people can share news from the BBC or NetEase to Facebook or WeChat. This convenient information flow enhances people's social power, facilitates smart decision making and extends social networks (Brown & Duguid, 2002).

To sum up, the characteristics discussed above make the smart mobile device a type of product that allows users to check information, exchange different types of information

and networking anytime and anywhere (Rheingold, 2002), which brings large utility to users for connect others and thus makes the smart mobile device is unsubstitutable.

3.5 Service

According to service-dominant logic, the mobile devices discussed above only provide a potential value proposition; people will only achieve value through value-in-use (Vargo & Lusch, 2004). From this perspective, user value perceptions are included the acquisition value and the transaction value of the mobile device-based services (Kim et al., 2007). Such mobile-based services come in multiple ‘flavours’ and have varying dimensions, just like the information sources and the function values.

Information source

All mobile app services leverage data. The service provider’s feed data sources are commonly the source of mobile app services, with some applications based on user feeds or hybrid data (Desouza & Bhagwatwar, 2012). Some mobile services depend completely on open ‘company feed data’ or data from companies. These applications provide an accessible platform for citizens to get information, such as receiving updated information on different activities. Applications based on user-provided information, or user feeds, do not depend on any particular firms’ data as a source. Companies or government agencies only provide a communication platform to facilitate the communication of information among users. Applications that use hybrid data start with government or company provided open data as a source. As more and more users start using and interacting with the app, user feeds add great value. These applications thrive on the network externalities associated with multiple users sharing their experiences, feedback and even personal data.

Function

Following Kim et al. (2007), the services offered through smart mobile devices can be categorised into 3Cs: commerce, communication and content. Commerce covers mobile banking, e-ticketing and physical product purchases. Communication services refer to

email and interactive services such as *WeChat* and *Skype*. Services such as downloads, news, traffic updates, location-based services and so on are considered as content.

Leveraging information and technology is critical for people to manage their daily life effectively and efficiently. Synthesising information from multiple sources under strict time and resource constraints requires collaborative and inclusive decision making by multiple stakeholders within society. Mobile technologies give us the capacity for real-time content awareness, convenient commerce activities and better communication activities.

3.6 The Interactive Relationships among People, Society, Device and Service (PSDS)

To build a research model for understanding the context of smart communication, four elements were selected: people, society, device and service. The relationships among them form the PSDS model of smart communication, as shown in Figure 3.2.

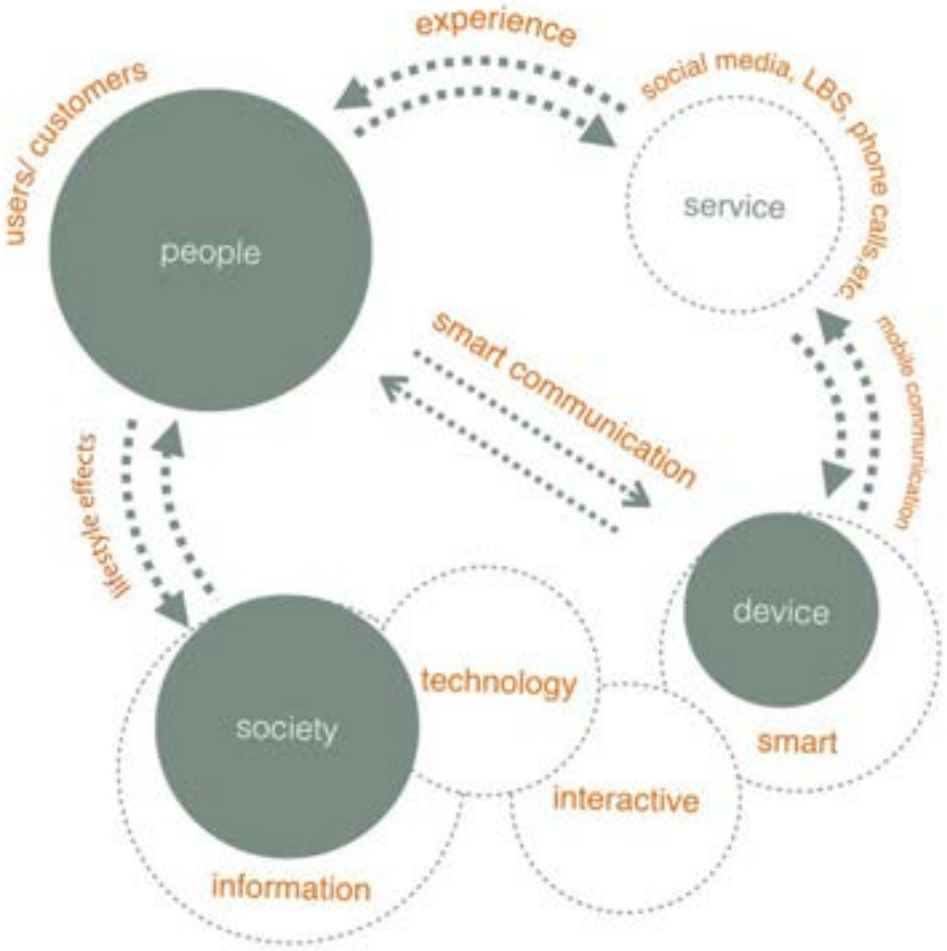

Figure 3.2 The PSDS model of smart communication

Of the four aspects of smart communication, people are the most important. In the context of this study, people are users and customers. Society, devices and services together create a better, people-centred, lifestyle for users and customers. Service is the process of user experience, expressed in this model as a dashed line. As the device is an artificial appendage, it should be less important than people and society, and we should be more concerned about the people themselves than their devices. This research is focused on user behaviour and user experience; devices and society support people's activities. Through social media, location-based services (LBS), phone calls and other services, people experience different services to communicate with others and link to the world. This kind of mobile communication is based on smart mobile devices (smartphones, tablets, e-readers, smart watches and smart bands). User experience becomes important in

the concepts of creativity, innovation, context and quality of product design. With the help of smart mobile device platforms, people can easily interact with the information technology society in a great variety of ways, including texts, audio, pictures, videos and even virtual gestures and body movements. Meanwhile, the information technology society and people's lifestyles continuously influence each other. Smart communication can also occur between people and their devices in a direct interaction.

3.7 Summary

The dynamic relationships among people, society, device and service are interesting. When we talk to other people, it can be via the tangible interaction of face-to-face communication or through an intangible interaction of digital communication with the help of a smart mobile device. With the advance of society, information technology in a wide variety of services has made communication ubiquitous – people can find out the latest information anywhere, anytime. As mentioned earlier, the development of devices as communication carriers has improved how people communicate with each other. Information technology has changed the perceptions of this digital society: video chat (e.g., Skype) makes communication more visual, voice messaging (e.g., WeChat) provides better and easier input methods, LBS services (e.g., Foursquare) make life more affordable and enjoyable, and online payment (e.g., PayPal) creates faster and ubiquitous financial networks. Behind this ubiquitous communication is an eagerness to be together, and the virtual space created by smart mobile devices meets people's aspirations in this area. Through these communication technologies, users in different places can feel connected.

CHAPTER 4 RESEARCH METHODS

4.1 Preamble

This chapter describes the research methodology. Herman and Egri (2002) wrote that quantitative research can show *what* is happening, and qualitative research can contribute to an understanding of *why* it happens. In an effort to answer the research questions, this study uses both methods. Qualitative research is the core method and quantitative research is an additional method. Qualitative and quantitative research have many differences, but they complement each other (Neuman, 2005).

This study follows an ethnographic approach and uses observation, focus group interviews and survey methods to collect data. The observation method has the advantage of providing first-hand data and information for further analysis. The smartphone is usually considered a private device, so it not easy to obtain detailed information about usage and perception through observation. Focus group interviews, as a method supplementary to observation, can provide detailed information through round-table discussions. Some details that cannot be obtained through observation can be obtained through the interviewer's interactions with users. The key issues arising from the observation and focus group interviews were used to design a questionnaire for a quantitative study and statistical analysis.

4.2 Research Framework

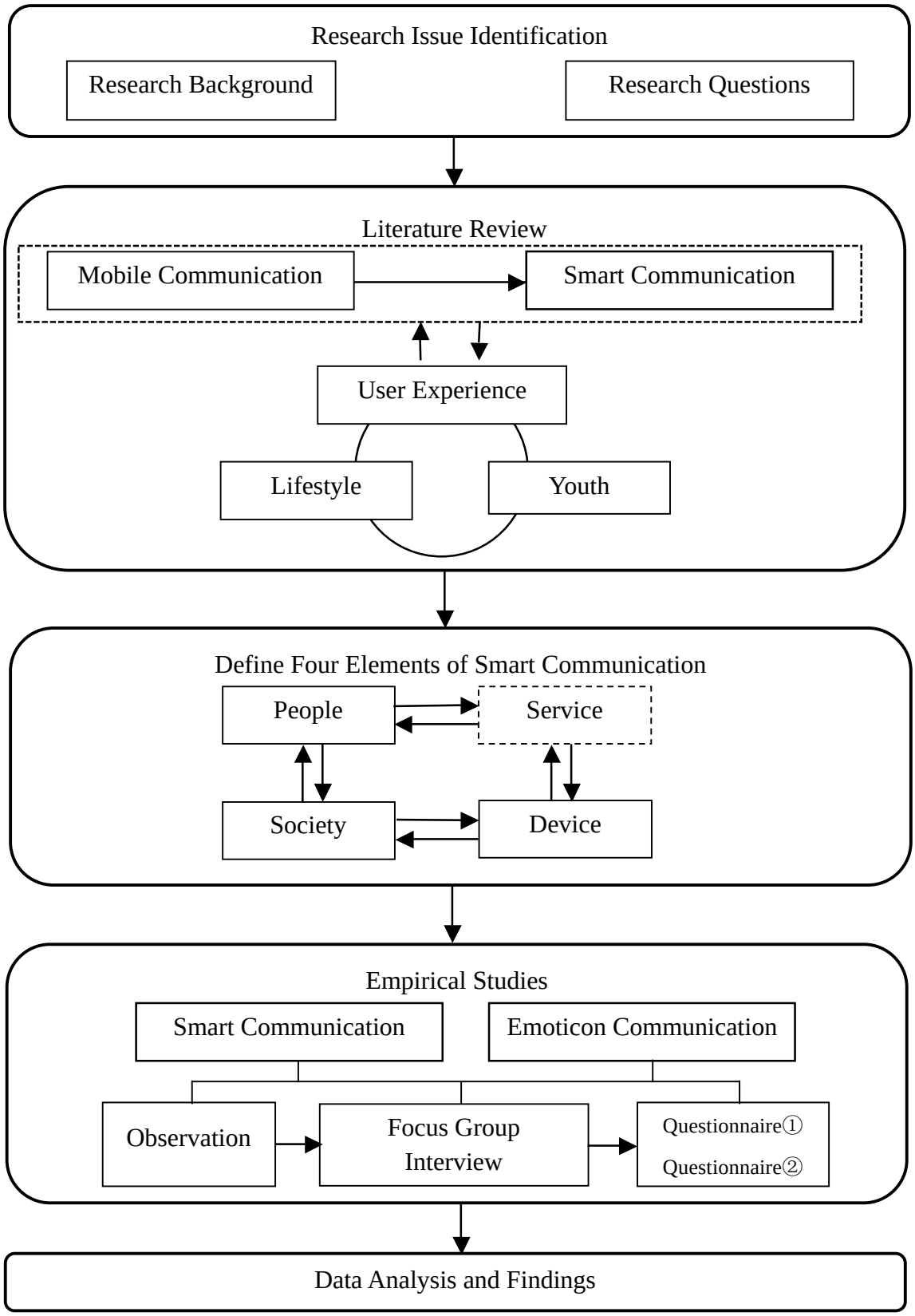

Figure 4.1 The research framework

Figure 4.1 presents the research framework. The study is divided into five stages. First, the research issue is identified, through considering the research background and research questions. Second is a literature review, a brief review of the history of communication, with a focus on mobile communication and smart communication and discussion of keywords including ‘user experience’, ‘lifestyle’ and ‘youth’. Third, the PSDS model is proposed, and its four parts – people, society, device and service – defined. Fourth, the empirical methods of observation, focus group interviews and questionnaire surveys are applied. The fifth stage is data analysis and findings. Each stage is closely related to the others, and every stage represents a different kind of data collection or activity.

As mentioned previously, this study used observation, focus group and survey research methods. The use of more than two methods is called data triangulation, and enhances the validity of the findings. Triangulation was first applied in social science research for concepts that required more than one source of supporting information (Bogdan & Biklen, 2006). It means looking at something from multiple points of view rather than from only one perspective, and mixing qualitative and quantitative styles of research and data (Neuman, 2005), which makes research fuller and more comprehensive. According to Denzin (1989), data triangulation means the use of multiple data sources, and should be distinguished from the use of multiple methods to produce data.

Stage 1 constituted the research background and research questions of the study. Its findings provided a foundation for the entire study. The objective and the scope of the study and the significance of the study were defined. It is necessary to have a holisticunderstanding of the topic of study and clear research questions before proceeding further.

Stage 2 was the literature review. After the research issue had been made explicit, the next stage was the literature review, the aim of literature review was understanding the research topic from different theoretical perspectives. The literature review focuses on the change from mobile communication to smart communication. The terms and scope of analysis in this study were defined at this stage, clarifying the concepts of youth (including why young people were chosen as the target for this study of smart communication), lifestyle and user experience. These terms were defined in relation to

mobile communication and smart communication. This literature review provides overall impressions of the research topic, the development of communication and general cultural behaviour in different countries and regions, which helps to narrow down the research scope and identify specific research problems.

Stage 3 defined four important elements in the smart communication, namely, people, society, device and service. These elements constitute the PSDS model, which can help us to understand the context of smart communication. This stage belongs to literature review as well. Based on these four features of smart communication, observations and focus group interviews were carried out.

Stage 4 was the key data collection stage, using empirical methods to study the use of smart communication and emoticon communication. Separate questionnaires were designed for these two subjects. The data from observations and focus group interviews were used to support the questionnaire design and implementation.

4.3 Sampling

Youths between the ages of 18 and 30 were targeted for this study. Young people were chosen as the sample population to help us to understand current and future trends and identify potential opportunities and problems related to new technologies, such as the use of mobile telephones primarily to sustain and enhance social networks (Srivastava, 2005). As Ling (2004) pointed out, young people have adopted mobile-telephone technology more rapidly than their older counterparts, and their usage behaviour is more unexpected. This group is the driving force behind mass adoption of technology and mass usage behaviour.

The focus group interview sessions were carried out with four groups of 6–8 Hong Kong young people aged from 18 to 30 years who regularly use smart mobile devices, especially smartphones. Each group had a similar number of male and female participants to ensure an even gender balance. Two questionnaires were distributed in Hong Kong, to which 377 and 347 responses were received, respectively.

As our target participants were Hong Kong people aged between 18 and 30, we distributed our questionnaire online using two methods. First, we identified several *Facebook* groups,*WeChat* groups and *Whats App* groups and distributed the link to our questionnaire to these chat groups. We selected people with different backgrounds, we were able to identify participants between the ages of 18 to 30 with different education levels and different occupations. As well as collecting more participants, we distributed the link to our questionnaire on several major social media in Hong Kong, such as *Facebook, Weibo,WeChat moments*. These social media serve almost everyone who uses smartphones and emoticons in Hong Kong.Of the respondents to the survey about usage of smart mobile devices, 158 were male and 219 were female; 139 respondents were male and 208 were female for the survey of emoticon usage, which is consistent with the distribution in the population that frequently uses smart mobile devices.

The respondents had diverse ages, educational backgrounds and occupations. Most were undergraduates or graduates, which is consistent with the education level of the population aged between 18 and 30.Appendix 1 and Appendix 2 show the occupations of the participants, which are notably diverse. From the distribution of the respondents' ages, education level and occupations, it is clear that they come from diverse backgrounds.

This sample of Hong Kong young people who use smart mobile devices exhibited a wide variety of mobile device usage patterns and experiences, from less than 1 year of experience and using the device for 1 hour a day, to more than 5 years of experience and using the device for more than 8 hours a day. Most respondents had a great deal of experience with smart mobile devices: 81.4% had used their device for more than 3 years, and 46.4% use the mobile device for at least 5 hours a day.

4.4 Research Design

The literature review revealed that previous similar studies (Aoki & Downes, 2003; Ling & Yttri, 1999; Leung & Wei, 2000; Mutchler et al., 2011) used qualitative and quantitative methods, such as focus groups, questionnaires and interviews. However, they did not use observation methods at the same time, thus a limitation of these studies is that they do not take a more holistic view to understand target users. This study adopted an

observation method and captured a series of pictures to present data from a visual perspective. Focus group interviews and questionnaires were used as well; focus groups to obtain more detailed information from young people, andquestionnaires to determine the general situation and provide a quantitative analysis based on a large sample.

4.4.1 Mixed Research Approach

Mixed research approaches integrate quantitative and qualitative research methods in one study. Such mixed approaches strengthen the overall research design, and provide more comprehensive and convincing evidence than mono-method studies, as the strengths of one approach offset the drawbacks of the other (Creswell & Clark, 2011). Qualitative research methods are often depicted as part of a research strategy that emphasises an open-ended approach to the research process that sometimes produces new insights (Bryman, 2006). Quantitative research methods are normally considered neutral tools, although the imaginative application of the tools sometimes can result in new understandings as well (ibid.). Bryman (2006) claimed that if these two methods are conducted in tandem, there is the potential for unanticipated outcomes. In the social sciences, quantitative research methods normally transform data into numbers that can be analysed through statistics to give an understanding of a given problem; qualitative research methods provide a holistic view and also add to the understanding of the social processes and contexts that explain complex textual situations that cannot be transformed into digits (Holme & Solvang, 1997). Therefore, mixed methods are preferred in this study, to give a deeper understanding of particular social phenomena. Mixed methods can also help researchers to clarify the nature of their attention and their accomplishments (Crewsell et al., 2003). Moreover, mixed approaches have a further practical benefit as they encourage interdisciplinary cooperation and usage of multiple paradigms (Guest et al., 2012).

Table 4.1 Data collection types, options, advantages and limitations (Creswell, 2008; Phellas et al., 2011)

Data Collection Type	Options within Type	Advantages of the Type	Limitation of the Type

Observation	Complete participant – researcher is fully engaged within the phenomenon. Observer as participant – role of researcher is known. Participant as observer – observation role secondary to participant role. Complete observer – researcher stands at arm's length without participating.	Researcher gains first-hand information and experience. Researcher canrecord information when it occurs. Unusual aspects can be captured during observation. Useful for issues that informants may not be comfortable discussing.	Researcher may be biased. Sensitive or personal information may be observed that researcher cannot report. Researcher's attendance and observing skills may influence the results. Informants with low literacy levels may express specific problems.
Interview	Face-to-face interview – one on one personal interview. Telephone interview – interview through phone call. Focus group interview – interview through a target group.	When informants cannot be observeddirectly, interviews are useful. Informants can provide detailinformation. Researcher can control the questions.	Information is filtered through interviewees' perspectives. Information is perceived in a designated place rather than a natural field setting. Researcher may bias responses in interpretation. Informants are not equally articulate and perceptive.

Questionnaire	Postal survey – mailing questionnaires to a target group of people. Internet-based survey, including email and web surveys – sending questions in the body of an email, as an attachment or web page and asking respondents to answer them and send back.	Cheap to implement. Allow greater geographic coverage without increasing cost of travel. Reduce the biasing error caused by the skills of interviewers. Absence of an interviewer gives greater anonymity to respondent, which increases reliability for some sensitive and personal questions.	Questionnaires should be short and simple, thus there are no opportunities to clarify misunderstanding. Lack of control over who fills out the questionnaire. People with low levels of literacy or poor access to email may be unlikely to complete the questionnaire, so they are excluded. Response rates tend to be low and characteristics of the nonresponses are hard to know, which may influence the findings.

4.4.2 Qualitative Research Methods

Qualitative research is an interpretive, naturalistic and cognitive approach to personal experiences as research objects. Specifically, scholars explore things in their natural settings, and try to make sense of explanations and phenomena in terms of the meanings people bring to them. Qualitative research includes diverse empirical case studies, interviews, observations, personal experiences, life stories and introspective, historical, interactional and visual content that depict the meanings of complex phenomena (Dentin & Lincoln, 2000).

Through using qualitative research with inductive notions of describing the real world, we can gain a more comprehensive understanding, further explore how and why phenomena occur and vividly demonstrate a phenomenon to readers (users) of the research. Additionally, the primarily qualitative method of ‘grounded theory’ (Glaser & Straus,

1967) can be used to generate inductively a tentative but explanatory theory about a phenomenon. As with empirical research, qualitative methods are inductive and designed to interpret multiple realities for deep understanding and legible information about the human experience, by collecting most essential data face-to-face from participants to determine particular causation.

Qualitative research has two levels. One lacks quantitative analysis, and the conclusions tend to be broad and recapitulative; the other is established on the basis of quantitative analysis, and represents a higher level of qualitative research. Following Alasuutari (1995), in a sense qualitative and quantitative can be seen as a continuum, not as opposites or mutually exclusive models of analysis. In practice, qualitative research and quantitative research often work together. Before undertaking quantitative research, researchers have to use qualitative study to determine the properties of the research phenomena; in the process of quantitative research, researchers need to apply qualitative methods to define and observe the causes and processes of changes.

Field observations

In this study, field observation was not the only means of observing the real behaviour of young people using smart mobile devices, because this method has some limitations, this observation was built around the existing smart mobile devices and does not reflect the characteristics and essence of user behaviour. Extending the observations to users' conversations, records, unconscious actions, etc., can lead to helpful new clues and ideas. Products generally correspond with typical behavioural trends, but user behaviour does not stand alone, it is always under the influence of surrounding relationships, which can produce some specific types of behaviour.

Capturing data about the ways people use mobile devices and their reasons for doing so may prove difficult using the observation method. Because most people tend to protect their personal privacy, they are reluctant to expose their true personal lives in front of a camera or observers. This was the most difficult problem to overcome during the study. In this situation, observing someone over time may lead to more discoveries than short

observations because after a period of time, users get used to being recorded and will behave more naturally, so data about their real lives can be obtained.

The field observations were mainly carried out in Kowloon, because Kowloon is located in the middle of Hong Kong, between Hong Kong Island and the New Territories, and thus mobility in Kowloon is high and the data are more diverse. Observations were conducted in various locations, including the MTR (including MTR stops), buses (including bus stops), shopping malls, restaurants, cafes, college canteens and sidewalks. As it is not possible to watch people in private, most of the observations were made in public spaces, making it possible to discover interesting user behaviour in different situations.

The data were collected from May 2013 to May 2014. The smart mobile device usage behaviour was similar across the period, regardless of the season or the weather. Observations were made at different times, locations and venues on different days. By combining the data from different days, all venues were investigated from 8 am to 8 pm. Figure 4.2 shows the observation schedule of the study, and the scenarios captured.

The observation results were recorded by camera and with qualitative descriptions. The collected observation data included the interactions between the smart mobile devices and users. Each set of observations included answers to the following questions: 1) What are the surroundings when people are using a smart mobile device? 2) What are the differences in people's behaviour when they use a smart mobile device? 3) How do people interact with people close to them when they use smart mobile device?

The data collected through field observations was used to generate hypotheses and theories. Similar to other qualitative approaches, field observation is more concerned with description and explanation than with measurement and quantification (Wimmer & Dominick, 2006). To achieve an in-depth understanding of smart mobile device usage behaviour, the observation method may be regarded as fundamental.

Figure 4.2 Field observation schedule

Focus group interviews

The focus group is an effective supplementary approach for identifying participants' various definitions of a situation and their particular opinions and notions. In *Inquiry by Design*, Zeisel (1981) suggested that a focus group should have six to eight participants to ensure a greater depth of information in terms of environmental and human behaviour. The interview should be set up informally around a table or in a circle. In addition, the room should be sufficiently small to allow participants to feel that they are all part of one event. The interviewees should also have something in common. Focus groups are suitable for exploring 'sensitive' topics; indeed, the group context may actually facilitate personal disclosures (Farquhar & Das, 1999; Kitzinger, 1994; Silverman, 2006). Young people are more likely to talk freely in a group context than in a one-to-one interview with an adult researcher (Kissling, 1996). User experience can be identified through the interactive communication within a focus group.The focus group approach in this study did uncover information about the mobile lifestyle and personal device usage.

The aim of the focus group interviews was to obtain a preliminary understanding of the participants' smart communication lifestyle and the effects that smartphones had on them. It allowed the participants to co-construct specific discourses and perspectives through conversational interactions in the hope that the participants would engage in a discussion about their true user behaviour.

For the study related to uses of emoticons on smart mobile devices, the focus group interview stage consisted of a pilot test with measures designed to generate an overview of emoticons use on smart mobile devices. The purpose of this test was to expose as many items relating to emoticon use as possible, to facilitate the questionnaire design. Therefore, focus group interviews were conducted with young people who were interested in emoticon use, primarily to examine the function of emoticons during smart mobile communication.The interviewees were asked to answer the following questions. 'To what extent do you incorporate emoticons into your communication on smart mobile devices?' 'In what kinds of situations do you prefer to use emoticons?' 'What kinds of emoticons do you use frequently, and why do you like them?' 'What is the significance of emoticons to your communication?' 'What are the advantages and disadvantages of emoticon use

during your daily communication?' The responses gave us a general understanding of Hong Kong young people's preferences regarding emoticon communication.

4.4.3 Quantitative Research Methods

Questionnaires

To understand the lifestyle of Hong Kong's young people, the study used qualitative research approaches to discover their culture, behaviour and preferences. Questionnaires were used to determine the general situation, and a field study was then undertaken to observe and interview target users.

Standardised questionnaires are typically used to uncover the similarities among groups of people by comparing their answers to the same set of questions (Zeisel, 1981). This study aimed to understand the usage of smart mobile devices among young users in Hong Kong. The most appropriate general survey method is the questionnaire, as such quantitative research allows the status of respondents to be understood very quickly and can be used to define the qualitative research. Electronic means of deploying questionnaire studies are widely applied nowadays. With the help of Internet technics, the implementation of questionnaire studies can be improved in many ways, such as reducing the cost and increasing efficiency. For instance, online questionnaires enable fast sharing, to reach a wide range of target groups. Meanwhile, electronic means of analysis enable quick automatic provision of the existing data (Verkasalo, 2010).

Questionnaires were distributed in Hong Kong. To cover a wide range of people, questionnaires were printed on paper and distributed in public spaces as well as via the survey website. Completed questionnaires were collected from Hong Kong youth aged between 18 and 30.

For the survey about Hong Kong young people's use of smart mobile devices, 377 responses were received after excluding non-valid responses; 158 respondents were male and 219 were female. This generated general data about how young people look at smart mobile devices, including the kinds of smart mobile devices that they use, their most

important reasons for choosing a particular smart mobile device and how smart mobile devices have changed the nature of their lifestyle. The online and printed questionnaires were provided to each subject for one month. In the process of data collection, some participants did not fulfil the criteria of youth as defined in this study (i.e., their ages were not between 18 and 30) and these responses were removed from the analysis and results, to more accurately collect data about the smart mobile device usage of Hong Kong young people. The questionnaire is shown in Appendix 1.

The aim of the study related to uses of emoticons on smart mobile devices was to develop a deeper understanding of user behaviour and social relationships conducted through smart mobile devices. Based on the focus group interviews, we developed a questionnaire comprising motivational and attitudinal statements. We used predominantly quantitative analysis to better understand the number and variety of emoticons used during text messaging, and to identify users' needs when communicating via smart mobile devices. We also considered the effects of gender, age, social-application type and education on emoticon use. Data on the users' communication was collected from in-depth interviews. As text messages are considered to be a private form of communication, we omitted their detailed content and recorded only the local context in which each emoticon was used. We explained the content of the questionnaire to the participants and invited them to offer suggestions for revising the questionnaire. We believe that our study is important as it draws on actual emoticon use in text messages sent on smartphones.After excluding invalid questionnaires, our sample consisted of 347 responses. Each subject was given access to the online questionnaire for 1 month. During the data collection, we found one outlier responsible for 10% of overall emoticon use: some of the participants failed to meet the criteria for 'youth' as defined in this study, as they were not aged between 18 and 30. These participants were removed from the analysis to more accurately survey the emoticon use of Hong Kong youth.The participants had diverse educational backgrounds, socioeconomic levels and occupations; 139 were male and 208 were female, which is consistent with the distribution in the population that frequently uses smartphones and emoticons. The questionnaire is shown in Appendix 2. The responses to this questionnaire generated data on the ways in which young people use emoticons on their smart mobile devices, such as the kinds of emoticons used, their most important reasons for choosing particular emoticons and how emoticons have changed the nature of their communication.

The two questionnaires were all completed by young people in Hong Kong but as they were distributed at different times, the two groups of respondents were not duplicated.

4.5 RecordingData

Schrøder et al. (2003, p. 163) noted that ‘One should always start out with a pilot interview in order to test the research design.’ For this study, a pilot interview in a small scale version was carried out with two undergraduate students for each questionnaire and interview. The advantage of conducting a pilot study is that it can give advance warning of where the main study could fail, where the questions may lead to misunderstanding and where they are hard to follow (van Teijlingen & Hundley, 2002). Feedback on the pilot study gives us a reference from which to modify the interview guide to ensure comprehension and clarity. In this case, the small scale version of the study was considered to be sufficient and further pilot study may not have contributed further to the precision of the interview guide. Minor adjustments to the question wordings were made continually based on the different background and understanding of each respondent. In pilot interview we foundsome of abstract questions were difficult to answer, such as, ‘What is your mobile life?’ or ‘What kinds of communication do you think are smart communication?’, especiallybefore the interview. The question list was thus revisedso that it began with questions related to concrete experiences, for example, ‘Do you ever forget take your smartphone when you leave home? What do you do?’ These kinds of question revealed data about user behaviour and preferences, and also helped the interviewees to feel more comfortable when answering abstract questions later.

All interviews were video- or tape-recorded and then transcribed verbatim for data analysis. The sessions were designed to capture a variety of subjective and spontaneous statements about participants’ smartphone usage. Participants were generally encouraged to discuss any issues that were relevant to the topic. The coordinator wrote down some key points on which to focus the analysis.

The focus groups participants were first asked to talk freely about what they really used their smartphone for, and then to share their experiences with others to encourage more

detailed information. The researcher asked the participants to share how they had changed their social behaviour and their opinions about this lifestyle transformation.

4.6 Summary

This chapter presents an overall description of the research methods applied in the current study. The framework of the thesis is outlined in relation to the study's five stages. Qualitative and quantitative methods were used, to strengthen the validity and reliability of findings. To understand the relationships among people, society, devices and services, observations, focus group interviews and questionnaires enable first-hand and real-life acquisition of knowledge and experiences. These research methods are believed to be fit for the research topic and able to achieve the research objectives.

CHAPTER 5 FINDINGS OF THE EMPIRICAL STUDY

5.1 Preamble

This chapter shows the findings from two surveys on Hong Kong young people's use of smart mobile devices and their use of emoticons on smart mobile device. The use of emoticons has become increasingly popular among youth in recent years, particularly on smart mobile devices. The emoticon is not just a form of communication; it also represents a new lifestyle and trend among young people. The study aimed to understand how emoticons influence the daily lives of young people, how virtual communication on smart mobile devices has been improved via this medium, and what kinds of emoticon people prefer to use.

The following sections, present the data sources and the summary statistics. Section 5.2 presents the main data about Hong Kong young people's use of smart mobile devices. Section 5.3 displays the main data about emoticon usage on smart mobile devices.

5.2 Smart Communication Survey

This section is a descriptive summary of the results of a survey of 377 Hong Kong young people (18–30 years old). Appendix 1 is the questionnaire used in the survey.

5.2.1 The Use of Smart Mobile Devices

The use of smart mobile devices by the participants is presented in Table 5.1. In this sample, most of the participants used smartphones (98.4%) and tablets (61.3%) for smart mobile device communication, most (81.43%) had used a smartphone for more than 3 years and only 1.86% had used one for less than 1 year. Smartphone use was very frequent, with 22.28% of participants using one for more than 8 hours per day, 24.14% for 5–8 hours per day, 30.50% for 3–5 hours per day, 21.22% for 1–3 hours per day and only 1.86% for less than 1 hour per day. The respondents changed their smartphone moderately frequently, with 42.71% of respondents changing their smartphone every 1–2 years and 39.26% every 2–3 years. Smartphones are essential for the respondents; 54.91% feel uncomfortable being without their smartphone and 24.67% cannot live a normal life without their smartphone.

Table 5.1 Summary statistics of smartphone usage

Question	Option	Mean	# of Obs.
What kind of smart mobile devices do you have?	Smartphone	98.4%	377
	Tablet	61.3%	377
	E-reader	9.3%	377
	Smart wearable device	9.0%	377
	Other	0.8%	377
How long have you used your smartphone?	Less than 1 year	1.86%	377
	1–2 years	5.31%	377
	2–3 years	11.41%	377
	3–5 years	42.44%	377
	More than 5 years	38.99%	377
How many hours a day do you use your smartphone?	Less than 1 hour	1.86%	377
	1–3 hours	21.22%	377
	3–5 hours	30.50%	377
	5–8 hours	24.14%	377
	More than 8 hours	22.28%	377
How often do you change your smartphone?	Less than half a year	0.00%	377
	Half a year–1 year	6.90%	377
	1–2 years	42.71%	377
	2–3 years	39.26%	377
	3–5 years	9.81%	377
	More than 5 years	1.33%	377
How would you describe the role of your smart mobile device in your life?	Not a normal life without it	24.67%	377
	Uncomfortable without it	54.91%	377
	Dispensable	16.18%	377
	Happier without it	4.24%	377

5.2.2 Survey Results forSix Key Characteristics

To investigate the specific characteristics of smart communication, we conduct a survey and ask our sample of respondents a series of questions about their views of six important smart communication characteristics: security, mobility, efficiency, coordination, sociability, and enjoyability. In particular, the respondents can respond ‘strongly agree’, ‘agree’, ‘neutral’, ‘disagree’, or ‘strongly disagree’ to the notion that smart mobile device possesses each of the six characteristics. We provide the survey results in more detail in Appendix 1.

Regarding the survey results for security, over half of the respondents support the notion that smart mobile device provides them with a sense of security. There are 13.00% of the respondents choosing the option ‘strongly agree’ and 41.11% choosing ‘agree’, while the rest 31.56% choose ‘neutral’ and only 14.33% choose ‘disagree’ or ‘strongly disagree’. From these results, we can infer that people feel that smart mobile devices can bring them a sense of security.

Regarding the survey results for mobility, the vast majority of responds view mobility as a very important attribute of the smart mobile device. 25.99% of the respondents choose the option ‘strongly agree’ and 54.11% ‘agreed’. In contrast, 16.45% feel ‘neutral’ and only 3.45% respond either ‘disagree’ or ‘strongly disagree’. From these results, we can infer that people feel that mobility is one of the main advantages of the smart mobile device.

The survey results for efficiency are similar to those for mobility. 24.40% of the respondents ‘strongly agree’ with the notion that smart mobile device can make your life and work more efficient, and 53.05% ‘agree’, while only about 20% of the respondents hold different views, i.e.,16.45% feel ‘neutral’ and 6.11% choose ‘disagree’ or strongly ‘disagree’. From these results, we can infer that most people feel that smart mobile devices improve the efficiency of their life and work.

The survey results for coordination and those for sociability are quite similar too. Specifically, 14.06% (19.89%) of the respondents ‘strongly agree’ and 49.87% (49.87%) ‘agree’ that coordination (sociability) is a very important attribute that smart mobile device possesses; while 25.99% (22.02%) feel ‘neutral’ and only 10.08% (8.22%)

‘disagree’ or strongly ‘disagree’ with the notion. As a result, we can infer that people on average feel that smart mobile devices help them to coordinate their life and work, as well as improving their sociability.

Finally, about survey results for enjoyability, 8.22% of the respondents ‘strongly agree’ that it is enjoyable to use smart mobile device, 56.23% ‘agree’, 30.50% ‘neutral’ and only 5.04% ‘disagree’ or ‘strongly disagree’. From these results, we can infer that most people feel, to some extent, enjoyment using smart mobile devices.

Taken together, from the results for all six characteristics of smart mobile device, we further show inTable 5.2 andFigure 5.1that the highest degree of agreement is clearly for mobility, at 4.04; followed by efficiency, at 3.96; the third is sociability, at 3.81; enjoyability and coordination tied for the fourth, at 3.67; and sixth is security, at 3.55. Most of the respondents believed mobility is characteristic of smart communication, proving once again the importance of mobility. It is no surprise that in the fast-paced city of Hong Kong, young people strongly endorse the statements that smart mobile device brings mobility and efficiency.

Table 5.2Degree of agreement for six characteristics

Characteristic	Degree of agreement
Mobility	4.04
Efficiency	3.96
Sociability	3.81
Enjoyability	3.67
Coordination	3.67
Security	3.55

Figure 5.1Radar map about degree of agreement for six characteristics

5.2.3 Demographics of the Respondents

Table 5.3 summarises the demographics of the respondents. In this sample, 41.91% were male and 58.09% were female, which is close to the census data showing a 46.09% male population in mid-2015 (Census and Statistics Department, 2015); 24.40% of the respondents were between the ages of 18 and 22, 29.18% were between the ages of 23 and 26 and 46.42% were between the ages of 27 and 30; 36.87% of the respondents were students and the rest were employed. Most of the respondents had completed undergraduate education or above, and only 1.59% of the respondents were educated to below secondary school level. The income data comes from only 332 observations, as 45 respondents refused to report their income. Of these 332 respondents, most (55.42%) had a monthly income below 10,000 HKD and 32.53% had a monthly income between 10,001 and 20,000 HKD. The characteristics of the respondents to the survey describe a group of well-educated and low-income young people, which is consistent with the characteristics of typical Hong Kong young people.

Table 5.3 Summary statistics of the basic characteristics of the survey respondents

Item		Mean	# of Obs.
Gender	Male	41.91%	377

	Female	58.09%	377
Age	18–22	24.40%	377
	23–26	29.18%	377
	27–30	46.42%	377
Occupation	Student	36.87%	377
	Employed	63.13%	377
Education	Below secondary school	1.59%	377
	High school	5.04%	377
	Junior college	11.94%	377
	Undergraduate	59.68%	377
	Postgraduate	17.77%	377
	Doctor and above	3.98%	377
Income	0–10,000HKD	55.42%	332
	10,001–20,000HKD	32.53%	332
	20,001–30,000HKD	6.33%	332
	30,001–50000HKD	4.82%	332
	Above 50,000HKD	0.90%	332

Note: 45 respondents refused to report their income range, so only 332 observations have income data.

5.2.4 Focus Group Interview Summary

Four groups of participants were involved in the focus group. This section presents their perceptions of smart communication. The findings of the empirical study are summarised in Table 5.4.

Table 5.4 Focus group interview summary

Category	Interviewee responses
Dependency	Intervieweesindicated that they were quite dependent on smartphones. In response to the question, ‘If you forget to take your smartphone when you leave home, what do you do?’ participants gave different answers:

	• Keth (male): Most of the time, I use my smartphone for work. I quite enjoy being with my iPhone. If I forget it, I must go back home. My parents, my girlfriend and some of my close friends cannot find me if I do not have my smartphone – it is impossible to find other ways to reach me. • Jimmy (male): If I just leave home for a while, for example, if I'm just going to the 7-Eleven to buy something, I won't go back home to get my phone, because I can remember all the goods I need to purchase and I can get back home soon. But if I go out a bit further, I definitely go back home and get my phone. • Ada (female): I always need to take my smartphone because I'm afraid my parents and friends won't be able to find me, so I will go back home to get my phone. • YoYo (female): I will go back home and get my phone. I need to contact others. I feel out of touch with the world because all my friends, all my work is in that smartphone. My smartphone lets me keep in touch with my boyfriend, even though we are not in the same place. • Nancy (female): Because I have a smartphone, when I'm bored, I can refresh *Facebook* or *Instagram* to kill time. A smartphone is a good tool for staying in touch with friends all the time, and the multi-task function can let me do several things at the same time.
Usage in Peak Hours	Most of the interviewees said before bedtime and waiting times were the peak hours they used smart mobile devices. • James (male): I prefer to use my iPhone or iPad to read books or watch TV. It is quite convenient to use these kinds of smart mobile devices to get information. Most of the TV shows or movies are available online and I have a lot of choice. • Kam (male): I am so tired after a whole day's work, I just set the alarm on my smartphone, charge it and put it on the table, where it is far away from my bed. • Keung (male) and Susan (female): I will check whether I have any unread messages. Checking my smartphone once in a while has

	become a habit. • Ada (female): I browse the smartphone for around half an hour before sleep, it's already a habit for me. Most of the time I glance over the social network apps, like *Facebook*, *Instagram*, *Twitter*, etc. • YoYo (female): I send instant messages to my boyfriend before going to sleep. It's a long-distance relationship so we need to keep in touch frequently. The smartphone makes this effortless. There are some interesting emoticons in instant message apps that can express my thoughts. Besides messages, we can use Facetime or Skype for video chat, this is really convenient for communicating with each other.
Social Interaction	Smart mobile devices make the distance between two people closer, and provide a convenient way to communicate. • James (male): I couldn't get in touch with some of my old friends if we didn't have the mobile social network. The smartphone makes the distance between us closer and it's easy to keep in touch with others. • Lee (male): Because of *WhatsApp* and *Facebook*, I can interact with friends through the mobile social network or group chat. In the past, after we graduated, it wasn't easy to keep in touch with classmates so the smart mobile device has extended our social circle.
Isolation	Smartphones make people isolated in a virtual world. It is not polite to play with phones all the time when having a meal with others; people know this, but some messages or calls are unavoidable in this information age. • Keung (male): My parents get angry if I use my smartphone when I'm having a meal with them. Most of the time I won't use my smartphone when I'm with them. They think the smart mobile devices obstruct normal communication with their children. • Nikita (female): When I am dating, if my boyfriend plays with his smartphone, so do I. • Vivian (female): I would take out my smartphone if my friends were all using theirs when we were together.
Selective Ignoring	Too much information disturbs people's everyday lives. Selective ignoring of some unimportant information was quite common among

	interviewees' responses. • Lily (female): I will ignore some information when I am busy, even if I receive it. I don't want to be bothered. Lots of information is sent to me every day. We should select useful information. • Nikita (female): Sometimes you feel like the smartphone is a leash – people know that they can find you through calls or instant messages. But for non-urgent things, they just send a *WhatsApp* message, and if I don't want talk to him/her, I won't reply, I just ignore it.
Gender Preference	Males and females have different preferences for the usage of smart mobile device. • Kam (male): I will make a call if I have something to tell my male friends, but maybe send a message to girls. • Nikita (female): I like chatting with my female friends about life and work via *WhatsApp*. Using instant message is interesting because I can send pictures or voice messages as well.
Mobility	People can take smartphones everywhere and use them for multiple purposes. • Keth (male): I like reading the latest news about design and technology. I also listen to music on the MTR. • YoYo (female): Most of the time I use *WhatsApp*. I like chatting with my boyfriend and my friends. I want to be in touch with them all the time. Maybe I did not contact so many people in the past, as I would be charged for sending a message or calling, but now I use *WhatsApp*, it's free and I can use it at anytime, anywhere. • Nikita (female): I browse *Facebook* on the MTR. I follow my friends' news and some interesting public pages – I can get most of my information on *Facebook*, I don't need to open another page, which is quite convenient. It is very crowded on the MTR, so using a smartphone can avoid embarrassment, you can be separate in your own world, and it is quite noisy in the metro, so we use earphones to make a call and listen to music. • Ada (female): I will take a portable battery charger if I am going outside, as using the Internet allows the battery to drain faster. I need a

	portable battery charger to make sure my smartphone is online.
Efficiency	Smart communication improves the efficiency of communication, and makes information easily conveyed. • Thomas (male): When I am busy, I will use emoticons to respond to my friends, because it is easy to convey the meanings. Actually, this way is so nice because they also understand that I am busy, so I cannot type any words. • Lucy (female): I usually send 'happy' emoticons to my new friends, because it can speed up the process of getting to know each other.
Coordination	Smart mobile devices can coordinate people's life and work, and make things easier. • Lee (male): There are so many apps to assist with my physical training. When I start jogging in a park, I will take out my smartphone to count my heart rate and calories.
Sociability	It is easy to be social with others when using smart mobile devices. Social media provides different platforms for young people to communicate with each other. • Ada (female): When I was abroad, I liked to take out my phone to use *WeChat* to make friends with strangers, because I had no friends there. • Lee (male): I can find out about some of my old friends through the mobile social network or group chat via *Facebook*. Social networking has also extended our social circle.
Enjoyability	The majority of participants felt that when people use emoticons to communicate on smartphones, they feel enjoyment. Susan's statement reflects the feelings of the majority of participants when discussing emoticons: • Susan (female): I think the emoticon is a kind of communication flavouring agent, making the conversation enjoyable and relaxed. • Lucy (female): My friends and I often have a happy hour when we use emoticons to communicate on smartphones.

5.3 Emoticon Communication Survey

The major forms of communication in our daily lives, such as phone calls and text messages, do represent the meaning of smart communication among young people. Emoticons are another quite popular means of communication. As a special form of smart communication, emoticons can accelerate virtual communication and eliminate some of the difficulty and awkwardness of using words. As emoticon communication has become an interesting and popular form of youth communication in recent years, this study includes emoticon usage to make the smart communication research more holistic(Chen & Siu, 2016).

The data comes from a survey of 347 Hong Kong young people (18–30 years old). The questionnaire used in the survey is displayed in Appendix 2. Table 5.5 summarizes the basic characteristics of the people who answered the questionnaire.

Table 5.5 Characteristics of the respondents to the questionnaire on emoticon use

Item		Mean
Gender	Male	40.06%
	Female	59.94%
Age	18–22	37.46%
	23–26	44.67%
	27–30	17.87%
Occupation	Student	24.78%
	Employed	75.22%
Education	Below secondary school	0.86%
	High school	1.73%
	Junior college	8.36%
	Undergraduate	50.14%
	Postgraduate	30.55%
	Doctorate and above	8.35%

Empirical analysis was performed on 347 valid questionnaires using the ordinary least squares (OLS) estimation method. The research findings allow us to better understand the ways in which emoticons have developed and the ways in which young people’s lives

have changed with emoticon use. Based on these findings, this study aims to provide inspiration and direction for better experience design in smart communication.

5.3.1 Meanings of Emoticons

In a study of emotional expression and attitude, Sperber and Wilson (1986) found that speech content occupies only 7% of communication activity; 93% of a message is delivered through emotional expression. This led us to explore the role of emoticons in conveying meaning during daily virtual communication. Hong Kong young people who are reluctant to reveal their feelings and emotions face to face find that emoticons make mobile communication more relaxing. As a result, emoticons are extensively used to express users' emotions and to convey polite greetings and enquiries.

Question 16 in the survey was, 'What kinds of emoticons do you normally use?' Figure 5.2shows the results for the top three responses across all participants ('happy', 'nothing to say' and 'sad'). As previously noted, emotional expression accounts for the majority of everyday emoticon use. Emoticons used to express personal inner feelings have become increasingly popular in mediated communication, as they extend message content to fulfil individuals' everyday communication needs. Therefore, a large proportion of emoticons are designed to represent 'happy' or 'sad' emotions. Most of the users surveyed used emoticons to convey positive rather than negative emotions:78.39% chose 'happy' emoticons when communicating with friends.We inferred from these results that positive emoticons can be used to maintain continuity during communication and enrich the content of a conversation. We also inferred that Hong Kong young people prefer to convey happiness rather than sadness or anger. The emoticon expressing 'nothing to say' ranked third highest. During face-to-face communication, people try to find new topics as quickly as possible to keep the conversation active and to demonstrate friendliness and politeness. Similarly, the emoticon 'nothing to say' fills silences during conversation on smart mobile devices. When a topic of conversation comes to an end, users can send the 'nothing to say' emoticon to avoid awkward silences during communication. This emoticon offers a versatile response to any message, enabling users to show respect rather than ignoring their conversational partners. As a result, emoticons used to express

personal inner feelings have become increasingly popular in mediated communication, as they extend message content to fulfil individuals' everyday needs.

As shown in Figure 5.2, emoticons expressing 'hello', 'goodbye', 'thank you' and 'sorry' were used relatively infrequently. This group of emoticons fulfils basic everyday functions, such as greetings and polite responses, which correspond to practical everyday needs. Specifically, these emoticons are used to animate neutral and emotionless greetings and polite responses in text messages. The participants seldom used such emoticons to increase intimacy or to visually convey the semantic meanings of their greetings; the emoticon expressing 'sorry' was used least of all. Many young people dislike apologising to each other directly, and thus prefer to use emoticons other than 'sorry' to express the same meaning. The use of 'sorry' tends to create a subdued atmosphere or silence communication altogether. This observation is consistent with our finding that most of the users were more willing to share positive than negative emotions with their friends.

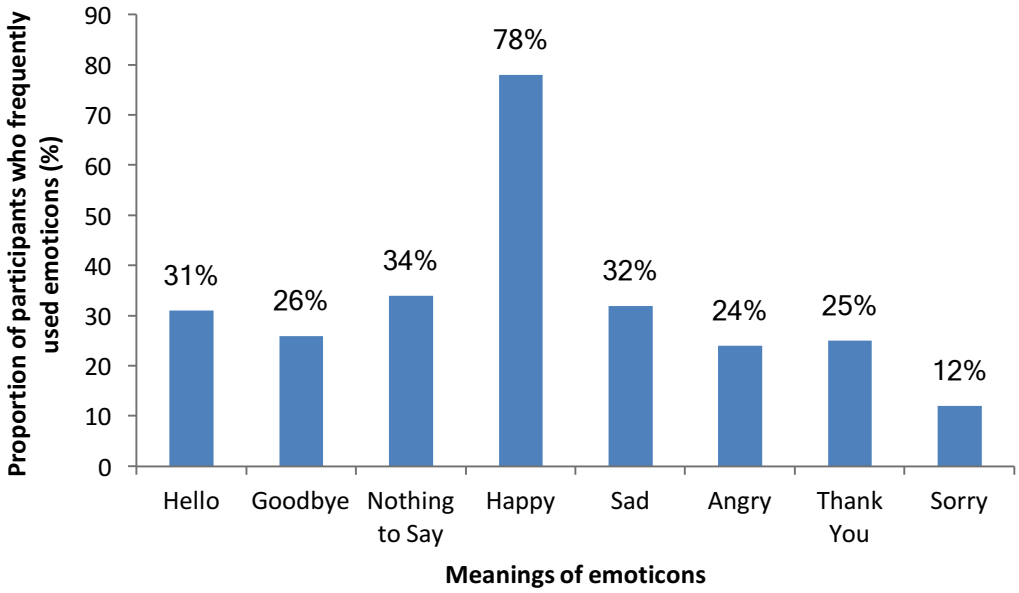

Figure 5.2 Frequency of emoticons uses, by meaning

The above findings is also supported by the finding that most young people use social-networking media to communicate closely with their friends and casually share interesting aspects of their daily lives. Therefore, emoticons with a more formal tone and less personal emotional content, such as greetings and polite responses, may be ignored in

favour of emoticons that can be used to represent personal feelings and emotions. As a result, the emoticons used on social networks are gradually expressingdeeper emotions. The instantaneity that characterises mediated communication on smart mobile devices is in part enabled by the emoticon, a semantic symbol that contains abundant information and helps a recipient to rapidly understand the meaning of a message. According to the literature reviewed in Section 2.4.3, this argument is also supported by the increasing semiotic complexity and dynamism of the emoticon. To maintain active and abundant conversation on smart mobile devices, the makers of many social applications have developed a large number of emoticons that contribute to the richness, interactivity and pleasurableness of communication. Most emoticons are designed to express feelings rather than formal or general meanings and they tend to convey positive emotions (Huang et al., 2008) rather than general greetings or polite responses.

5.3.2 Propensity for Emoticon Use

We also wanted to know what kinds of emoticons young people prefer to use to express their personal feelings and emotions. Is emoticon use determined by the evolution of emoticons on smart mobile devices, and why do users consider certain emoticons the most effective means of expressing emotions?

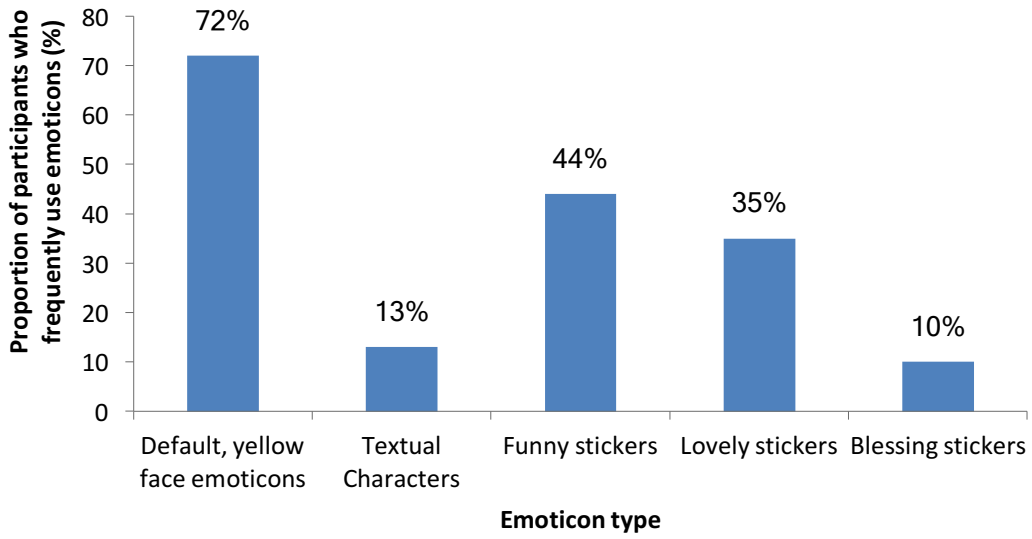

Figure 5.3 Frequency of emoticons uses, by types

Figure 5.3shows the results of our survey on the types of emoticons most frequently used. The literature on the evolution of the emoticon suggests that emoticons not only reflect social needs but are related to daily lifestyle and mental state (Russell, 2013). The use of 'antiquated' emoticons comprising textual characters has declined. Our survey indicated that the use of such characters accounts for only about 13% of emoticon use on smart mobile devices. Text-based emoticons' capacity to convey abstract meaning is inevitably limited, and runs counter to the emoticon's purpose of symbolising objects in a virtual environment. This decrease in the use of expressive textual characters indicates that people prefer to express themselves visually during mobile communication.

This observation raises the question of whether people prefer to use more complex and dynamic emoticons to express their feelings and emotions. However, an overwhelming proportion (71.76%) of the participants frequently used the 'default yellow-face emoticons', which are simple emoticons that evolved from combinations of letters and special characters. Such emoticons provide 'electronic gestures' convey the warmth of face-to-face communication and add breadth to a message (Blake, 1999). Although those emoticons are basic, they can convey vocal inflections, facial expressions and bodily gestures virtually on smart mobile devices (Mackiewicz, 2003). However, as noted by Tossell et al., (2012), emoticons have become increasingly complex and dynamic, presumably to enable the more accurate expression of emotions and feelings. It remains unclear why people still choose to use default yellow-face emoticons to deliver information and emotions.

In terms of preferred applications, about 75% of the participants reported most frequently using *WeChat* (a mobile text and voice messaging application developed by Tencent in China) to communicate with their friends. Although the makers of *WeChat* have developed and created a large number of complex and dynamic emoticons, most of its users prefer to use basic yellow-face emoticons, due both to their great variety and to the ease and accuracy with which they convey intended meanings and feelings during virtual communication. These default yellow-face emoticons are easily recognisable, having been used by most people for a long time. As users are more familiar with the default emoticons, they find it easier to select appropriate emoticons from this range. As a result, yellow-face emoticons offer a familiar and idiomatic mode of expression in the context of mediated communication; they can be seen as a kind of emoticon language – the basic

language of text messaging – and people are less fluent in the use of more complex emoticons. Furthermore, if a message using default yellow-face emoticons is easier to understand, the receiver's processing time is reduced. As time is an increasingly important commodity, people value the capacity of emoticons to express an abundance of information in a single sentence and expedite the interpretation of messages. Another important benefit of default emoticons is their size. Such emoticons can be easily embedded in a message, either standing in for a word or used at the end of a sentence for semiotic emphasis. High-efficiency communication can be achieved through the use of a number of emoticons, and is facilitated by the compactness of the default yellow faces. One interviewee (Ada, female) reported that 'I like sending three of the same yellow-face emoticons at the same time, as this expresses my emotions more strongly. The default yellow face is too small, so sending one is not enough. But I don't like using larger-scale emoticons. I find them too complicated.' This suggests that default yellow-face emoticons are easier to use as part of a sentence due to their compactness and familiarity. More complex and large-scale emoticons may interrupt the continuity of a message, which can be distracting during a conversation on smart mobile devices. Indeed, larger-scale, more complex emoticons tend to form independent expressions without text or characters.

'Funny', 'lovely' and 'blessing' stickers supplement mediated communication. Funny stickers were used by43.52% of the respondents to make up for the deficiencies of the default yellow-face emoticons. This corresponds with the tendency to use 'happy' emoticons to enliven the communication atmosphere. As shown in Figure 5.3, funny-sticker emoticons were the second most popular choice to ensure a recipient's rapid understanding. Text that incorporates funny stickers is generally considered to be richer, more amusing and more interesting than text accompanied by fewer gestures, tones or scenarios (Daft & Lengel, 1986; Leung, 2002; Kishi, 2008, Otondo et al., 2008). Used in conjunction with the default yellow-face emoticons to enrich messages and make communication more enjoyable, as well as to offer visual depictions of emotions, funny-sticker emoticons may enhance mediated communication.

CHAPTER 6 ANALYSIS AND DISCUSSION OF THE EMPIRICAL STUDY

6.1 Preamble

Communication has become increasingly smart in terms of simplicity, ease and effectiveness. New technologies have come to act as stimuli for development requirements that advance a smart lifestyle. This chapter analyses and discusses the empirical study. First, considering the influence of smart communication from a dialectical perspective, assessing its positive and negative aspects, we conducted observations and focus group interviews with Hong Kong young people with the aim of understanding the lifestyle transformation brought about by smart communication.

This chapter also discusses the characteristics of smart communication and emoticon communication via quantitative and qualitative methods, based on the findings from observations, focus group interviews and questionnaires that focused on Hong Kong young people aged between 18 and 30. Six characteristics that were hypothesised to have relatively close correlations with smart communication were extracted from interview keywords: ‘security’, ‘mobility’, ‘efficiency’, ‘coordination’, ‘sociability’ and ‘enjoyability’. Each provides a different insight into the participants’ personal experiences, usage characteristics, feelings and emotions. These insights, in turn, greatly influence design quality, and thus the improvement of smart communication. A framework presented in this chapter contributes to the study by revealing some characteristics of the concept smart communication.

6.2 The Effects of Smart Communication

This section is in three parts. The first part considers the supporting information needed in lifestyle changes, focusing on how smart communication has changed our lifestyle, especially through providing information. The second part describes how smart communication makes us close and creates an environment with no distance and no strangers, and considers dependency, usage in peak hours and social interaction. The third part considers the negative aspects of smart communication – how it can increase the distance between us and allow people to become isolated and selectively ignore information.

6.2.1 Supporting Information Needed in Lifestyle Change

Smart communication helps people navigate the world and seek information as needed. Numerous applications provide the supporting information needed for lifestyle change, improving quality of life, work efficiency and coordination of everyday life.

6.2.1.1 Reinventing the Transportation Experience

Hong Kong has one of the highest population densities in the world, and the number of people per square kilometre of land area increased from 6,237 in 2001 to 6,544 in 2011 (Census and Statistics Department, 2012). Its transportation network is highly developed and very busy. Over 90% of daily journeys (11 million) are made using public transport, the highest such percentage in the world (Lam & Bell, 2011). Franchised buses (35.1%) and railways (36.3%) are the most used forms of transport in the city (Figure 6.1). About 29% of journeys rely on other transport modes, including public light buses, taxis and light rail. This section considers the most used transport – franchised buses and MTR – and analyses how to use new technology to coordinate people's everyday lives to not only provide passengers with a safer environment and on-time schedule, but also continue to improve the comfortable travelling experience.

An in-depth analysis of Hong Kong's interactive public design was carried out. First, the social behaviour of users was observed, and then the local mobile applications for smart mobile devices and some digital public facilities for public transport were analysed. The aim of the analysis was to define a better user experience for public transport and a smart communication lifestyle.

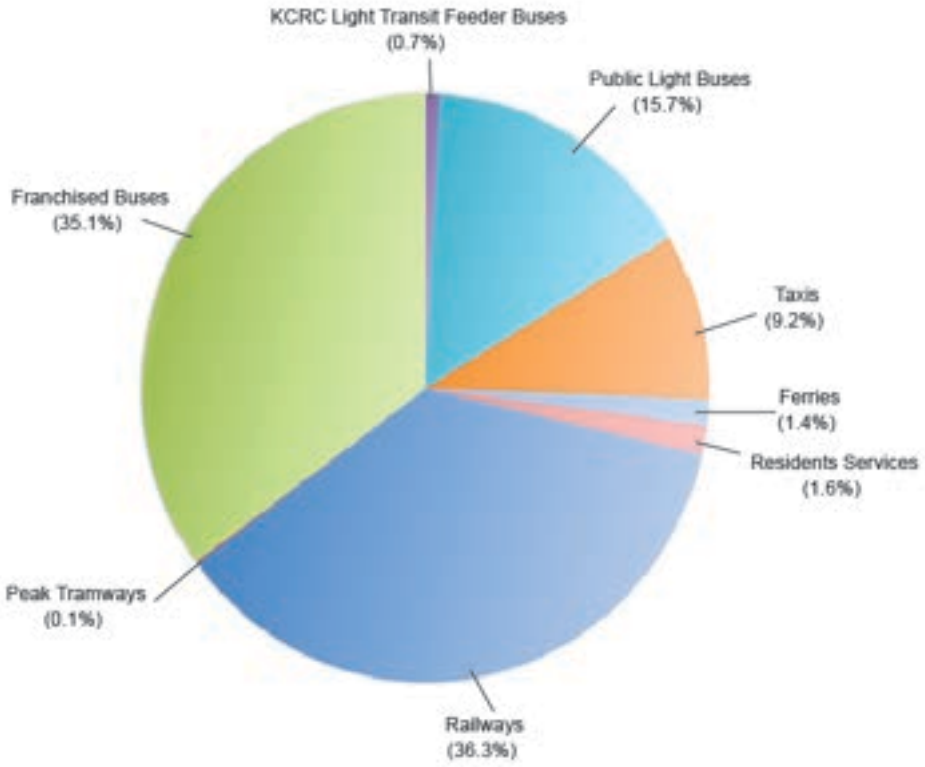

Figure 6.1 Average daily public transport patronage by mode

Notes: (1) Railways include MTR, KCRC East Rail, West Rail, Light Rail and HK Tramways. (2) Franchised Buses include KMB, Citybus, NWFB, LWB and NLB.
Source: HKSAR Transport Department Annual Report 2005.

The user experience of public transport services in Hong Kong can be created through intangible services from mobile apps and tangible experiences of digital public facilities. These are all now based on new technology and are part of smart communication.

In Hong Kong, travellers on public transport can be divided into two categories: local people and visitors. Most local people like using smart mobile devices on public transport to relieve stress or kill time. Young people and those with higher household incomes have been found to be more likely to use ICTs (Wang & Law, 2007). Visitors whose smartphones do not have mobile data will try to find a Wi-Fi provider, and free Wi-Fi connections are readily available in Hong Kong. According to Internet World Stats, Hong Kong's Internet penetration rate ranks first in Asia and ninth in the world. By November 2016, there were 44,016public Wi-Fi access points (OFCA, 2016). Given this, there are

many opportunities for public services to improve their services and user experience through new technologies making use of smart mobile devices and digital public facilities.

Private Self-Service Devices

Since they came into our lives, small devices like smartphones have completely changed our daily life. Due to the fast-paced lifestyle in Hong Kong, smartphones have become particularly important to the city's citizens. Smartphones are small, portable, fast, increasingly accessible and relatively affordable (Hanson, 2007). Hong Kong public transport providers have different mobile applications for passengers to download, such as the Citybus & New World First Bus app, which provides bus information for passengers. The MTR Mobile app gives users a holistic perspective of the MTR network from the following four perspectives.

(1) Comprehensive Journey Planning

Passengers search the MTR route simply by tapping on the route map and choosing the starting location and desired destination. This app contains other functions, including fare information, recommended routing and station services. If a station interchange is necessary, passengers can follow the guidance on the app.

Figure 6.2 MTR Mobile iOS interface.

Source: Screenshot from MTR Mobile app

(2) Real-time Stop Reminding

The Citybus & New World First Bus app has a reminder feature called real-time stop reminding, which pops up a message when your destination distance is less than 500 metres away, then at 300 metres and then at arrival. This function is convenient for users who are not familiar with the route, and the ‘heads-down tribe’ like the young people always playing with their mobile phone (Figure 6.3).

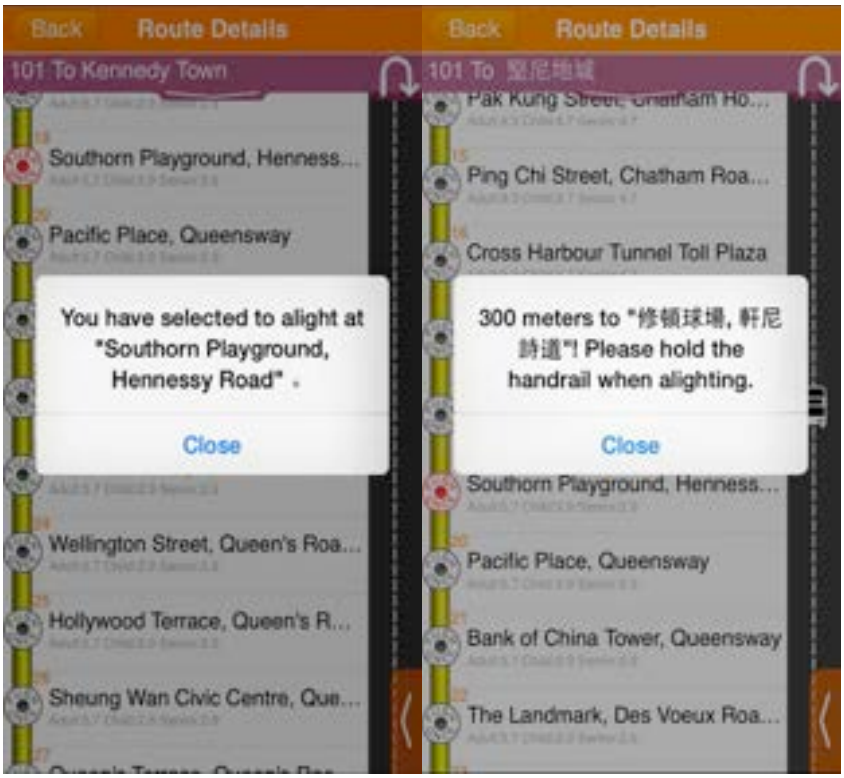

Figure 6.3 Citybus &New World First Bus iOS interface.

Source: Screenshot from Citybus &New World First Bus app

(3) Instant Updates on Special Service Arrangements

For some special service arrangements such as train or bus delays, cancellations or changes to the route, users will get an instant message from these apps. As an efficient city always prioritises time, this feature fits the Hong Kong lifestyle. Most people use these apps to check public transit schedules and other services before they go out.

(4) Information around Stations

The MTR Mobile app has a function based on the station where users stop, such as nearby shopping malls, restaurants, etc. Information about exits can be found in this app as well. This app can help to give visitors a good travel experience.

Public self-service devices

(1) iCentre

Passengers can access the Internet with computers installed at iCentres in most MTR stations. They can also enjoy a snap Internet connection through free Wi-Fi at the iCentre. (HK MTR Services and Facilities, 2015a). This accessible public facility helps passengers link globally and tune in to the latest information (Figure 6.4).

Figure 6.4 An iCentre in a Hong Kong MTR station.

(2) eInstant Bonus Terminals

Users can carry an Octopus card (a reusable stored-value smart card for public transit) and register for the MTR Club to manage their account, redeem special offers, purchase tickets, etc. (HK MTR Services and Facilities, 2015b) (Figure 6.5).

Figure 6.5eInstant Bonus terminals in a Hong Kong MTR station.

Characteristics of smart communication devices

Smartphones, tablets and laptops consist of hardware, software and networked technologies (Larivière et al., 2013). This combination of multiple features sets smart mobile devices apart from previous inventions. These devices combine multiple value propositions in one product, and facilitate users' new experiential value perceptions. The private and public self-service devices (SSD) have their own characteristics and help users in different ways (Table 6.1).

Table 6.1 Characteristics of private and public self-service devices.

Characteristic	Private self-service device	Public self-service device
Accessibility	Portable	Fixed
Privacy	Personal	Public
Interaction	Digital information interaction	Physical and digital information interaction
Networked	Yes, with limitation on cost	Yes, with limitation on time
Multi-function	Yes	No

- *Accessibility*. Private SSDs can be taken anywhere and used whenever needed. Although public SSDs are fixed in a public area, passengers can directly use them. Passengers can access updated information through most of the public SSDs.

- *Privacy*. Private SSDs enable passengers to store their own personal information and settings. The SSD is based on customer's requirements, with a focus on public information.

- *Interaction*. The interaction between passengers and private SSDs, such as smartphones, is based on a digital information interaction. Public SSDs sometimes require physical interaction during the service, e.g., recharging an Octopus card by contact with a ticket machine.

- *Networked*. A key feature of smart communication devices is fast Internet accessibility, which gives access to a vast array of information sources. Both private and public SSD have limited Internet service currently, e.g., time may be a crucial limitation of free Wi-Fi services.

- *Multi-function*. Technology has enabled passengers to access a wide array of functions through smart communication devices. Usually, private SSD users install a variety of mobile applications with multiple functions and public SSDs' functions are based on public requests.

User experience creation through smart communication devices

The multi-function nature of smart communication devices enables multi-value propositions to be achieved through a single device. Multiple values can be achieved by using smart communication devices and engaging with social media. In this study, five types of function using the private SSD and two types of function using the public SSD were observed. Such devices facilitate experiential value creation – in terms of

convenience value, information value and monetary value – through multiple functions in various dimensions (Table 6.2).

- *Function 1*: travel planning. Simple and unintegrated information cannot enhance travel experience creation until it is combined. The integration of multiple information from different resources (metro, pedestrian paths, etc.) in a single mobile app with real-in-time route adjustment provides value in terms of ease of use, efficiency and convenience. Such information is provided by different transport authorities or other online sources based on a scheduled timetable.

- *Function 2*: station reminding. This is a location-based service, which measures the expected time to the destination and alerts passengers so that they do not miss their station. It provides convenience value to customers in different contexts.

- *Function 3*: transport tracking. This provides real-time information to facilitate passengers' 'smart decision making'. Travellers perceive the information value as an enhanced sense of security. This service also reduces the potential conflict between customers and bus drivers, when travellers know of transport delay information in advance.

- *Function 4*: surrounding information pushing. This helps travellers to discover relevant events and conditions in their immediate surroundings. The information can either be provided by transport authorities or commercial firms. By having such information, travellers feel empowered in making consumption decisions. For instance, while on the premises of a retailer one could search for a nearby alternative shopping place or restaurant. The immediate information pushing enhances the experience value in terms of convenience and satisfying curiosity.

- *Function 5*: free connection to the Internet. Connection online can be the most important thing for travelling city commuters, who must manage large amounts of information to make certain travel related or non-travel related decision. Due to cost consciousness, free Wi-Fi Internet services are favoured by travellers, especially tourists newly arrived in a new city, who may need to seek advice, look for attractions or want to

contact friends. The free online connection services provided by mobile companies and transport authorities add value to the travel experience in monetary and convenience terms.

- *Function 6*: coupon information. A large amount of promotion information contributes value to both customers and companies. From a customer's point of view, a one-stop coupon information self-service platform facilitates the collection of information relating to surrounding events or commercial promotion activities, and enables better decisions. From a company's point of view, providing direct benefits to customers rather than investing in traditional advertising contributes to market insights and market expansion. Such functions contribute monetary value, convenience value and information value to travellers' daily journeys.

Table 6.2 Experience value creation through smart communication devices

Type of smart communication device	Function	Value	Actors
Private self-service device	Travel planning	Convenience	Passenger, public transport authority
	Station reminding	Convenience	Passenger, transport, public transport authority
	Transport tracking	Convenience, Informational	Passenger, transport driver, public transport authority
	Surrounding information pushing	Convenience, Informational	Passenger, public transport authority, third parties
Public self-service device	Free connection to Internet	Monetary, Convenience	Passenger, public transport authorities, telecommunications providers

	Coupon information	Monetary, Convenience, Informational	Passenger, commercial company, public transport authority

Note: This table reports the types of functions and values that are analysed in the aforementioned cases; note that not all the potential types of value are summarized in this table as some devices are not discussed in our cases.

In the current case study of public transport in Hong Kong, the development of information technology and people's capability to deal with information empowers customers to experience 'smart decision making' and 'smart solutions' in the daily transport context. The combination of accessibility, privacy, interaction, networked and multifunctional private and public self-service technology characteristics in varying degrees enhances users' experience of convenience, monetary and information value creation.

6.2.1.2 Information Provider

Smart mobile devices are information providers, and users can obtain information easily through different apps. The smartphone is becoming the lens through which we see the world. It is also an appropriate device from which to deduce user context, because the data emerging from the frequent interaction between users and devices can be collected and managed easily through various sensors.

Although smart communication has advantages in information seeking, resource providing, problem solving and support, the adoption and usage of smart technologies still presents conflicts and challenges (Stewart, 2003). Through smart communication, even social media can be an information provider to support people during disasters. Sarcevic et al. (2012) did an inductive analysis of 89,114 Twitter communications over the three-week emergency period in the immediate aftermath of the Haiti earthquake of 12 January, 2010. This data contributed to the understanding of medical coordination challenges from pre-deployment readiness to on-the-ground action.

Other information services include dining guide apps such as Open Rice, which is based on LBS and is quite popular in Hong Kong. Similar international dining guide apps, such as Yelp, are well known in America and other countries. Open Rice is one of the few profitable locally designed applications in Hong Kong. It can find your current location with GPS and show nearby restaurants. Through the app you can read local people's useful comments about the restaurants and recommended dishes. Keyword searches for restaurant names, addresses and signature dishes are also available.

In addition, numerous apps for smart mobile devices are designed to improve daily life by boosting efficiency. Most people like to keep up to date with the latest news and interesting information. Some apps provide an opportunity to organise a great deal of content based on a user's preferences, location and subscriptions. The smart mobile device also enables users to save time by completing tasks. Organisation is essential, but even organised tasks are time-consuming (tracking deliveries, paying bills, reserving a table or ticket, etc.). Apps can reduce the time required to complete these tasks. For example, if someone's birthday is approaching, a person can easily be notified and can post a message through apps. If a user has an appointment, an app can provide a reminder, suggest a time of departure and give directions. These examples clearly illuminate the influences of smart mobile devices, particularly their ability to provide information and improve the quality of our everyday lives.

6.2.1.3 Peer Services

Ride-hailing

After the mobile application *Didi* Taxi was launched in China, it grew rapidly in popularity. Sometimes it is difficult to hail a taxi during rush hour, but this mobile app can help passengers a lot. The user can use his or her smartphone to send a voice message or text message to a platform. Nearby taxi drivers receive the service request. The first driver to contact the user makes an appointment and finds the user via GPS and LBS. This app allows users to find a taxi more easily and decreases 'blind driving'. Further, the booking service asks customers to pay an optional gratuity (ranging from 5 to 20 Chinese Yuan) to receive a better chance of snagging a taxi during rush hour or in less-busy areas.

Figure 6.6 shows the app's interface and a picture of a taxi driver using it. When the app was used to hail a taxi for this study, a driver responded in only 39 seconds. The driver called immediately to make sure of the location, and we waited for him to arrive.

Figure 6.6*Didi* Taxi iOS interface and a taxi driver using the app

Source: Screenshot from the *Didi* Taxi app, photo by the author

This app has changed the lives of its users in that they can now use their smartphones to order a taxi rather than wait for one on the road, rain or shine. It also helps reduce congestion, as drivers do much less unnecessary driving around looking for fares. Meanwhile, the app allows users to communicate effectively with taxi drivers in a way they have never before attempted.

This is a typical case of online-to-offline (O2O) commerce, i.e., users determine their needs online and then purchase the relevant products in the real world (offline). Other ride-hailing services such as *Uber* and *Lyft* are popular in America. As a form of 'proximity commerce' an O2O application usually creates an online agent that incorporates online service providers and resources (Lin et al., 2013). Given the wide availability and usability of smartphones, new innovative approaches have led to a new lifestyle, one that is smarter and decreases costs and time. An individual can determine his or her needs anytime and anywhere and fulfil them immediately.

E-shopping

E-shopping based on mobile devices has changed the way that consumers shop andchanged lifestyles tremendously. One of the most successful e-commerce companies is *Taobao*. It operates under Alibaba, which uses the typical customer-to-customer (C2C) business model used by *e-Bay* in the US. Customers can browse and order their merchandise online from one of the *Taobao* shops. A transaction is completed when the product is delivered.

Before the rise of smartphones, one required a computer to shop online. However, due to size restrictions and other factors, order statuses could not always be checked. Through smartphone applications, users can now feel free to use networks, view products and make orders and payments. A user can shop in the street, at the office or even on the toilet. If an individual finds a desired item at the mall, he or she can immediately search for the same item on *Taobao*. Thus, the volume of online shopping transactions has risen exponentially and transcended the barriers of time and space. Those who love shopping are never frustrated because networks bring different types of products to the Internet.

Shopping has moved from the real world to cyberspace, and is now moving to mobile life. This radical change is increasing the number of Internet connection methods, making it convenient to shop and promote a country’s economy. However, as people’s dependence on their smartphones increases, they are losing the motivation to go outside and experience the real world.

Figure 6.7*Taobao* iOS interface

Source: Screenshot from the *Taobao* app

6.2.2 So Close: An Environment with No Distance and No Strangers

Smartphones focus on intelligent interaction, whereas people generally only use the calling function of feature phones. Smartphones can be used to communicate in ways other than phone calls (Hurlen, 2013). Smartphones mean that users are always online and accessible anywhere (Agger, 2011). Users can choose to use different kinds of SNS, and an increasing number of users access virtual communities through their smart mobile devices, which is associated with a greater level of social activities (Ishii, 2003). Mobile devices are becoming the most popular means of accessing the Internet.

Compared with the ‘location to location’ telephone, a mobile phone is a ‘one-to-one’ tool: it overcomes the limitations of specific locations and offers the possibility of a different form of communication and social networking (Schuurman et al., 2011). No matter where you are, you can get in touch with your friends via mobile phone. Young people expect to be able to communicate at any time, and assume that their friends also have smartphones and are willing to receive messages at any time. This kind of expectation is more obvious for smartphones than feature phones. Behind this ubiquitous communication is the eagerness to be together, and the virtual space created by smartphones happens to meet

people's aspirations. Through these communication technologies, users in different places can feel connected.

The mobile Internet era has changed the traditional forms of communication in social relationships, from calls and messages to multiple means of instant messaging. Technology makes it easy to blur the boundary between confession and apology; young people feel 'it's harder to say "sorry" than text it' (Turkle, 2011). Mobile technology has also become a popular means of communicating in weak social relationships, such as between acquaintances and strangers.

Before the advent of the Internet, interpersonal communication was dependent on real social relationships: social networks consisted of acquaintances and were stable. With the appearance of the Internet, particularly the mobile Internet, people have many more channels available for meeting even if they don't know each other (Rheingold, 2002). Various smartphone applications, some of which use LBS, make it possible for users to search for and then chat with people they may be interested in. The shake and drift bottle functions in apps make it possible to find new friends. The interactive areas for interpersonal communication have been extended to an infinite space.

6.2.2.1 Dependency

As smartphones can do more and more things, people are becoming increasingly dependent on them. All day long, people find themselves instinctively reaching for their phone, using it as a tool to validate their existence. A study by Meeker (2013) in the annual Internet Trends report carried out in May 2013indicated that the average user checks his or her phone almost 150 times a day. According to this report, people check their phones, on average, 23 times a day for messaging, 22 times for voice calls and 18 times to find out the time. Data compiled by the New York-based app Locket indicate that the average user checks his or her smartphone around nine times an hour at peak times (Woollaston, 2013).

In Hong Kong, after a period of consolidation, five major mobile phone operators – Peoples, SmarTone, 3, CSL and PCCW Mobile – compete for a market of seven million

people. It may not be an exaggeration to say that the mobile market in Hong Kong is one of the most competitive in the world (Yan, 2001). It is easy to swap providers without changing cell phone numbers in Hong Kong, and as a result cell phone charges are very cheap. Table 6.3 compares mobile data charges in Hong Kong with Beijing, and shows that all operators offer concessional mobile data packages for young people, allowing them to use their smart mobile devices more conveniently. As a result, people in Hong Kong are more dependent on smartphones.

Table 6.3 Mobile phone operator charges in Hong Kong and Beijing

Source: data from all major mobile operators' official websites

Mobile phone operator	Hong Kong					Beijing		
	Peoples	SmarTone	3	CSL	PCCW	China Mobile	China Unicom	China Telecom
Mobile data charges (lowest)	88 HKD/ month (unlimited)	78 HKD/month (unlimited)	68 HKD/ 400 MB	87 HKD/ 1GB	119 HKD/ 1GB	38 RMB/ 300 MB	46 RMB/ 150 MB	49RMB/ 200 MB

Because Hong Kong is a compressed city, compared to a big city like Beijing, one mobile phone operator in Hong Kong may need only a few base stations to cover the entire region. However, in mainland China, the mobile phone operators need a huge number of base stations for all of their users, and thus have higher costs. Smart mobile device users spend more money on data transmission, which is their main means for connecting with the world.

The smartphone seems to change everything (Agger, 2011). Once people start using a smartphone regularly, it becomes a part of their lives and they feel lost without it (Aoki & Downes, 2003).

Most of the interviewees carried a smartphone all of the time, and acknowledged that it gave them some sense of security. The smartphone is a good tool for killing time. In this

scenario, the mobile device facilitates dependence. It creates an inseparable connection with users who generally lack a sense of safety or are good at socialising.

The mobile Internet is growing so fast that people cannot be satisfied only by phone calls and sending text messages, and they are more eager to share their happiness and sorrow through their phone immediately. Another advantage is that people can choose to hide something that they do not want to be seen on the Internet.

Some people have invented novel methods of using smartphones more easily in public spaces. For instance, Figure 6.8 shows a man using blind tracks bricks to help him walk while looking at his phone. He is not blind, but for the ease of using a smartphone, the blind tracks bricks can help the smartphone addict avoid the need to look at the direction of the road. Some people are really dependent on their smartphone and never miss an opportunity to use it.

Figure 6.8 A man walking on the blind tracks bricks when using his smartphone.

6.2.2.2 Usage in Peak Hours

Before bedtime is one of the peak times for smartphone use because most people are busy working in the daytime. According to the findings in of the focus group interviews, most people choose to play with their smartphones at night, especially before sleep, when they might check whether they have missed any information or browse for something.

Most of the interviewees said that they were woken up by the smartphone's alarm clock, because the alarm is already integrated with the phone and is easy to use. Using a smartphone has become a new habit at bedtime, just like reading in bed, although some studies have indicated that it is affecting health. It is possible that mobile devices are changing traditional lifestyles, as they have introduced a number of functions that make everyday life convenient and creative.

Waiting for something is another peak time for smartphone usage. It is very common in Hong Kong to see people using their smartphones when waiting in line for the bus or MTR (Figure 6.9).

Figure 6.9 People often use smartphones when they are waiting

Smart mobile devices allow people to spend fragmentary time to fulfil the human need to communicate and converse with friends whenever they want. Fully utilising their time is very important for young people who work in Hong Kong. It is an efficient city and time is valuable.

6.2.2.3 Social Interaction

Social interaction incorporates both the information exchange among people and groups online and the effects of online interaction on offline communication, both face-to-face and via other media (Katz & Rice, 2002). Christakis & Fowler (2009) proposed that the in-depth research on social networks motivated us to consider them a kind of human super organism, in which they grow and evolve with all sorts of things flow and move inside. Smart mobile devices definitely improve the sociability of life. Such a rapid pace of social media development is inseparable from the rapid urbanisation of society. Fast-paced city life puts great pressure on young people, and after work, they hope to meet more new friends. Some instant messaging apps based on smart mobile devices are quick and convenient. Compared with SMS on feature phones, instant messaging apps have a variety of attractive features such as low cost, high efficiency, enjoyability and creativity. Furthermore, it is possible to search for friends among people nearby. This way of getting to know strangers can achieve rapid communication and social interaction at any time. Interviewees indicated that smart mobile devices make it easy to get in touch with old friends and follow their news on social networks.

Smart mobile devices make people communicate in more diverse ways, and change the way in which people respond to their friends. Using voice messages to chat with friends is very popular nowadays, and in both Hong Kong and mainland China young people use a popular app called *WeChat* to communicate. *WeChat* is a communication app developed by Tencent. Tencent developed *QQ*, which is well-known network communication software with hundreds of millions of users in mainland China, and *WeChat* can be seen as an upgraded version of mobile *QQ*, although it coexists with mobile *QQ*. In fact, *WeChat* is not just a simple communication app – besides sending text and hypertext information through the network, it can send hold-to-talk voice messages. Users can have multiple dialogues, send their location to friends and even find a random friend when they are lonely. It has become a ‘must have’ application for smartphone users in China.

Figure 6.10 shows a young person using *WeChat* voice messaging to chat with a friend. She was walking across the street and thus not easily able to input texts, but this kind of

smart communication tool does not require the inputting of text, and allows users to easily chat with friends even in crowded streets and when they are busy.

Figure 6.10 A young person using voice messaging to chat on a Hong Kong street

With the development of technology, people interact with each other through social networking apps, instant messaging or other media. They build personal networks and spread different needs across different networks. New technologies reduce the cost of communication but people's social circles become more dispersed.

6.2.3 So Far Away: 'Smartphone Addicts' Ignore People Around Them

Although smartphones allow close interaction, some problems have started to appear. People are increasingly ignoring the world around them as they become obsessed with their smart mobile devices. The swift progress of mobile Internet technology and the availability of hundreds of thousands of apps have created 'smartphone addicts', and the number of addicts is expected to grow.

Technology affects people's interactions and ways of talking. The use of digital products for communication has changed our previous activity to meet the particularities and limitations of this new technology. It is noticeable that people tend to communicate less verbally and more through smart mobile devices. Having direct access to the Internet via smartphones has amplified this phenomenon, and many people choose to share their thoughts or special moments on *Facebook* rather than with a friend.

Figure 6.11 Members of the 'heads-down tribe'

Smartphone addicts are also referred to as the 'heads-down tribe', a Chinese term that doctors and researchers use to describe smartphone addicts who are susceptible to traffic accidents, physical illness or psychological disconnection (Tseng et al., 2012). For example, at Hong Kong MTR stations, people constantly hear public announcements warning of the danger of mobile phone use – 'Don't keep your eyes only on your mobile phone' – and you can see this kind of warning label on the escalators as well (Figure 6.12). This indicates that the 'heads-down tribe' in Hong Kong is huge and smartphones are increasingly dominating our lives. The 'heads-down tribe' is easy to find anywhere in our social life, such as having meals, at lectures, in meetings or in social activities with friends and family. Such smartphone addicts are not interested in communicating with

others and neglect and dismiss the importance of building and maintaining relationships with them (Chasombat, 2014).

Figure 6.12 A warning sign on a Hong Kong escalator

To restrict the excessive use of smartphones, the US city of Fort Lee, New Jersey, has begun cracking down on smartphone-addicted pedestrians, imposing a penalty of US$85 on those who walk and use their phones at the same time (Tseng et al., 2012).

It is not uncommon to see a group of young people sitting together, all using their smartphones rather than talking to each other. Youths are forward thinking and have high consumer awareness. Most of the time they keep their heads down and play with their smartphones; their bodies do not move except to tap the screen. For many people, browsing their friends' news on SNS or checking the national and international news is the starting point of the day. There is less conversation on buses and the metro as everyone is looking at their smartphones. When at work, the smartphone is a significant communication tool; when at rest, the smartphone is an important entertainment tool. Smartphones have suddenly become ubiquitous in our social and work lives. Smartphones have changed the ways in which we work, live, sleep, connect and engage with the community (Agger, 2011). In this information age, the distance between people appears to

be getting closer, when in reality they are moving further and further away from each other.

Figure 6.13 Smartphone-addicted pedestrians on Hong Kong streets

6.2.3.1 Isolation: Usage with Friends and Family

The ubiquitous use of smart mobile devices is already a common phenomenon. Whether for social networking or entertainment, people spend their spare time playing with their smartphones, yet this lifestyle means they are far away from the people around them, as they isolate themselves in the smartphone world. Figure 6.14 shows four Hong Kong workers intensively playing with their smartphones in their leisure time. Chatting with friends, surfing the Internet or playing games can help them to relax after work. However, we do not see them talking to each other in their spare time. Technology lets people focus on the machine more than reality, especially young people who are more likely to use digital devices to communicate. One of the realities of technologies is that they are imbricated in the everyday and the real and people move between modes of experiencing the contemporary moment.

Figure 6.14 Workers sit on the railing and play with their smartphones in their spare time

The photo in Figure 6.15(a) was taken in Hong Kong Time Square Starbucks. The little child was crying all the time, then his young father took out a smartphone and the screen was shining in front of his son. As expected, the child stopped crying and looked intently at the smartphone; maybe his mother was shopping and left the young father to look after the baby, but the young man spent all of the time playing with the smartphone while he was with his son. Likewise, the woman in Figure 6.15(b) gave her baby a smartphone on the MTR, and the baby was focusing on the phone and never cried. Both pictures capture moments in which children were absorbed with smartphones, and show that smartphones affect not just young people in Hong Kong, but children as well. These are portrayals of typical smartphone usage with friends and family nowadays.

(a) (b)

Figure 6.15 Children absorbed by smartphones

Sometimes people's behaviour affects others. According to Homans' (1958) early study on human behaviour, social exchange is the exchange of activity, people's behaviours and activities are interactive, thus the use of smartphones during gatherings or in public has become normal. In Figure 6.16 we can see two people eating together in a canteen, but instead of face-to-face communication, they choose to use their smartphones for online communication. As stated by some of the interviewees, other people's behaviour influences their own behaviour – if everyone plays with their smartphones, nobody will talk. Meanwhile, parents do not agree with their children playing with their phones when they are having a meal with them.

Figure 6.16 Two people sit together using their smartphones after dinner

Most of the participants disagreed with using smartphones when with friends, but said that some messages or calls were unavoidable in this information age. Others' use of smartphones also affected their own use. Of course, face-to-face communication is much more important than virtual communication, and when friends or parents are talking to someone, it is not polite to use a mobile device. Society is full of digital products and interpersonal communication has become impassive; a message or a call has already replaced the traditional warm greeting. In this rapidly developing city, people need to slow down and enjoy real life.

6.2.3.2 Selective Ignoring

A traditional phone has the characteristic of 'compulsivity': you must choose to answer or not as soon as the phone rings. This kind of situation can be avoided when using social apps, as users can select to ignore the message or reply to it later. The interviewees believed that sometimes a smartphone is a leash disturbing them with lots of messages every day, and they preferred to ignore some unimportant messages.

Users of WeChat (a mobile instant messenger app), for example, can send text messages, voice messages, photos and videos, and the recipient can reply at any time. It offers a different experience because WeChat charges by data usage instead of the number of SMSs. It is becoming popular because it is free and convenient. By August 2013, the WeChat messaging application already had 236 million active users per month, which was nearly triple the number a year earlier (Mozur, 2013). However, what has followed is a great deal of junk information spread through the Internet, which causes great disruption to our lives. People select to ignore useless information and this phenomenon is accompanied by new means of communication.

Another interesting finding of this study is the influence of gender in users' perceptions of smartphone usage. The focus group participants revealed different preferences: female users preferred typing to calling and were more likely to use SNSs such as *Facebook* and micro blogs. Females also preferred indirect communication and used messaging most of time, and they would talk about something not directly related to the core topic that they originally wanted to talk about. In contrast, male users preferred direct communication. Calling would be their first choice for contacting others as they preferred to let people know what they wanted directly.

According to the reflections in the book *iBrain* (Small & Vorgan, 2008), women tend to have a more social response to technology, and more frequent usage of mobile technology to connect with friends and family. Men are more eager to talk about work-related issues, and it seems their phones are more integrated into this part of their lives than into their personal lives.

6.2.3.3 Quantitative Analysis of the Consequences of Overusing a Smart Mobile Device

The data comes from the survey of 377 Hong Kong young people (18–30 years old).Appendix 1 is the questionnaire used in the survey. After excluding 45 people who refused to disclose their income, a sample with 332 observations was obtained.

Table 6.4 summarises the degree of agreement with to the statement that people with

smartphones are nearer to people far away but farther away from people nearby.

Table 6.4 The degree of agreement with the view that smartphones estrange people

Question	Option	Proportion
Do you think that people with smartphones are nearer to people far away but farther away from people nearby?	Strongly agree	31.63%
	Agree	47.59%
	Neutral	13.55%
	Disagree	6.63%
	Strongly disagree	0.60%

In this sample, 31.63% of the respondents strongly agreed and 47.59% agreed that people with smartphones are nearer to people far away but farther away from people nearby. Only 13.55% chose ‘neutral’, and less than 8% of the respondents disagreed or strongly disagreed. This result indicates that people do feel farther away from people nearby due to the use of smartphones.

Table 6.5reports the consequences that the respondents thought excessive dependence on a smartphone would cause.

Table 6.5 The consequences of excessive dependence on smartphones

Consequence	Agreement (% of respondents)
Estrangement from people around you	69.28%
Harm to health	59.04%
Fragmentation of information	44.28%
A feeling of anxiety	42.17%

In this sample, 69.28% of the respondents agreed that excessive dependence on smartphones causes estrangement from people around them (Estrangement), 59.04% agreed that excessive use of smartphones harms their health (Harm), 44.28% agree that

excessive use of smartphones causes fragmentation of information (Fragmentation) and 42.17% believed that excessive dependence on smartphones makes them feel anxious (Anxiety).

To explore the effect of the use of smartphones on the respondents' lives, four logistic regressions were conducted to show the influence of personal characteristics and habits of smartphone use on the likelihood of agreeing with the four consequences, namely, Estrangement, Harm, Fragmentation and Anxiety.

$$DV = \beta_0 + \boldsymbol{\beta EV} + \varepsilon \quad (1)$$

The dependent variables for the four regressions are the dummy variables that indicate whether the participants chose estrangement, harm, fragmentation or anxiety as consequences of the excessive use of smartphones. The independent variables ($\boldsymbol{EV}$) are the dummies of the respondents' years of using smartphones, daily usage, frequency of changing smartphones, gender, age, occupation, education and income. The detailed variable definitions are displayed in Appendix 3.

The results of the regressions show that only Estrangement and Fragmentation are affected by those factors. Thus, only the results of the regressions of Estrangement and Fragmentation are reported. Table 6.6reports the results of the logistic regression of Estrangement on the personal characteristics and habit of using smartphones.

Table 6.6 The effect of using smartphones on the likelihood of agreeing that excessive dependence on them causes estrangement

Variable	DV = Estrangement	
	Coefficient	*p*-Value
Intercept	-2.6549	0.2708
Usage_2	2.0538	0.1559
Usage_3	2.5641	0.0649
Usage_4	2.6289	0.0530
Usage_5	3.1295*	0.0223
DUsage_2	-0.1384	0.9274

DUsage_3	-0.8001	0.5937
DUsage_4	-0.0431	0.9770
DUsage_5	-0.6936	0.6439
Freq_2	-0.0867	0.9498
Freq_3	-0.6375	0.6043
Freq_4	-1.0752	0.3865
Freq_5	-2.0797	0.1057
Gender_M	-0.3654	0.1802
Age_2	0.6715	0.1319
Age_3	0.7063	0.1824
Student_Y	0.2521	0.5691
Education_2	2.3617	0.1046
Education_3	1.7644	0.1648
Education_4	1.9702	0.1143
Education_5	1.6535	0.1889
Education_6	0.7216	0.6056
Income_2	-0.1479	0.6590
Income_3	-0.6685	0.2335
Income_4	-0.6131	0.3336
Income_5	-1.9052	0.1357
Observations	332	
Pseudo R-square	0.1121	

Note: This table shows the results of the logistic regression of the likelihood of agreeing that excessive dependence on smartphones causes estrangement on the variables indicating personal characteristics and habit of using smartphones. Variables are defined in Appendix 3. ***, ** and * indicate significance at the 0.001, 0.01 and 0.05 levels, respectively.

The results show that the number of years of using smartphones is the only significant factor. With the increase of time using smartphones, the estimated parameters and significance of the dummies increases. The results indicate that the likelihood that

participants believe that excessive dependence on smartphones causes estrangement from people around them increases with the number of years using smartphones.

Table 6.7reports the results of the logistic regression of Fragmentation on the personal characteristics and habit of using smartphones.

Table 6.7 The effect of using smartphones on the likelihood of agreeing that excessive use of smartphones causes fragmentation of information

Variable	DV = Fragmentation	
	Coefficient	*p*-Value
Intercept	0.3653	0.8759
Usage_2	-1.3401	0.334
Usage_3	-1.4253	0.2806
Usage_4	-2.1078	0.104
Usage_5	-2.3278	0.0734
DUsage_2	-0.6019	0.656
DUsage_3	-0.9798	0.4643
DUsage_4	-1.4574	0.2759
DUsage_5	-0.2994	0.8235
Freq_2	0.4277	0.7076
Freq_3	0.4616	0.6561
Freq_4	0.5913	0.5715
Freq_5	1.5253	0.1682
Gender_M	-0.1093	0.67
Age_2	-0.4495	0.2676
Age_3	0.3106	0.5269
Student_Y	-0.1753	0.6633
Education_2	1.0706	0.4467
Education_3	0.7088	0.5782
Education_4	1.8396	0.1397
Education_5	2.2335	0.0756
Education_6	2.1575	0.1184

Income_2	0.1099	0.7145
Income_3	0.0963	0.8576
Income_4	-0.0297	0.9604
Income_5	-0.8603	0.5106
Observations	332	
Pseudo R-square	0.0981	

Note: This table shows the results of the logistic regression of the likelihood of agreeing that excessive use of smartphones causes fragmentation of information on the variables indicating personal characteristics and habit of using smartphones. Variables are defined in Appendix 3. ***, ** and * indicate significance at the 0.001, 0.01 and 0.05 levels, respectively.

The results show that only the number of years using smartphones and education have marginal significant effects on the likelihood of agreeing that excessive use of smartphones causes fragmentation of information. The time of using smartphones has a negative effect on Fragmentation. With the increase of years using smartphones, the magnitude of the estimated parameters and significance of the dummies increases. This indicates that the likelihood that respondents believe that excessive use of smartphones causes fragmentation of information decreases significantly with time using smartphones. Education has a concave effect on Fragmentation. With an increase in education level, the magnitude of estimated parameters and significance of the dummies increases at first, peaks at postgraduate level and then decreases slightly at the doctoral level. This indicates that the overall likelihood that respondents feel fragmentation of information increases with their level of education, but when they reach doctoral level of education, the likelihood decreases.

A linear OLS regression was also conducted to reveal the effect of personal characteristics and smartphone habits on the degree of agreement with the statement that people with smartphones are nearer to people far away but farther away from people nearby (Neglect). Table 6.8reports the results.

Table 6.8 The effect of using smartphones on the degree of agreement that people with smartphones are nearer to people far away but farther away from people nearby

Variable	DV = Neglect	
	Coefficient	*p*-Value
Intercept	0.9426	0.0011
Usage_2	0.0572	0.7328
Usage_3	0.0407	0.7970
Usage_4	0.0237	0.8774
Usage_5	0.0103	0.9471
DUsage_2	0.1839	0.3042
Dusage_3	0.2122	0.2310
Dusage_4	0.1748	0.3208
Dusage_5	0.1941	0.2730
Freq_2	0.0978	0.5066
Freq_3	-0.0062	0.9630
Freq_4	-0.0054	0.9682
Freq_5	0.0072	0.9598
Gender_M	0.0809*	0.0174
Age_2	-0.0110	0.8369
Age_3	-0.1085	0.0968
Student_Y	-0.0449	0.3986
Education_2	-0.1403	0.4129
Education_3	-0.1437	0.3544
Education_4	-0.1010	0.5049
Education_5	-0.0973	0.5258
Education_6	-0.0224	0.8968
Income_2	0.0570	0.1540
Income_3	0.1436*	0.0465
Income_4	-0.0314	0.7014
Income_5	0.1683	0.3220
Observation	332	

Adj. R-square	0.0012

Note: This table shows the results of linear regression estimated by OLS. Variables are defined in Appendix 3. ***, ** and * indicate significance at the 0.001, 0.01 and 0.05 levels, respectively.

The results show that gender, age and income are the three significant factors. The positive coefficient of Gender_M indicates that male informants agree more with the statement that people with smartphones are nearer to people far away but farther away from people nearby. Also, the marginally significant negative coefficient of Age_3 shows that respondents aged 27 to 30 agree less with this statement. The significantly positive coefficient of Income_3 indicates that informants with an income of HKD 20,001 to 30,000 agree more.

The quantitative analysis indicates that the use of smartphones increases the feeling of estrangement from people nearby and the sense of fragmentation of information. Specifically, people who have used smartphones for longer, who have monthly incomes in the range between HKD 20,001 and HKD 30,000, and who are relatively young are more likely to feel estranged from people nearby. Also, males feel estrangement from people nearby more deeply than females. As to the sense of fragmentation of information, people with a shorter time using smartphones are more likely to feel the fragmentation of information, and the likelihood that people feel fragmentation of information increases with their level of education up to the postgraduate level.

6.3 The Characteristics of Smart Communication

Sections 6.5.1 to 6.5.6 analyse the main characteristics of smart communication, namely ‘security’, ‘mobility’, ‘efficiency’, ‘coordination’, ‘sociability’ and ‘enjoyability’. As a special form of smart communication, this section also includes an emoticon communication study. Emoticons aim to accelerate virtual communication and to eliminate some of the difficulty and awkwardness of using words. Some of the characteristics of smart communication, i.e., ‘efficiency’, ‘sociability’ and ‘enjoyability’ are also applicable to emoticon communication (see Figure 6.17). These three aspects

allow us to better understand the ways in which emoticons have developed and the ways in which young people's lives have changed with emoticon use. These findings should provide inspiration and direction for improving the design of smart communication. In section 6.5.7, a framework is generated based on the smart communication survey results, which gives a better understanding of the characteristics of smart communication.

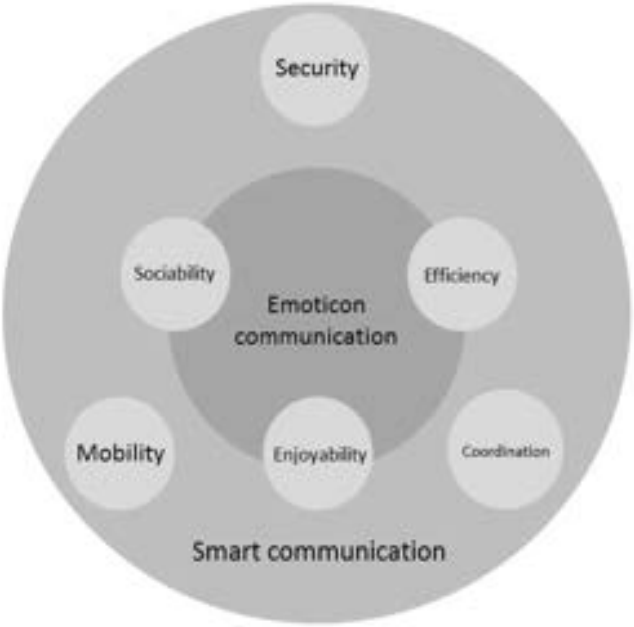

Figure 6.17The relationship among characteristics of smart communication and emoticon communication

In the following subsections, the basic characteristics of the respondents and their smartphone usage that influence feelings of sense of security, mobility, efficiency, coordination, sociability and enjoyability are applied in the following model:

$$DV = \beta_0 + \boldsymbol{\beta EV} + \varepsilon \quad (2)$$

whereDV is the dependent variable, which is a continuous variable calculated by taking the natural logarithm of the degree of sense of security, mobility, efficiency, coordination, sociability and enjoyability, respectively, and $\boldsymbol{EV}$ is a vector of the independent variables, which are the dummy variables constructed from applying the basic characteristics of the respondents and their usage of smartphones.

6.3.1 Security

The smartphone can provide immense reassurance to certain individuals (Swallow et al., 2005), especially young females who are isolated at night, whose smartphone can let them stay in touch with family and friends in case of danger (Carroll et al., 2002). Smartphone functions like LBS, instant messaging, video chat and cameras can give comfort. The findings of Swallow et al. (2005) showed that a common reason for people buying a mobile phone was safety and security, often for car-related safety or unknown situations.

Ling (2007) and Palfrey (2008) noted that the mobile phone has been viewed as a safety link. The young generation often get a phone for some triggering event (Ling & Bertel, 2013). The latent ability to use the mobile phone in a real emergency situation is an important justification for having one (Cohen et al., 2007; Ling, 2012).

Factors that influence the sense of security of the respondents were investigated in this study. Table 6.9 reports the results based on Model 2. As only 332 respondents disclosed their income, the number of observations used in the regression is 332. The adjusted R-square of the regression is 0.3064, which is acceptable. According to the *p*-values and parameter estimation, daily smartphone usage and attachment are of particular interest. The variables of daily usage are all significant (*p*-value <0.01), and the economic magnitude of daily usage displays a concave influence on the sense of security. In other words, the sense of security increases with the increase of daily usage of smartphones at first, peaks at 3 to 5 hours per day, and then decreases with the further increase in daily usage. Attachment is also a significant factor that influences the participants' sense of security, and the economic magnitude and statistical significance of the dummies constructed by attachment increase with the increase of attachment to the smartphones. To be specific, for respondents who rely more heavily on smartphones, the sense of security brought by smartphones is the highest, and the sense of security is the second highest for respondents who feel uncomfortable without smartphones. In addition, although the dummies of age are not all significant, Age_3 (27 to 30) is significantly negative, indicating that respondents over 27 feel a decreasing sense of security from smartphones. Another interesting point is that gender does not affect the sense of security brought about by smartphones, which is indicated by the parameter (almost 0) and the *p*-value (larger than 0.99) of the variable Gender_M, which indicates male participants.

Table 6.9 Results of the factor model on security

Variable	DV = the degree of security	
	Coefficient	*p*-Value
Intercept	0.746	0.0014
Usage_2	-0.119	0.4339
Usage_3	-0.191	0.1825
Usage_4	-0.065	0.641
Usage_5	-0.021	0.8821
DUsage_2	0.439**	0.0077
DUsage_3	0.454**	0.0053
DUsage_4	0.436**	0.0071
DUsage_5	0.425**	0.009
Freq_3	-0.075	0.2523
Freq_4	-0.084	0.2001
Freq_5	-0.168	0.0329
Freq_6	-0.153	0.2515
Attachment_1	0.382***	<.0001
Attachment_2	0.251**	0.0011
Attachment_3	-0.066	0.4394
Gender_M	0.000	0.9944
Age_2	0.026	0.8473
Age_3	-0.086	0.0325
Student_Y	-0.005	0.8958
Education_2	-0.279	0.0724
Education_3	0.023	0.8688
Education_4	0.031	0.8192
Education_5	-0.020	0.8847
Education_6	0.048	0.7546
Income_2	-0.025	0.4964
Income_3	0.055	0.4013
Income_4	-0.058	0.4348

Income_5	0.156	0.311
Observation	332	
Adj. R-square	0.3064	

Note: This table shows the factors that significantly affect users' sense of security in smart communication. The OLS estimation method was used. Variables are defined in Appendix 3. ***, ** and * indicate significance at the 0.001, 0.01 and 0.05 levels, respectively.

6.3.2 Mobility

Mobility is the most important paradigm that symbolises communication in the context of lifestyle transformation today. An increasing number of digital devices are equipped with mobility, including smartphones, tablets, wireless LANs and others. According to the Information Services Department (2004), mobile density in Hong Kong is one of the highest in the world, because free Wi-Fi connections are available in most public places and public transport (such as parks, streets, MTR stations and buses). Figure 6.18 shows free Wi-Fi hotspots in a Hong Kong MTR station, on a bus and on the street. Hong Kong people and visitors are able to use their smart mobile devices everywhere.

Figure 6.18 Free Wi-Fi connections are available in Hong Kong public spaces

Both locals and visitors are able to connect to the network via smart mobile devices anytime and anywhere. In this regard, free wireless LAN and 3G/4G mobile data services increasingly become a determinant for using smart mobile devices, which assists spatial

mobility, as temporal mobility saves time. In fact, these benefits help people to overcome the constraint of location and provide a promise of efficiency resulting from mobility.

The MTR is a public place in which a large number of smart mobile device users gather. The participants in the focus group indicated that they frequently used their smartphones in the MTR, but their user behaviour and preferences were diverse. Based on the findings in section 5.2.4, listening to music, browsing for news, chatting with friends and browsing social media are typical actions of Hong Kong young people in the MTR.

The participants also mentioned that most Hong Kong young people like playing games on the MTR to release pressure or kill time. The MTR is more stable than a bus, so it is easier for users to use smartphones. Figure 6.19 shows that in the crowded Hong Kong MTR, most passengers use smartphones to avoid embarrassment, and they create an abstract private space for themselves and avoid interactions with others.

Figure 6.19 Passengers using smartphones on the MTR

Hong Kong's young people like to use streaming media while on the road; they spend a long time on the journey to work and smartphones make the long journey more fulfilling. Most people will take a portable battery charger in case their smartphone powers off, or if they undertake frequent outdoor activities.

In public places such as the MTR or bus, young people spend their time on various social networking applications, games and streaming media. This kind of behaviour means that people create a new space that separates them from strangers and helps to kill time (Siu & Zhao, 2013); they escape from the physical place to a virtual world they have built themselves. The mobile device has introduced a new kind of abstract space in which people can amuse themselves with their interests and needs, instead of a substantial space with rigid constraints. Thus, mobility has built a link that mediates some of the conflict between recreation and banality in our daily lives.

The context of smart mobile devices is the most significant factor for understanding the social consequences for our society. The contextual mobility described here denotes free communication that emphasises instantaneity and richness. Smartphones offer an opportunity for communication without any constraints. For example, most people view their favourite news sites and search for interesting information via their smartphones in the MTR on the way to work. Even when people are at home, they are likely to use smartphones to search for information and chat with friends, because laziness traps people in more comfortable places, such as their beds, sofas or recliners. The friends-and-family context is an important aspect of the usage of smart mobile devices. Most people use mobile devices to maintain their social networks to make their MTR journey more fulfilling. In fact, the mobility of smart mobile devices can completely fulfil human needs because it allows people to spend fragments of time communicating and conversing with friends whenever they want. For young people, mobility has a meaning other than communication: they use mobile devices to preserve or manage their privacy outside their parents' supervision. In other words, young people try to obtain freedom from family control via smart mobile devices.

It should be mentioned here that people have long used various forms of media, from books and newspapers to the Walkman and Discman, to carve out a 'private arena' when they are in public spaces, and such media usage has long been carried out strategically to avoid communicating with others. Certainly, the degree to which young people focus on their smartphones may be much greater than the focus on other media in the past, hence the general need for this study.

In short, mobile technologies are sold on the basis that they provide ‘anytime, anywhere’ connections, whether those connections are via voice or (increasingly) data (Green &Harvey, 1999). They create a new kind of abstract space with a freedom that others cannot access or control.

Table 6.10reports the factors that influence the responses of survey respondents based on Model 2. As only 332 respondents disclosed their income information, the number of observations used in the regression is 332. The adjusted R-square of the regression is 0.0566, which indicates that the model does not fit well; however, the significance of some independent variables is still interesting. According to the *p*-values and parameter estimation, attachment and education are of particular interest. Attachment is a significant factor that influences feelings of mobility, and the economic magnitude and statistical significance of the dummies constructed by attachment increase with the increase of attachment to the smartphones. To be specific, the feeling of mobility brought about by smartphones is highest for the respondents who rely most heavily on their smartphones, and second highest for the respondents who feel uncomfortable without their smartphones. In addition, although the dummies of education are moderately significant, it is notable that the parameters display a concave property. In other words, the feeling of mobility increases with the increase of level of education at first, peaks at junior college level and then decreases with further increase in level of education; junior college and undergraduate respondents felt most mobility from smart phones.

Table 6.10 Results of the factor model on mobility

	DV= the degree of mobility	
Variable	Coefficient	*p*-Value
Intercept	0.894	<.0001
Usage_2	-0.159	0.2296
Usage_3	-0.071	0.5677
Usage_4	0.021	0.8639
Usage_5	-0.048	0.6903
DUsage_2	0.191	0.1787
DUsage_3	0.192	0.1708

DUsage_4	0.170	0.2243
DUsage_5	0.161	0.2514
Freq_3	-0.068	0.2290
Freq_4	-0.039	0.4905
Freq_5	-0.069	0.3131
Freq_6	-0.049	0.6682
Attachment_1	0.163*	0.0186
Attachment_2	0.119	0.0732
Attachment_3	0.051	0.4857
Gender_M	-0.001	0.9655
Age_2	-0.071	0.5451
Age_3	0.040	0.2524
Student_Y	0.052	0.1499
Education_2	0.202	0.1329
Education_3	0.227	0.0615
Education_4	0.214	0.0707
Education_5	0.185	0.1226
Education_6	0.180	0.1798
Income_2	0.069	0.0266
Income_3	-0.005	0.9324
Income_4	0.020	0.7516
Income_5	0.017	0.8980
Observations	332	
Adj. R-square	0.0566	

Note: This table shows the factors that significantly affect users' mobility in smart communication. The OLS estimation method was used. Variables are defined in Appendix 3. ***, ** and * indicate significance at the 0.001, 0.01 and 0.05 levels, respectively.

6.3.3 Efficiency

In this information age, efficiency is essential for young people, especially in Hong Kong. Speed means everything and young people always need to compete with time (Siu, 1999). Smartphones are embedded into their daily lives, not just for communication, but also as a tool to improve their working efficiency.A new technology revolution is reshaping lifestyles and work schedules all over the world. Mobile Internet is speeding up work efficiency and revolutionising communication. Smart mobile devices offer some additional nice touches, such as the ability to alert people to bad weather the night before an appointment, track shipments and merge duplicate contacts. Perhaps their best feature is the ability to show people their completed tasks and the amount of time saved by using the service.

Figure 6.20 People often spend fragments of time (e.g., on the metro or bus) to use smart mobile devices to improve their work efficiency.

Mobility is a feature that obviously promotes efficiency in our daily lives. As stated above, the mobility of smart mobile devices attempts to break through the constraint between time and place. In some ways, it has improved people's productivity and increased the speed of everyday life. For instance, the emoticons in most smart mobile devices exemplify highly efficient communication. Emoticons actually present an evolution of communication, as they strive to visualise our feelings and emotions and enrich

conversation by supporting the text and characters; consequently, people can completely understand the meaning of a message in a short amount of time.

Emoticons are normally used within virtual communication to represent verbal cues but to perform non-verbal communication functions. They provide a rich visualisation of information. In everyday life, information transmission typically relies on verbal communication; however, the failure to express real emotions or feelings may cause misunderstandings. As such, efficient face-to-face communication usually requires people to visualise their facial expressions and body language, and to convey emotions through tone of voice. Although some people feel closer when communicating through instant messaging, messages without emoticons may make information impenetrable. In the absence of emoticons, people may need to re-read messages to understand them. This process affects the efficiency of communication and undermines communication quality. Emoticons offer a means of visualising language and information through anthropomorphic elements to compensate for the inability to convey non-verbal information in virtual settings. This additional communicative tool makes messages richer than those containing only text and characters. Emoticons not only offer clues to the intended meaning of words, but may also compensate for the deficiencies of virtual interaction, improving the efficiency and quality of communication. Indeed, efficiency is highly valued in the modern world, with the demand that every virtual message be understood in the shortest time possible. As Bruce (male) said, ‘I use emoticons mainly to increase the efficiency of communication’. Similarly, Helen (female) reported that ‘emoticons help me to reply quickly during virtual conversation’. Most of the participants were able to rapidly interpret a large number of symbols representing feelings or emotions. The emoticons were found to convey more than text alone, thus increasing the efficiency of information transmission.

It is difficult to express one’s actual emotions in a virtual message; recipients sometimes misunderstand senders’ feelings or meanings. The findings of this study revealed that emoticons are often used to avoid such misunderstandings. Emoticons are not only fun to use, but may increase the accuracy of the information conveyed and improve the efficiency and effectiveness of communication. Although some emoticons cannot fully convey emotions, their small size and great variety enable them to be easily combined

with text and characters. The resulting messages reflect meanings and express feelings more precisely than text alone.

As reported in this section, we also attempted to determine whether users find emoticons to clearly reflect their personal mood during communication (i.e. the accuracy attribute of emoticons). We defined ‘accuracy’ as the extent to which a message sender believed that emoticons helped them to express the desired message. Perceived accuracy was measured using Q. 11, as follows. ‘Do you think that emoticons clearly reflect your personal mood during communication?’ The responses were given on a scale ranging from 0 (strongly disagree) to 5 (strongly agree). The participants were not aware that we were examining the construct of accuracy. They provided information based only on the terms of the question.

In response to Q. 11, 38.62% of participants strongly agreed and 44.09% agreed that emoticons clearly reflected their mood during communication. In short, the accuracy of information transmission was regarded as important by a large proportion of the users, who demanded a lot from emoticons in terms of their ability to enhance communication and expression. Misunderstandings can be avoided by using emoticons in messages, which help the user to convey more information in a shorter space of time. Emoticons can also reflect personal emotions and feelings and enable people to distinguish jokes from other types of message content. Indeed, a number of emoticon characters are regularly used to make jokes during virtual communication. However, making jokes without communicating emotions has the potential to create a negative mood and/or cause embarrassment and misunderstanding. Using emoticons helps people to accurately identify humour. The inclusion of emoticons helps readers to better understand the emotional content and context of an online message (Tossell et al., 2012).

Panel A of Table 6.11 reports the factors that influence the efficiency brought about by smart mobile devices, based on Model 2. As only 332 informants disclosed their income information, the number of observations used in the regression is 332. The adjusted R-square of the regression is 0.0860. According to *p*-values and parameter estimation, gender, education and attachment are of particular interest. Although the variables of education are not all statistically significant, the significance and economic magnitude of

education dummies display a convex influence on efficiency. In other words, the efficiency brought about by smart mobile devices decreases with an increase in the level of education at first, is lowest at postgraduate level and then increases. Attachment is also a significant factor that influences the respondents' sense of efficiency, and the economic magnitude and statistical significance of the dummies constructed by attachment increase with an increase in attachment to smartphones. To be specific, the sense of efficiency engendered by smartphones is highest for respondents who rely heavily on their smartphones, and second highest for respondents who feel uncomfortable without their smartphones. Another interesting point is that gender affects the sense of efficiency brought about by smartphones. The significantly positive parameter of Gender_M indicates that male informants feel a greater sense of efficiency from smartphone use.

We used ordinary least squares (OLS) estimation to identify factors that significantly affected users' perceptions of the accuracy of communication via emoticons in Table 6.11, Panel B. People who used mobile telephones more often (Hrs_of_Dailyuse) were more likely to believe that emoticons clearly reflect a user's personal mood during communication. Female users were more likely than male users to believe that emoticons improve the accuracy of communication, as indicated by the significantly negative coefficient on Gender (coefficient = -0.134, *p*-value = 0.124). Younger users were more likely to believe that emoticons improve the accuracy of communication, as indicated by the significantly negative coefficient on Age (coefficient = -0.134, *p*-value = 0.021). We also found that social-application type had no influence on users' perceptions, as indicated by the insignificant coefficients on *QQ*, *WhatsApp* and *WeChat*.

Table 6.11 Results of the factor model on efficiency

Panel A : Factors that affect users' efficiency in smart communication		
	DV = the degree of efficiency	
Variable	Coefficient	*p*-Value
Intercept	0.847	0.0001
Usage_2	-0.023	0.8748
Usage_3	-0.080	0.5525
Usage_4	-0.046	0.7261

Usage_5	-0.067	0.6082
DUsage_2	0.030	0.8454
DUsage_3	-0.038	0.8030
DUsage_4	0.008	0.9559
DUsage_5	0.005	0.9725
Freq_3	0.024	0.6899
Freq_4	0.011	0.8561
Freq_5	-0.100	0.1757
Freq_6	0.033	0.7919
Attachment_1	0.359***	<.0001
Attachment_2	0.280***	0.0001
Attachment_3	0.192*	0.0163
Gender_M	0.056	0.0553
Age_2	-0.028	0.8253
Age_3	0.018	0.6339
Student_Y	-0.010	0.8046
Education_2	0.239	0.1011
Education_3	0.263	0.0459
Education_4	0.265	0.0403
Education_5	0.116	0.3749
Education_6	0.185	0.2029
Income_2	0.047	0.1656
Income_3	0.018	0.7729
Income_4	0.041	0.5541
Income_5	0.088	0.5423
Observations	332	
Adj. R-square	0.0860	

Panel B: Factors that affect users' beliefs that emoticons can improve the accuracy of communication (and thus affect users' efficiency)

Variable	DV = the degree of accuracy	
	Coefficient	*p*-Value
Intercept	3.835***	<.0001
Hrs_of_Dailyuse	0.134***	0.001

Yr_of_Use	-0.019	0.600
Gender	-0.134	0.124
Age	-0.134*	0.021
Edu	-0.002	0.967
QQ	0.118	0.674
WhatsApp	0.109	0.813
WeChat	0.192	0.482
Observations	347	
Adj. R-square	0.0661	

Note: Panel A shows the factors that significantly affect users' efficiency in smart communication. The OLS estimation method was used. Variables are defined in Appendix 3.

Panel B presents the factors that significantly affect users' beliefs that emoticons can improve the accuracy of communication. The OLS estimation method was used. Variables are defined in Appendix 4.

***, ** and * indicate significance at the 0.001, 0.01 and 0.05 levels, respectively.

6.3.4 Coordination

Coordination is a clearly a common activity for mobile professionals. In practice, people often make appointments, arrange visits, manage schedules and synchronise activities. The need to coordinate activities is a basic social function, especially in contemporary society, which is characterised by dispersed residential locations, car-based transport and complex activity patterns. The need to manage and coordinate daily schedules and consolidate tasks and activities that require coordination generates the impression that the pace of everyday life is increasing. Consider James's (male) daily schedule:

> In the morning, the first thing I do is go to school. After arriving at school at 9 o'clock, I check my email via the smartphone to learn whether there is a need to meet my tutor and have breakfast. I make a schedule for tomorrow. I have lunch at 12 o'clock. After I book a table via smartphone, I have a lunch date with my friends. I prefer to

schedule my agenda with my smartphone, because it will remind me of forthcoming events.

Given the complex affairs of our modern world, the smartphone serves as a helpful coordination tool because it makes daily life more systematic. As the smartphone becomes ubiquitous, it competes with and supplements time-based social coordination (Ling, 2004). Calendars, cameras, alarms, online banking and browsers are all integrated in one device. These kinds of tools support many people to decrease the contextual constraints encountered while being mobile. During their waiting time, many people use smart mobile devices to coordinate, collect information and monitor the work of subordinates in the office. They may also use them for personal purposes to balance their personal life and work life. The Internet connection through mobile devices allows people to work at any location and any time. For this reason, the border between life and work is becoming eliminated (Wajcman et al., 2008).

Mobile-based coordination using smartphones changes real-time coordination through the use of instant messaging, voice calls, email, browsing and apps. These attributes have the potential to lead mobile professionals to finesse their schedules. For instance, when planning a business meeting, the smartphone can be used to make an appointment and determine whether the meeting can take place. If the interaction is not too complicated, communication via a smartphone can replace a face-to-face meeting, thereby according the smartphone an equivalent function. *Coordination* was the most frequently mentioned word, often repeated by the participants, in reference to the internal and external management achieved through smartphones. Smart mobile devices have varied functions to assist people’s everyday lives and to coordinate various activities to form a cohesive structure.

Figure 6.21 Hong Kong taxi drivers use several smart mobile devices to coordinate their work every day.

Table 6.12reports the results of an investigation of the factors that influence the coordination brought about by smart mobile devices based on Model 2. As only 332 informants disclosed their income, the number of observations used in the regression is 332. The adjusted R-square of the regression is 0.1156. According to the *p*-values and parameter estimation, gender and attachment are of particular interest. Gender affects the sense of efficiency brought by smartphones. The significantly positive parameter of Gender_M indicates that male participants think that smart mobile devices help to coordinate their life and work more than female participants. Attachment also significantly influences the participants' sense of coordination, and the economic magnitude and statistical significance of the dummies constructed by attachment increase with increasing attachment to smartphones. To be specific, coordination brought about by smartphones is highest for those participants who rely the most on their smartphone and second highest for the participants who feel uncomfortable without their smartphone.

Table 6.12 Results of the factor model on coordination

	DV = degree of coordination	
Variable	Coefficient	*p*-Value
Intercept	0.725	0.0036
Usage_2	-0.104	0.5235
Usage_3	-0.184	0.2284
Usage_4	-0.063	0.670
Usage_5	-0.079	0.5977
DUsage_2	0.165	0.3454
DUsage_3	0.164	0.3410
DUsage_4	0.212	0.2174
DUsage_5	0.202	0.2429
Freq_3	-0.113	0.1050
Freq_4	-0.083	0.2343
Freq_5	-0.162	0.0532
Freq_6	-0.109	0.4440
Attachment_1	0.467***	<.0001
Attachment_2	0.356***	<.0001
Attachment_3	0.267**	0.0034
Gender_M	0.084*	0.0109
Age_2	0.057	0.6912
Age_3	0.026	0.5438
Student_Y	0.008	0.8630
Education_2	0.055	0.7387
Education_3	0.151	0.3103
Education_4	0.177	0.2256
Education_5	0.102	0.4900
Education_6	0.036	0.8261
Income_2	-0.016	0.6841
Income_3	-0.117	0.0950
Income_4	-0.072	0.3655
Income_5	0.003	0.9854

Observations	332
Adj. R-square	0.1156

Note: This table shows the factors that affect users' coordination in smart communication. The OLS estimation method was used. Variables are defined in Appendix 3. ***, ** and * indicate significance at the 0.001, 0.01 and 0.05 levels, respectively.

6.3.5 Sociability

As the smartphone is a tool of communication, the user experience of the smartphone should be intertwined with issues of sociability (Swallow et al., 2005). A range of social relationships are maintained or managed by smartphone (Green & Haddon, 2009). Individuals' using behaviour in terms of communication technology cannot ignore their contact partners (Markus, 1987). People's interactions using technical services is a key component of online community success and the sociability effects for individuals (Balasubramanian & Mahajan, 2001; Preece & Maloney-Krichmar, 2003). People build personal networks in the virtual world. With the development of technology, young people's everyday communication is increasingly reliant on social networking apps, instant messaging or other media. Smart mobile devices have become a key means through which young people mediate their social relationships (Osgerby, 2004). New technologies decrease the cost of communication, and increase the size of people's social circles. Indeed, smart mobile devices provide young people with a new way to know the world and to know strangers.

Some instant communication apps are location-based social networks, meaning that people can search for friends among nearby people anytime and anywhere. As a result, social networking can have a positive effect by extending sociability. One can easily search for long-lost friends and review their life profiles to make a closer connection.

Making friends with strangers instantly achieves rapid communication and social interaction. In addition, the emoticons in a number of social applications increase positivity in human interactions and sociability. According to the participants in the focus

group, most people prefer to use more positive emoticons, signifying happiness, to maintain a stronger continuity of communication and to enrich the content of the conversation. Because the emoticons in virtual communication are able to express more feelings and emotions than a person is able to express in a formal situation, people enjoy the conversational atmosphere and interesting topics with friends via their smart mobile devices. Mobile social networks are already creating new forms of social behaviour that blur the distinctions between online and real-world interactions (Ziv & Mulloth, 2006).

The data confirmed that emoticons are an important component of mediated communication, and enhance people's everyday lives. We found a significant correlation between emoticon use and personal interaction, further emphasising the importance of sociability to mediated communication. The use of an emoticon is intended to accelerate mediated communication and eliminate some of the difficulty and awkwardness entailed by the use of words alone. Aided by emoticons, conversation is easier, more fluent, more interactive and more fun. Many people use emoticons sarcastically to express things that they cannot convey in person, thereby promoting personal interaction. The enjoyable experience of personal interaction via emoticons reinforces sociability in virtual settings. Most users forget about wealth, position, power, status and other burdens of real life. Instead, they playfully engage and interact with others, or play conversational games that increase conviviality, shared experience and emotional content. The emoticon also plays a role in everyday socialisation in terms of politeness and morality. For instance, emoticons that express the meanings 'hello', 'goodbye', 'thank you' and 'sorry' provide a mode of expression that is to a certain extent humble, friendly, courteous and comfortable, and which can be used to close the gap between face-to-face communication and virtual communication on smart mobile devices. This is consistent with the following statement made by Anny (female): 'I prefer to download emoticons that are polite. It's very interesting to try those emoticons, but I only send emotion stickers to acquaintances, because suitable emoticons make people feel comfortable'. Indeed, our research findings indicate that friendships develop more quickly when appropriate emoticons are used extensively during communication.

Table 6.13reports the factors that influence the sociability brought about by smart mobile devices based on Model 2. As only 332 participants disclosed their income information,

the number of observations used in the regression is 332. The adjusted R-square of the regression is 0.1002. According to the *p*-values and parameter estimation, education and attachment are of particular interest. Although the variables of education are not all statistically significant, the significance and economic magnitude of the education dummies increase as the level of education increases. In other words, the sociability brought about by smart mobile devices is higher when the education level of the respondents is higher. Attachment also significantly influences the sociability of the respondents, and the economic magnitude and statistical significance of the dummies constructed by attachment increase with increasing attachment to smartphones. To be specific, the sociability brought about by smartphones is highest for those people who rely most heavily on their smartphone and second highest for those who feel uncomfortable without their smartphone. Gender and other factors do not significantly affect the sociability brought about by smartphones.

Table 6.13 Results of the factor model on sociability

	DV = the degree of sociability	
Variable	Coefficient	*p*-Value
Intercept	0.737	0.0031
Usage_2	0.001	0.9939
Usage_3	-0.077	0.6143
Usage_4	-0.024	0.8741
Usage_5	-0.039	0.7924
DUsage_2	0.072	0.6821
DUsage_3	0.052	0.7649
DUsage_4	0.041	0.8109
DUsage_5	0.058	0.7372
Freq_3	-0.012	0.8653
Freq_4	-0.033	0.6334
Freq_5	-0.175	0.0372
Freq_6	0.034	0.8134
Attachment_1	0.358***	<.0001
Attachment_2	0.326***	<.0001

Attachment_3	0.124	0.1718
Gender_M	0.040	0.2257
Age_2	-0.080	0.5780
Age_3	0.013	0.7681
Student_Y	0.028	0.5285
Education_2	0.080	0.6290
Education_3	0.227	0.1298
Education_4	0.247	0.0914
Education_5	0.253	0.0876
Education_6	0.306	0.0645
Income_2	0.048	0.2155
Income_3	0.072	0.3036
Income_4	-0.036	0.6462
Income_5	0.056	0.7329
Observation	332	
Adj. R-square	0.1002	

Note: This table shows the factors that significantly affect users' sociability in smart communication. The OLS estimation method was used. Variables are defined in Appendix 3. ***, ** and * indicate significance at the 0.001, 0.01 and 0.05 levels, respectively.

6.3.6 Enjoyability

Nowadays, smartphones are more than a product that makes phone calls (Park & Lee, 2011). People can watch movies and listen to music, and as smartphones have an embedded Wi-Fi and 3G/4G function, users can easily connect to the Internet and read the latest news and social network sites. A smartphone is like a portable computer, shifting the experience of a traditional mobile phone and bringing us enjoyability.

Smart mobile devices can replace game consoles, and have convenient functions for mobile games, which is also an important requirement for Hong Kong young people. Quite a few young people use smartphones or tablets to play games on public transport. Figure 6.22 shows a young man in a mini bus who is even using three smartphones to

play mobile games at the same time, illustrating Hong Kong young people's enthusiasm for mobile gaming. Compared to static game consoles like PlayStations, mobile games are much easier to access. As mobile gaming devices are becoming more popular mainstream products (Davidsson et al., 2004), more enjoyability is brought about by smart mobile devices and they make people's lives more colourful.

Figure 6.22 A gamer plays mobile games on the mini bus

Using a smartphone is refreshing experience that helps relieve stress (Chun et al., 2012). In a city that is rapidly developing, Hong Kong young people are always under tremendous work and life pressure. Smart mobile devices, especially smartphones, can be a recreation tool after work and can be used at anytime, anywhere.

Panel A of Table 6.14 reports the factors that influence the sense of enjoyment brought about by smartphones based on Model 2. As only 332 informants disclosed their income information, the number of observations used in the regression is 332. The adjusted R-square of the regression is 0.0919. According to the *p*-values and parameter estimation, education and attachment are of particular interest. Although the variables of education

are not all statistically significant, the significance and economic magnitude of the education dummies display a convex property. In other words, the sense of enjoyment brought about by smart mobile devices first decreases with the increase of the education level of the respondents, is lowest for postgraduate respondents and then increases with the level of education. Attachment also significantly influences the respondents' sense of enjoyment, and the economic magnitude and statistical significance of the dummies constructed by attachment increase with increasing attachment to smartphones. Specifically, the sense of enjoyment brought about by smartphones is highest for those respondents who rely most heavily on smartphones, and second highest for those who feel uncomfortable without their smartphone. Gender and other factors do not significantly affect the sociability brought about by smartphones.

The findings of this study indicate that the ease and enjoyability of emoticon use are important determinants of both the intention to use and the actual use of these symbols. Most emoticons are aesthetically pleasing, convey amusement or happiness and are very easy to select during conversations on smart mobile devices. When people enjoy the communication process, they tend to use emoticons more frequently and respond more quickly, thereby making conversation between friends more active. The enjoyment experienced during virtual communication usually stems from emoticons that represent positive emotions and feelings. Most people like to use a number of emoticons in their messages to keep the conversation vivid and fluid. Therefore, emoticons not only facilitate communication but energise and enhance the atmosphere of communication.

The findings also indicate that the more frequently people use smartphones in their daily lives, the more strongly they feel that emoticons make conversations enjoyable. Table 6.14 Panel B shows the factors that significantly affect users' enjoyability of using emoticons. The more often people used their mobile telephones (Hrs_of_Dailyuse), the more they enjoyed using emoticons. Gender did not play a significant role in explaining enjoyability (coefficient = -0.032, *p*-value = 0.675). Younger users enjoyed using emoticons more, as indicated by the significantly negative coefficient on Age (coefficient = -0.127, *p*-value = 0.014). We also attempted to determine whether the type of social application used affects the extent to which users enjoy using emoticons. The choice of

social application did not affect the degree of enjoyability, as indicated by the insignificant coefficients on *QQ*, *WhatsApp* and *WeChat*.

Table 6.14Results of the factor model on enjoyability

Panel A : Factors that affect users' enjoyability in smart communication		
	DV = degree of enjoyability	
Variable	Coefficient	*p*-Value
Intercept	0.777	0.0001
Usage_2	-0.022	0.8666
Usage_3	0.043	0.7293
Usage_4	0.025	0.8357
Usage_5	0.019	0.8738
DUsage_2	-0.093	0.5101
DUsage_3	-0.074	0.5923
DUsage_4	-0.101	0.4674
DUsage_5	-0.047	0.7338
Freq_3	0.023	0.6788
Freq_4	0.020	0.7242
Freq_5	0.016	0.8148
Freq_6	0.044	0.7027
Attachment_1	0.355***	<.0001
Attachment_2	0.317***	<.0001
Attachment_3	0.202	0.0059
Gender_M	0.013	0.6283
Age_2	0.021	0.8540
Age_3	0.002	0.9428
Student_Y	0.009	0.8029
Education_2	0.188	0.1587
Education_3	0.264	0.0285
Education_4	0.260	0.0277
Education_5	0.225	0.0591
Education_6	0.301	0.0244

Income_2	-0.053	0.0867
Income_3	-0.060	0.2862
Income_4	0.000	0.9943
Income_5	-0.016	0.9047
Observations	332	
Adj. R-square	0.0919	

Panel B: Factors that affect users' enjoyability when using emoticons

	DV = the degree of enjoyability	
Variable	Coefficient	*p*-Value
Intercept	3.886***	<.0001
Hrs_of_Dailyuse	0.139***	<.0001
Yr_of_Use	-0.012	0.708
Gender	-0.032	0.675
Age	-0.127*	0.014
Edu	0.050	0.239
QQ	0.044	0.861
WhatsApp	-0.004	0.993
WeChat	-0.074	0.761
Observation	347	
Adj R-square	0.0489	

Note: Panel A shows the factors that significantly affect users' enjoyability in smart communication. The OLS estimation method was used. Variables are defined in Appendix 3.

Panel B shows the factors that significantly affect the degree of enjoyability in emoticons use.OLS estimation was used. The variables are defined in Appendix 4.***, ** and * indicate significance at the 0.001, 0.01 and 0.05 levels, respectively.

Notably, the adjusted R-square value shown in Table 6.11(Table 6.14) revealed that only 6.61% (4.89%) of the variance in accuracy (enjoyability) was explained. However, the formation of a powerful determinant model was not the focus of our study. We leave this for future research. A low R-square is most problematic when the focus of the study is to produce precise predictions, but our study focused on whether common factors in our

survey were associated with users' emoticon use behaviour. Specifically, we attempted to determine whether certain common factors, such as age, gender and daily hours of mobile-device use, which constituted explanatory variables on the right-hand side of the regression, were related to emoticon use.

Furthermore, we explored male and female users' preferences regarding emoticon use. Table 6.15shows the logistic regression results. Most lovely-sticker emoticons were sent by females to enhance their friendships (coefficient = -1.200, *p*-value < .0001). There were no significant differences between males and females in the use of yellow-face emoticons, character-based emoticons, funny stickers or blessing stickers. However, females were more likely than males to display their feelings during virtual interaction with members of their social networks, as well as seeking to enhance the conversational atmosphere. Lovely-sticker emoticons were sometimes used simply as greetings, displaying users' personalities within the virtual setting. Supporting this finding, only 9.8% of the participants reported using greeting stickers. As previously mentioned, greeting emoticons are somewhat neglected in virtual communication because they tend to formalise conversations. Most people prefer to use funny stickers and lovely stickers, which can indicate the kind of friendship being developed, to express something similar to a greeting.

Table 6.15 Male and female relative preferences for using emoticons

Variable	DV = gender	
	Coefficient	*p*-Value
Intercept	-0.270	0.368
Yellowface	0.102	0.712
Char	0.384	0.272
Funny	0.189	0.443
Lovely	-1.200***	<.0001
Blessing	0.453	0.255
Observations	347	

Note: This table explores male and female relative preferences for using emoticons. A logistic regression was

used to estimate gender. Variables are defined in Appendix 4. ***, ** and * indicate significance at the 0.001, 0.01 and 0.05 levels, respectively.

6.4 Summary

This chapter examines six characteristics of smart communication and emoticon communication and indicates the factors that significantly influence these characteristics to give a better understanding of smart communication among young people in Hong Kong.

Communication mediated by the Internet or smart mobile devices is ‘virtual’ in the sense that no face-to-face interaction occurs. In face-to-face settings, people use non-verbal behaviour such as gestures and facial expressions to aid communication. These habits are replicated when using smart mobile devices to communicate virtually. Instant messaging based on words alone is not efficient because information is not vividly presented, making it difficult for readers to process the information. This deficiency in non-verbal resources necessitated the development of graphical symbols for non-verbal communication, which resulted in the increasing use of emoticons during communication via smart mobile devices. Through a simple combination of symbols, emoticons can express basic ideas and shorten the time needed to explain message meanings. During mediated communication, people use high-technology means to express their human senses, and emoticons are specifically used to convey human feelings and body language, blending fragmented text with emotion.

Emoticons also serve a transitional function, allowing users to jump between topics during mediated communication. In virtual environments, the emoticon not only helps to prevent awkward silences, but increases users’ enjoyment and enriches personal interaction. For example, the use of a ‘smiley’, which has positive connotations, allows people to continue their conversation naturally. In addition, network-based communication reflects psychological needs. People like to interact in ways that are similar to face-to-face communication. Our findings indicated that emoticons tend to shorten perceived communicative distance, making people feel more connected to one

another. Recipients wish to ‘see’ senders’ expressions and feelings, just as they do in face-to-face environments. Emoticons also make conversation more efficient due to their information richness. The use of emoticons during virtual communication improves the accuracy of the information transmitted. People can use the emoticons provided by instant-communication applications such as *WeChat* or *Line*, or create their own emoticons to compensate for the limitations of literal expression during virtual communication.

However, the use of emoticons may also have negative effects. For instance, poorly designed emoticons increase the likelihood of misunderstanding. The repeated use of emoticons whose exact meaning is unclear may reduce rather than increase communication efficiency. Overusing emoticons in messages may also confuse or disconcert the message recipient. The top three answers Q 15 (‘What are the disadvantages of using emoticons?’) were as follows: ‘excessive consumption of mobile data’, ‘excessive use of memory and storage’ and ‘too much spam’. This suggests that people are wearied by and resistant to the overuse of emoticons during communication.

The aim of the emoticon communication study was to investigate the influence of emoticons on the lifestyle of Hong Kong youth who engage in smart communication. The findings revealed that three main dimensions – sociability, enjoyability and efficiency) that can be used to describe people’s use of emoticons during daily communication.

Figure 6.23 summarises the effect of daily smartphone usage on sense of security. With an increase in daily use hours, the respondents’ feeling of security increases significantly. This effect is especially pronounced when the daily usage is less than 5 hours. This shows that the more people use their smart mobile device, the more they believe the device can give them a sense of security.

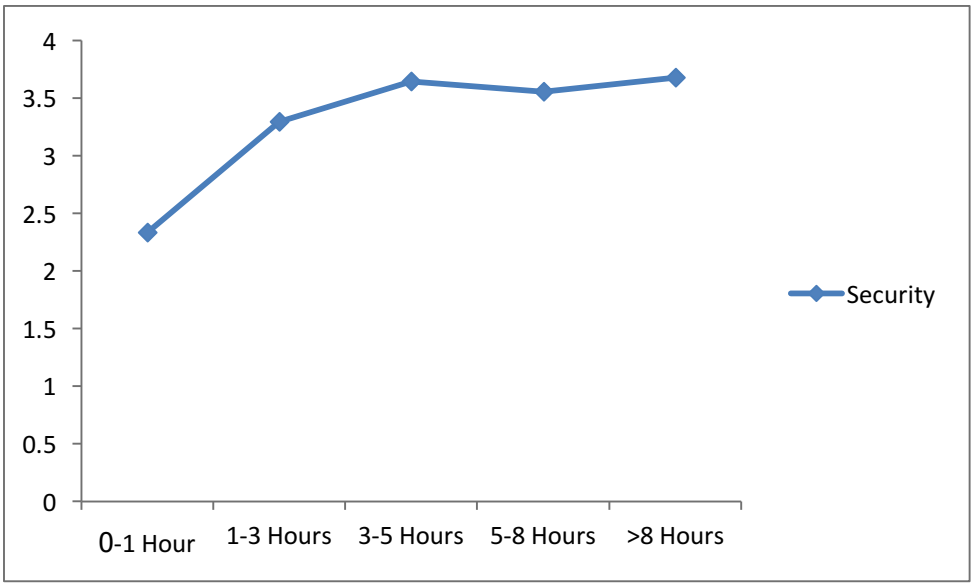

Figure 6.23 Effect of daily smartphone usage on sense of security

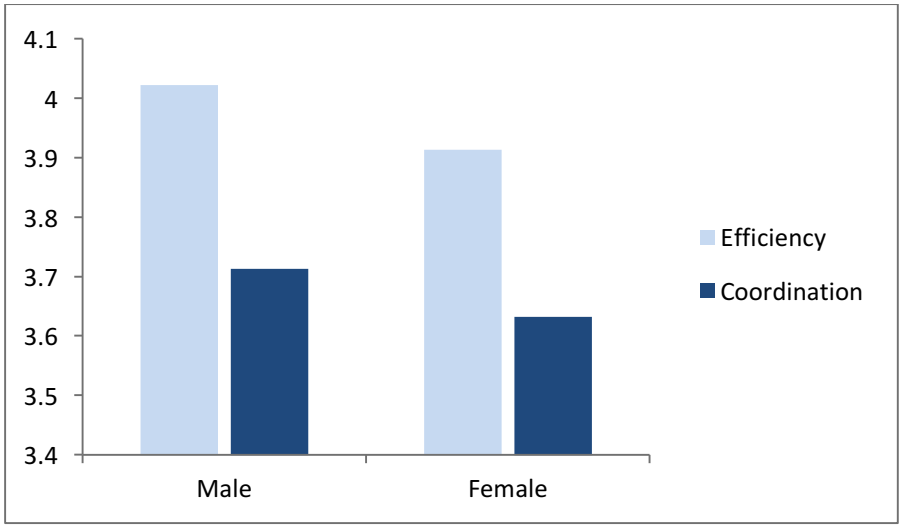

Figure 6.24Effect of gender on efficiency and coordination

Figure 6.24 illustrates the effect of gender on efficiency and coordination. In both aspects, male respondents have a higher sense of agreement than female respondents. This might be related to the occupations of the male respondents, i.e., males often have jobs that require efficiency and coordination.

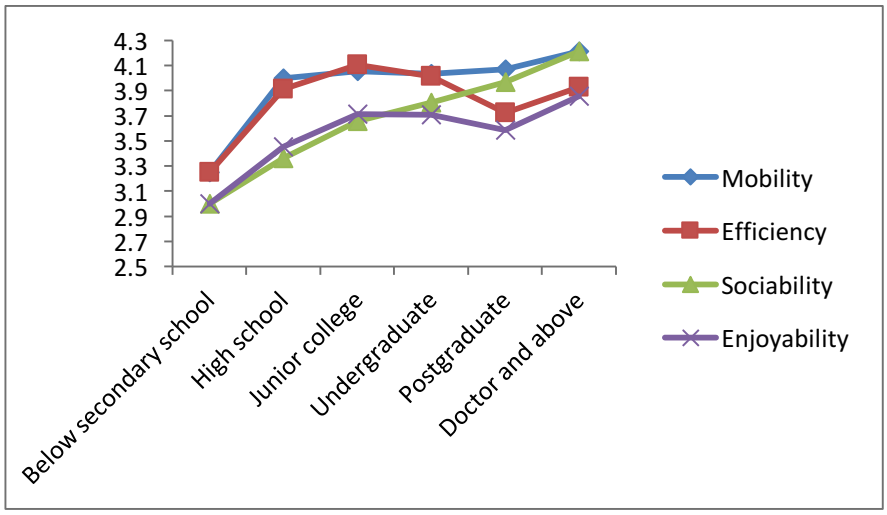

Figure 6.25 Effect of education on mobility, efficiency, sociability and enjoyability

Figure 6.25 shows the effect of education on mobility, efficiency, sociability and enjoyability. For mobility and sociability, the sense of agreement increases monotonically with the increase in education level, whereas for efficiency and enjoyability, the sense of agreement first increases with an increase in education level, then drops at postgraduate level, and increases again at the level of doctor and above. One explanation for the monotonic increasing effect of education on sociability is that people with higher education levels have a greater networking load and depend more on smartphones. In particular, for mobility, efficiency, sociability and enjoyability, the sense of agreement shows a huge jump with the increase of education before junior college, which indicates that junior college is an important education level at which people experience mobility, efficiency, sociability and joy from smartphones.

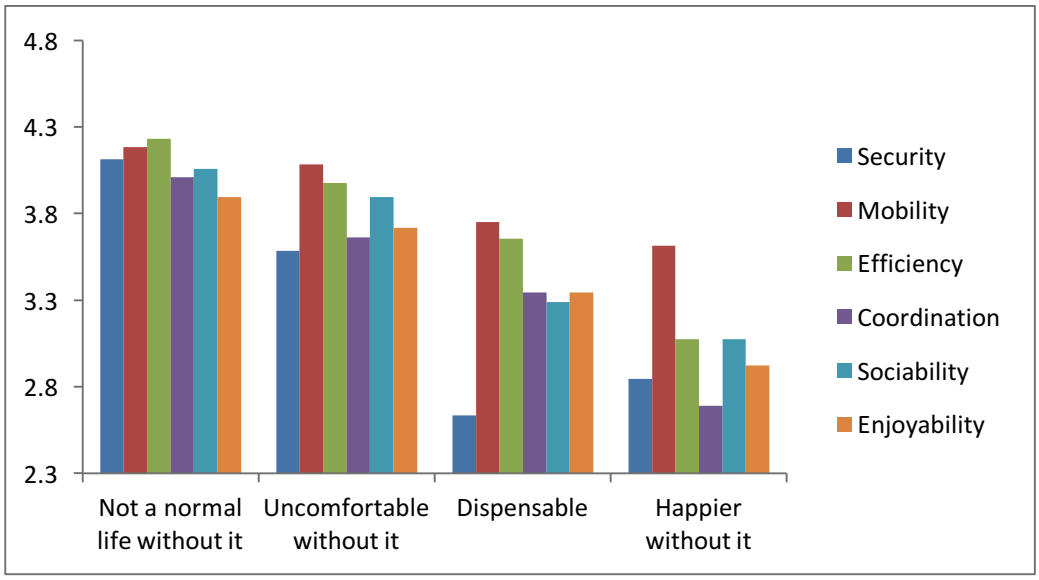

Figure 6.26 Effect of attachment to smartphones on security, mobility, efficiency, coordination, sociability and enjoyability

Figure 6.26 displays the effect of attachment to smartphones on all six aspects of smart communication. The sense of agreement decreases significantly for all six aspects with the decrease in attachment to smartphones. The more the respondents are dependent on smart mobile devices, the more they agree with all six characteristics.

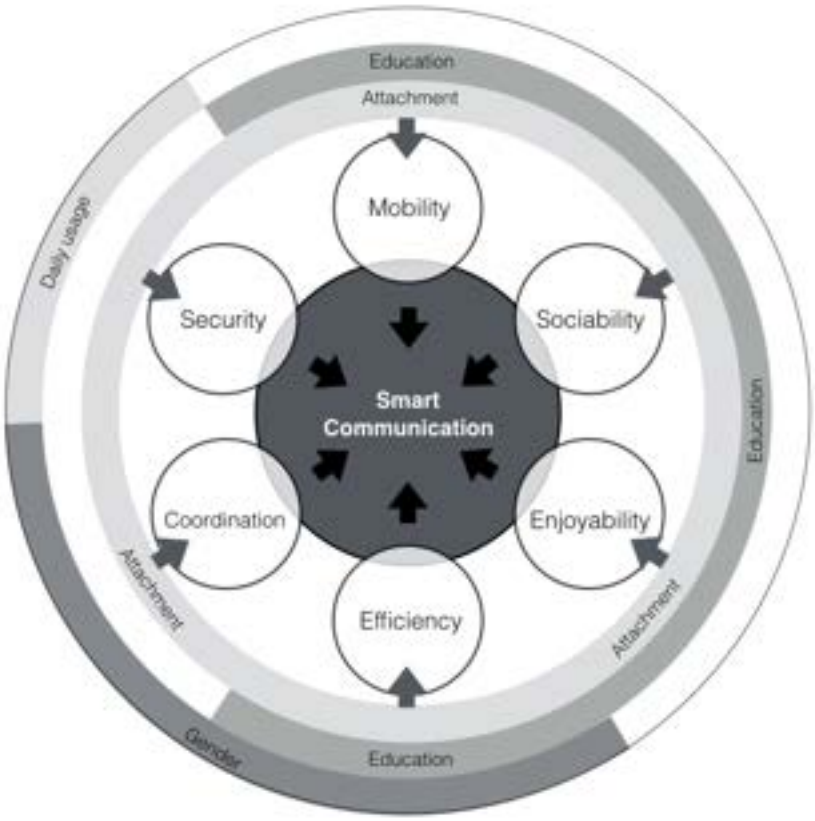

Figure 6.27 Framework of smart communication

Figure 6.27 shows the framework of smart communication generated according to the data analysed above. The six small circles are the characteristics of smart communication analysed in previous subsections. The outer circles are the significant factors that affect the six characteristics. Attachment is a significant factor that affects all of the characteristics; education affects efficiency, enjoyability, sociability and mobility; gender affects coordination and efficiency; daily usage time affects security. This theoretical framework describes the relationships among the factors and characteristics and summarises smart communication among Hong Kong's youth.

Based on the argument and discussion above, it can be concluded that everyday practice, encompassing lifestyle and behaviour, is a significant factor in understanding users and their needs, a process that begins by observing users in different situations (Karnowski & Jandura, 2014), understanding their goals and realising their desired ways of achieving those goals. This study has considered the ways in which people behave in mobile environments with homogeneous and stable technology. It has certainly demonstrated that

people’s predictions of their behaviour are vastly different from the way they actually behave in relation to technology. This study has further demonstrated that multiple factors are involved when users are confronted with a real situation.

There are concerns with the ways in which reflection influences the context of lifestyle transformation. These concerns led to the approach of using observation, surveys and focus groups to collect data as these approaches provide an opportunity to study the means by which individuals make sense of the user experience and behaviour. Six experiential categories representing the characteristics of smart communication have been suggested in this study: security, mobility, efficiency, coordination, sociability and enjoyability. A relational discourse and a framework of the six experiential categories generated different types of user behaviour that relate to our everyday lives and provides a new perspective on quality assurance to improve the design of smart communication. The research findings provide some illustration of the ways in which the six experiential categories can reveal design issues in terms of user experience.

CHAPTER 7 THE CHALLENGES AND INSPIRATION OF SMART COMMUNICATION

7.1 The Challenges of SmartCommunication

7.1.1 Current Issues of Overuse of Smart Communication

Although smartphones allow close interaction, some problems have started to appear. People are increasingly ignoring the world around them as they become obsessed with their smart mobile devices. The swift progress of mobile Internet technology and the availability of hundreds of thousands of applications have created the phenomenon of ‘smartphone addicts’ and the number of addicts is expected to grow.

As the use of smart mobile devices becomes increasingly ubiquitous, one area of particular concern is the fact that this phenomenon has led to a reduced ability to socialise face-to-face. Many researchers have already detected a negative correlation between the frequent use of smart mobile devices and face-to-face sociability. Many people have received complaints from their family members because they were spending less time together due to their heavy use of mobile devices.

Technology addiction can affect sociability negatively because people spend more time using mobile devices than socialising or devoting time to family. Sometimes the smartphone addict simply does not socialise with others effectively. This issue raises a series of social concerns about high-tech mobile devices and face-to-face sociability. It is an aspect of user experience that shows the perceptions that other people have of users of smart mobile devices.

The user behaviour and user preferences of Hong Kong’s young generation related to smart communication, and the lifestyle transformation brought about by smart communication, have been identified in this study. It was found that an increasing number of ‘smartphone addicts’ are obsessed with their smart mobile devices. Smart mobile devices add convenience but they have also created some new issues:

(1) People over-rely on smartphones and overlook face-to-face communication.

Smartphone owners are becoming increasingly reliant on their devices. A Google mobile consumer survey in Hong Kong showed that smartphone penetration had risen to 63% of the population, and 82% access the Internet every day, most of them never leaving home without their smartphone (Ipsos MediaCT, 2013). Smartphones can help people achieve multiple daily tasks, such as shopping, talking, watching TV, playing games, etc. However, over-dependence on mobile devices is reducing people's ability to have valuable face-to-face communication (Turkle, 2015). A survey by Chekwa and Daniel (2014, p. 81) found that 31% of respondents believe that people on cell phones are nearer to those far away than people in their immediate vicinity.

(2) Excessive smartphone usage and negative effects on study and work.

Checking a smartphone frequently can make people become anxious. In our study survey, 41.64% of the respondents believed that excessive smartphone usage led to them feel anxious, which will clearly affect their study and work. Some studies have shown that school performance can be lower due to IT addiction, and it brings family conflicts to work and work problems to home, as well as, in certain extreme cases, leading to depression and feelings of loneliness (Billieux et al., 2008; Caplan, 2002; Turel & Serenko, 2001). IT addiction undermines employees' work performance because of interruptions from mobile devices and an impaired ability to concentrate on work tasks (Chou et al., 2005). Similarly, a study by Serenko et al. (2009) found that smartphone addiction has resulted in many negative effects for users.

(3) Social skills have degenerated among young people because they communicate by text instead of verbally.

Young people who rely on smart communication grew up with smart mobile devices through their young adulthood. They are used to the networked culture and have become fluent with texting, connecting to their friends on *Facebook, Twitter* and all kinds of social apps (Turkle, 2011). Meanwhile, their verbal communication social skills degenerate gradually, and they prefer talking behind the smart mobile device, which enables unfettered networking. Srivastava (2005) argued that it is easier for people who are shy or who feel awkward in some situations to use texting for communication. The

more they avoid using verbal communication, the easier it is for their verbal communication ability to degenerate.

7.1.2 Existing Design Solutions

(1) Turning off social media alerts and notifications.

Every day we receive numerous alerts and notifications from different apps, mostly social media such as *Facebook*, *WhatsApp*, *WeChat* and *Twitter*. They can disturb our work or study as refreshing the pages and checking for news from friends becomes a habit. Turning off social media alerts and notification signs – the red dot – is one solution to avoid checking social media frequently.

Figure 7.1 The ‘mute for 1 hour’ feature of *WeChat*

Source: screenshot of *WeChat*

The popular instant messaging app *WeChat* launched a function called ‘mute for 1 hour’ (Figure 7.1) which stops *WeChat* reminders for an hour. This kind of function would survive the smartphone addicts.

(2) Uninstall social media applications.

Some respondents indicated that they would choose to uninstall some social media apps to avoid indulging in them every day. Although this is a method to control the usage of smart mobile devices, it will also cut off links with the outside world.

(3) Turn on the ‘do not disturb’ mode.

The iPhone has a function called ‘do not disturb’ with a moon-shaped icon. When you turn it on, all notifications including calls and messages will be disabled. This is quite useful for people who want to focus on work or study and do not want to be disturbed.

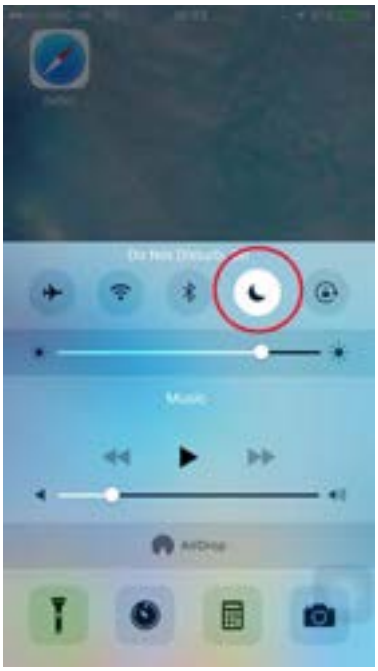

Figure 7.2 The iPhone’s ‘do not disturb’ mode

Source: screenshot of Apple iOS interface

(4) Record app usage time.

A record of the time spent using each smartphone app each day can be used to reflect on why so much time is spent on it. We spend a lot of time on the smartphone every day, often in fragments of time, but the frequency of looking at the smartphone is very high.

Using an app to track the cumulative amount of time using a smartphone lets phone addicts see if they have spent too much time on the smartphone and control the use of their time.

(5) Phone stacking game.

A game in which everyone stacks their phone in the centre of the table is an attempt to encourage people to actually interact with each other and avoid everyone being on their phones at gatherings. The person who picks up their phone first must pay the bill for all.

Figure 7.3 Phone stack

(6) Turn off Wi-Fi.

When people become used to searching for a Wi-Fi connection when they enter a public space, they focus on their smartphones rather than interpersonal communication. Some methods have been created to discourage this behaviour, such as the café sign saying, *No, we don't have Wi-Fi … TALK to each other!* (Figure 7.4), which has been widely shared online. It lets people rethink their current mobile communication behaviour.

Figure 7.4 ‘No Wi-Fi’ sign in a café

Source: http://trininista.blogspot.hk/2013/10/we-dont-have-wi-fi-talk-to-each-other.html

(7) Use feature phone instead of smartphone.

Some of the participants said they have been using feature phones instead of smartphones to avoid being disturbed by excessive Internet information. Although feature phones only support phone calls and messages, these simple functions already fulfil people’s fundamental needs to be in touch with others. We can see that excessive information has plagued people and an increasing number of messages are not necessary.

Table 7.1 classifies different methods of reducing smartphone use based on the three theoretical aspects of design defined by Norman (2004): visceral (perceptually based), behavioural (expectation based) and reflective (intellectually based).

Table 7.1Ways of reducing smartphone use, classified in three levels

	Visceral	Behavioural	Reflective
Turn off the social media update reminder signs		√	
Uninstall social media applications	√		
Turn on the ‘do not disturb’ mode		√	
Record each app’s usage time			√
Phone stack		√	
Turn off Wi-Fi	√		
Use feature phone instead of smartphone	√		

It may be assumed that because people are nowadays focusing more and more on their smartphones, they communicate face-to-face with others less frequently and a competition exists between online communication and offline communication. Whether this is necessarily the case needs to be considered. In fact, ‘too much online communication is detrimental to the construction and maintenance of meaningful interpersonal relationships’ was a theoretical proposition popular among scholars in the late 1990s, but it was quickly proven to be problematic because researchers generally found that offline and online communication complement each other. Smart communication gives people a good opportunity to maximise the advantages of new technology and improve the quality of user experience. The key consideration is whether people can balance the relationship between online and offline communication, or if excessive reliance on online communication does have a negative effect.

7.2 The Inspiration of Smart Communication

After discussing the context of smart communication and the pervasive interaction of daily life with new technology, we can understand that smart mobile devices already have

astounding effects on the lives of individuals and societies. Today, smart mobile devices are ushering in a new and intense phase of relationships between people and new technology. This section discusses the inspiration of smart communication, culture and technology as important key elements in the framework. Technology is a catalyst for change (Forlizzi, 2007) necessary for innovation, and culture determines user needs and design directions. The framework shows how different paths and cycles work together to make up the culture ∞ technology framework. The objective of this framework is to probe the underlying meaning of culture and technology in relation to smart communication.

The framework is based on the PSDS model discussed in Chapter 3 and extracts the four key elements of PSDS: people, society, device and service. Section 7.2.1 explains culture from the perspective of two paths describing how culture affects technology. Section 7.2.2 explains technology from the perspective of two paths describing how technology affects culture. Section 7.2.3 discusses the process of generating the framework. Section 7.2.4 shows the culture ∞ technology framework and its relationship with the study findings.

7.2.1 Two Paths of Influence from Culture to Technology

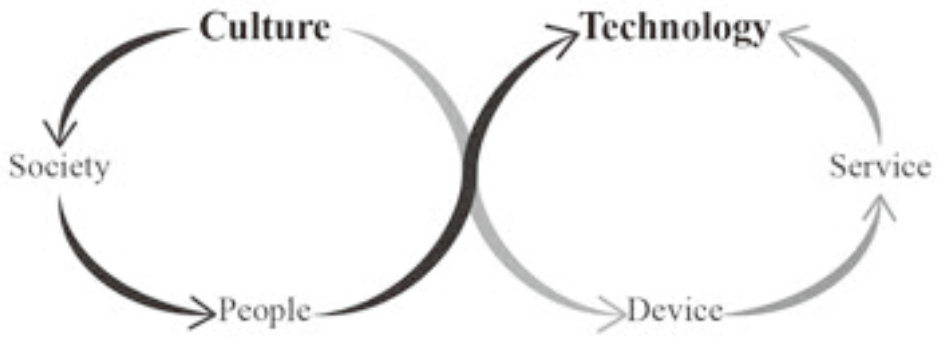

Figure 7.5Two paths of influence from culture to technology (Path CSPT and Path CDST)

Path CSPT (culture-society-people-technology)

Culture is an important tool for the management of societal and individual thinking. Playing an important role in human society, culture influences the politics, economy,

education and business of all humanity. It is the source of scientific and technological development and innovation as well as a determinant of the direction and objective of technological innovation. In human society, any defined culture is independent but also interrelated with other cultures. On the one hand, because of the division of social roles, location and age, cultures are relatively independent; on the other hand, due to the influence of business and education, culture has the feature of communicability, so they are interrelated. Several independent cultural symbols and interrelated cultural networks constitute the entire content of culture.

People become involved in the communication of culture through education and work, thereby linking relatively independent individuals and influencing their social life, thinking, beliefs, family lifestyle and living needs. Any culture thus defined can directly or indirectly affect any individual. Therefore, individuals can be affected by a similar culture and have the sense of identity about its symbols, forming groups which can be classified by social and commercial subjects. Technology development is an innovation activity using creative modes of labour brought about by behaviour that is focused on meeting new, different and unique needs of society. Therefore, the common cultural needs of social groups become the leading factor of technology development, and the social activities of the group become the basis for the background of technical innovation. Culture therefore affects the individual through his or her social network, and thus the individual who is affected by social culture drives technological innovation.

Path CDST (culture-device-service-technology)

As a cultural source of the social value of devices smart mobile devices have an evaluation function. First, the particularity of culture fundamentally determines the market value of a product or device. In a society with a particular cultural background, products or devices that do not follow the particularity of a culture or are incompatible with the cultural background of the target group are unable to obtain commercial value. Products or devices having higher cultural integration more easily gain market recognition. However, the device is essentially a medium providing services to people, and the way it fits people will directly affect service accuracy and precision. For instance, the product experience must fit a person’s cultural background and lifestyle. The

prevailing culture can direct service accuracy, improve the service pattern and create a better experience, accordingly fitting the culture of the user. In this path, the culture can be converted to concrete data through surveys. This can guide the integration of the device and improve the service. The service process is based on technology support. How to choose and combine existing technology or even manage the drive to create new technology will depend on the cultural environment. Thus, culture can make a reasonable judgement on the market value of technology development.

7.2.2 Two Paths of Influence from Technology to Culture

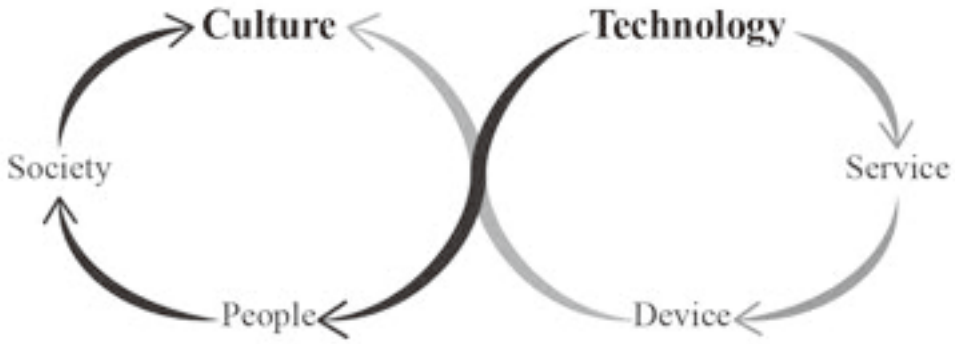

Figure 7.6Two paths of influence from technology to culture (Path TPSC and Path TSDC)

Path TPSC (technology-people-society-culture)

Technology promotes social productivity and changes methods of production and lifestyle. After technology is applied as a production tool, on the one hand, people need to learn advanced technical knowledge and update their knowledge structure. On the other hand, new technology will directly replace the existing old technical services and products, thus indirectly affecting people's lifestyle and experience. With societal acceptance and the application of new technologies, the new ways spread and are applied to associated social fields, such as Internet technologies, from military applications to business, education and personal relationships. Thus, technological innovation through product iterations gradually penetrates all aspects of society, promoting the innovation of the whole community. Culture follows society, and social changes will inevitably lead to cultural survival of the fittest. Decadent cultures have been abandoned and excellent cultures have advanced and evolved. The technology that has been affected by culture before, in turn

has changed the mode of social life. Hence, the meaning of a culture can survive in the new social production and influence the development of technology and innovation. For example, Internet culture has gradually replaced the handwritten culture and the culture of handwriting has become a kind of nostalgic culture.

Path TSDC (technology-service-device-culture)

The development of technology improves the efficiency of services. Advanced technology can help people cross time and space barriers, making the process of service consumption convenient and efficient. For instance, people can share digital documents rather than hard copies, and have online meetings rather than meeting in person. Therefore, the mobile device reduces consumption of resources and thus effects on the environment. Meanwhile, the risk for people's demands and burden is decreased. In the relationship between culture and experience, experience is the path to a cognitive culture. People gain a perceptual experience of a culture and are associated with certain cultures through interaction with products. Therefore, experience is an important tool for cultural transmission. As the terminal of experience, products become necessary for cultural transmission. Technology innovations provide a rich channel for cultural transmission and expand cultural diversity. In addition, different kinds of culture bridge the gap between different ideologies and expand the possibility of more effective communication. Focusing on technology in particular as the first condition of social, economic and trade exchanges, on the basis of promoting economic cooperation and achieving cultural exchange, illustrates yet another layer of meaning through which technology can refine culture.

7.2.3 The Relations between the Paths of Influence

Cycle C-T: Path CSPT (culture-society-people-technology) and Path TSDC (technology-service-device-culture)

The previous paragraphs discussed how the paths of influence between culture and technology are generated: first, culture affects technology generating Path CSPT; second,

technology affects culture generating Path TSDC. These two paths are interrelated and interact with each other.

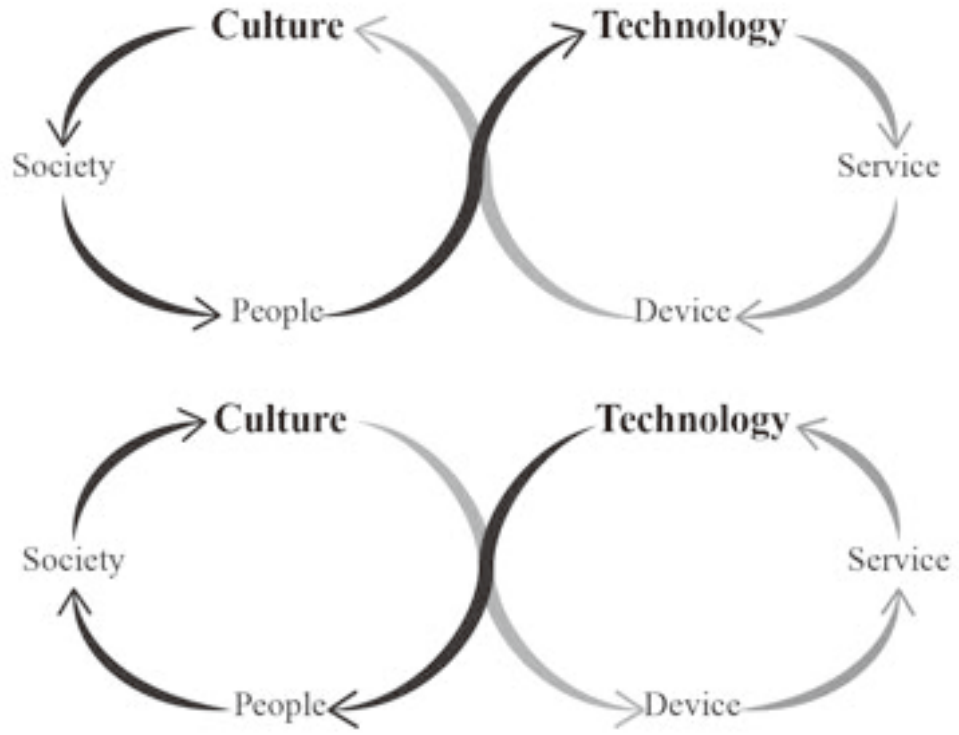

Figure 7.7The relation between the paths of influence (Path CSPT and Path TSDC; Path CDST and Path TPSC)

Path CSPT is a sufficient condition for Path TSDC to occur. On the one hand, people as developers of technology are enabled to become the dominant factor in the development of technology; on the other hand, people as users of technology give social value to technology innovation, making technology useful. These kinds of value are achieved by Path TSDC. The operation of Path TSDC is a necessary condition to ensure the continuous functioning of Path CSPT. Path TSDC decides the progress of productivity within human society, mainly on the progress of devices. Through devices, culture can be manifest by material products, thereby making the concept of culture perceivable, affecting social networks and people long afterwards. Path CSPT creates Path TSDC.

Such repeated effects give rise to continuous technological innovation led by culture, in turn promoting continuing cultural reinvention to promote new technological development. Path CSPT and Path TSDC make up Cycle C-T. This cycle is specific, direct and material. ‘Device’ is the main medium of the cycle.

Cycle T-C: Path CDST (culture-device-service-technology) and Path TPSC (technology-people-service-culture)

Path CDST and Path TPSC make up Cycle T-C. This cycle is abstract, indirect and conceptual. ‘People’ is the main medium of this cycle.

In Path TPSC, technology can change people’s behaviour, thereby changing society and culture. The fundamental concept is changing the way people live and work and promoting knowledge structure and social cognitive changes and updates, a process of people being domesticated by new technology. Because of the effect of lifestyle and social culture, the new culture decides the value of the device, such as usability and ease of use. As the new culture requires device improvement, service and technology are upgraded as well; these changes make Path CDST happen.

These effects mean that maturing technology can further effect lifestyle, including people’s social and workplace behaviour, further promoting the reaction of Path TPSC. Repeatedly, culture has been affected by technology and has evolved into new cultures by the incorporation of domesticated new technology, requiring higher standards of performance from devices and technologies.

7.2.4 The Culture ∞ Technology Framework

The whole process of influences between culture and technology is shown in Figure 7.8. Cycle T-C and Cycle C-T interact with each other. Culture affects the device, and services based on the device, and technology supports services and the device. Likewise, technology affects people, people are connected to society and culture is affected by society and people, developing the bidirectional relationship between culture and technology into infinity. ∞ signifies the relationship between culture and technology,

which is an infinite process. Thus, the framework is called a culture ∞ technology framework. The interaction of these two cycles facilitates culture and technology, constantly updating and generating new patterns.

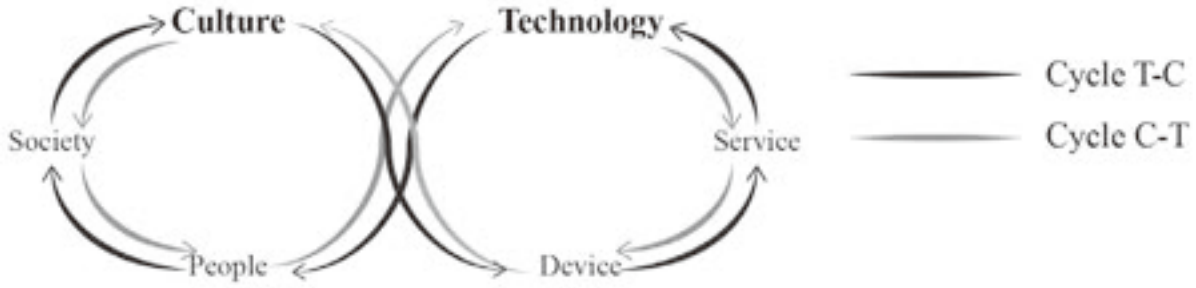

Figure 7.8The culture ∞technology framework

Meanwhile, the findings about the six characteristics of smart communication (security, mobility, efficiency, coordination, sociability and enjoyability) are reflected in the relationships between culture and device, technology and people. Because Hong Kong people often have a strong sense of time, this is an important cultural characteristic, so efficiency and coordination are determinants for Hong Kong people choice of device. Security and mobility show people's demands for the technology. Sociability and enjoyability are not only important factors related to technology and people, but also related to cultures and devices. These two factors represent the demands and lifestyle habits of the people of Hong Kong. The new pattern of communication constantly evolves with lifestyle transformation, which is influenced by technology and culture.

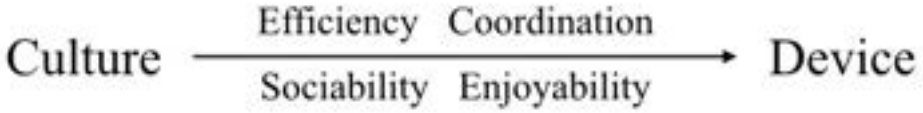

Figure 7.9 The relationship between culture and device

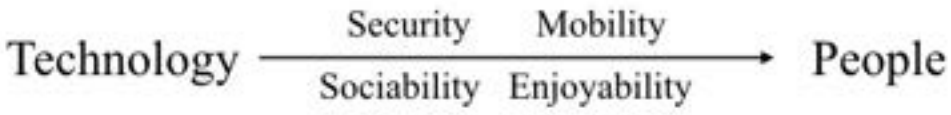

Figure 7.10 The relationship between technology and people

7.3 Summary

Based on this transformation of lifestyles, the characteristics of young people's smart mobile device usage behaviour are presented relating to participants' personal experiences, usage characteristics, feelings, emotions and subjective judgements. This study used in-depth qualitative methods to study the effect of smart communication in people's lifestyle. A common limitation of this approach is that it is not appropriate to draw a golden rule and general conclusion. However, the findings do generate some insights and inspiration for further exploration. Most people understand that using a smartphone is not polite when socialising with others, but they still cannot live without their smartphones, which have already become a part of their lives. The smartphone facilitates social interaction and the ability to participate in more social activities. Smartphones have turned into a secondary form of interpersonal communication that can extend social networks. People with a smartphone may belong to several social circles at the same time, so that they never feel alone and can join in the virtual communication space quite rapidly. People eagerly join in with the virtual space dialogue and this interaction shows that they want to get in touch with each other. Behind this means of daily communication is a desire to talk to and associate with others. However, technological changes also affect the negotiation of norms of response. The complicated and intriguing phenomenon of the continual negotiation of the norms governing interactions and responses via messaging services is reduced to the freedom of non-immediate response, which can be seen as a limitation of this study, and further investigated in further studies.

CHAPTER 8 CONCLUSION

8.1 Preamble

This chapter summarises the study and answers the research questions proposed in Chapter 1. The three research questions are formulatedand each answer follows. Finally, the limitations of the study and possibilities for further research are discussed.

8.2 Answering the Research Questions

8.2.1 Q1: What roles do smart mobile devices, especially smartphones, play in young people's daily lives?

People are dependent on smartphones; they are a tool to validate our existence. As a smartphone is just like a microcomputer, users have a mobile office in their pocket, and office mobility has grown at a dizzying pace. Mobile life has changed the way we communicate. It has added a freedom of movement that provides ease of use and a seamless connection to the social world (Kayastha et al., 2011). Smartphones are not just communication tools in young people's lives nowadays, they are more like life assistants to coordinate their daily lives. The roles smart mobile devices play in young people's daily lives include communication tool, social tool, entertainment tool, working assistant and life assistant. All of these roles are helped by the mobile Internet and technological advances. These roles also reflect the six characteristics of smart communication discussed in Chapter 5: security, mobility, efficiency, coordination, sociability and enjoyability.

As mentioned in Chapter 6, smartphones provide information, reinvent the transportation experience and also provide some peer services. They have already gone beyond the traditional communication function of a mobile phone. In the past, traditional mobile communication most often happened between two individuals at a time, but smartphones allow for smart communication patterns beyond one-to-one communication including various forms of 'mass self-communication' (Castells, 2009) occurring in many-to-many communication flows. The traditional-function phone used voice calls and SMS texting for strong ties (Ling et al., 2012). Nowadays, the smartphone can be used to support a larger network of weaker ties (Bertel, 2013a).

The smartphone has moved from being a mere ‘technological object’ to a key ‘social object’ (Srivastava, 2005). Smartphones enable more connection by social means. People turn to smartphones when they are bored, which happens because they have already become accustomed to a constant interested feeling from social connections, fresh information and entertainment. Turkle (2015) claims people only pay attention in class or meetings when they perceive interesting information; otherwise, they turn back to their smart mobile devices with the expectation of more interesting things.

Smartphones have unobtrusively changed and influenced people’s communication habits. As an example, for more and more young people, when they met a new friend, the first thing is not to exchange mobile phone numbers – they will ask for *WeChat* or *Facebook* account details first. Even though they never make a call, they interact on social media platforms, for instance by leaving a comment on a post. It is another kind of social interaction, which has become popular since people have had smartphones for smart communication.

The process of urbanisation lets people enjoy fast and advanced technology but creates social alienation at the same time. People hunger for emotion and look for a greater variety of communication methods, and mobile Internet satisfies these needs. Smart mobile devices combine multiple functions and make the means of communication more diversified.

8.2.2 Q2: How have smart mobile devices changed communication patterns and how does this affect the use of existing media?

Smart mobile devices bring a new lifestyle to people, and many behaviour patterns have been changed as people utilise the mobile Internet, including communication patterns, purchase patterns, entertainment patterns and journey patterns. This is inseparable from the development of mobile Internet and technological advances. People have more choices about ways to communicate, which is making communication more efficient and interactive. Sections 2.3 present the evolution of communication.

Before the age of the Internet, people found out the latest news from traditional channels such as newspapers, television and radio. When Internet media appeared, people started to get information through the new channels. Nowadays, the ways people obtain information and sources have become more diversified, and the channels not only include traditional media and Internet media, but also social media platforms such as *Facebook*, *WeChat* moments and *Twitter*. Young people in particular prefer to use social media platforms and mobile apps to get information and the latest news.

Section 2.3.4 discussed the relationship between traditional media and new media and considered that they will neither convergence nor replace each other, but rather intersect. Smart mobile devices, as the communication carriers of new media, facilitate more people to participate in content creation and become involved in more interactive communication online. Some existing media such as television are still important for people, who are already used to use these kinds of media. Smart communication clearly affects the use of existing media, and we can see some intersection between traditional media and new media. For example, an increasing number of TV performances use QR codes and the 'shake' function to interact with audiences nowadays, and audiences can use their smart mobile devices to participate in online lotteries or send messages on a bullet screen. This kind of new communication pattern is the encounter between new and traditional media. Smart mobile devices emphasise online communication, but online communication cannot replace face-to-face communication in the future. Smart communication is the trend of future communication and it accompanies traditional communication. People are enjoying the convenience of smart communication but not giving up traditional communication; the two should be balanced.

Smart communication has changed the pattern of society, and users/customers have begun to have an unprecedented strong and dominant place. In the past, users/customers were in an inferior position on the whole, and businesses in a position of relative strength. However, in the age of smart communication, customers have begun to develop strong power in the market economy. Consumers have the power of decision and the right of choice. Whoever can provide better products and service, as well as a better experience, will be chosen by consumers. Because of smart communication, customer loyalty is gradually decreasing. Nothing lasts forever, and if a customer wants to change to another

shop, he or she can just click on the screen. People will always want the best product, service and experience –this is a constant of human nature.

At the same time, in this open Internet environment, users/customers can by means of social media influence or change potential consumers. For instance, they can make comments about product quality, service or user experience via social media, and as a result better merchants will gain more positive evaluations, whereas evaluations of not very good products and services will influence the business reputation, for their improvement. The Internet is open and transparent, which makes information spread faster and makes it possible to be noticed by more people. This power cannot be ignored. It has a considerable influence on the reputation and image of a company. In the age of smart communication, every company should pay attention to its users/customers.

8.2.3 Q3: How do smart mobile devices mediate personal relationships among young people?

There are two kinds of younger generation. One is the ‘digital natives’, bornin the information age of the 1990s and 2000s. They grew up with digital products and smart mobile devices are already a part of their lives. The other is the ‘digital immigrants’, born in the 1980s and earlier. They changed their social attributes with the development of technology when digital entered their lives. Smart mobile devices help these generations to mediate their personal relationships. Young people like communicating through the smartphone – sending instant messages and updating social media status is already a part of their daily lives, and their social behaviour is affected by new technology constantly. A smartphone is a must-carry item for young people at all times. As it is a personal device, young people, especially college students, can interact in their own digital world with no interference from their parents or any others. Section 2.3.2 elaborates on these issues.

The use of smart mobile devices has become a central part of young people’s lives. Some young people are using smartphones predominantly and persistently. Smart mobile devices allow people to work, communicate and access entertainment wherever and whenever they want to connect online. Meanwhile, they allow people to communicate with friends, parents and people in their social networks. Moreover, they allow people to

have rich and colourful social activity, such as browsing friends' news, and sharing and chatting about each other's moments (Lenhart et al., 2010b).

Young people use smart mobile devices for texting, calling, surfing the Internet and social media, and a range of social relationships in their life are maintained or helped by smartphones (Green & Haddon, 2009). As the results of this study show, 46.4% of young people in Hong Kong use a smart mobile device for more than 5 hours per day, which enhances their personal relationships. People build personal networks in the virtual world. Due to graduation and starting work or changing to another job, the social environment and social emotions of the young generations changes constantly, which may contribute to the bridging and breaking of peer relationships. The dynamic nature of young people's relationships requires them to maintain and develop new personal relationships and expand their social networks (Bukowski & Newcomb, 1984). With the development of technology, young people's everyday communication relies progressively on social networking apps, instant messaging and other media. Smart mobile devices have become a key means through which young people mediate their social relationships (Osgerby, 2004). New technologies decrease the cost of communication, and increase the size of people's social circles. Some studies have indicated that young people use smartphones frequently to build and maintain their social relationship (Boase & Kobayashi, 2008). The main functions of smartphones for young people in Australia are connecting with others, social identity and fulfilling belonging needs (Walsh et al., 2009). Indeed, smart mobile devices provide the youth with a new way to know the world and to know strangers, in a domestication processes and adoption process that is influenced by new technologies.

8.3 Contribution of the Study

This study's contributions to the field can be summarised as follows. (a) The term '*smart communication*' is proposed, which, through the PSDS model can lead to a better understanding of the context of communication with smart mobile devices. (b) The smart mobile device user behaviour of young people in Hong Kong is analysed, in particular the effect of smartphones on their lifestyle and means of communication, and a framework of the characteristics of smart communication was set up. (c) Some social issues related to

young people's over-reliance on smart mobile devices are highlighted and design directions regarding these issues discussed. (d) Inspirations from smart communication are summarised in a systematic framework, and this framework is connected to the PSDS model, which prompts a rethinking of the interactions between technology and culture in the information society.

More specifically, referring to Figure 6.27, this study attempts to visualize the content of smart communication and to advance our understanding of the association between the characteristics of smart communication and the target users among young people. For instance, if the target users are highly educated young people, they tend to focus more on efficiency, enjoyability, sociability and mobility functions. For male users, coordination and efficiency are relatively important to them. In addition, while only the sense of security significantly affects smartphone heavy users, all the six characteristics of smart communication matters to those who rely more on smartphones. These findings provide insights to designers because designers always need to follow the needs of target users to design the features and services.

The research findings will help designers to better understand users' mentality and thus to better develop right strategies for new mobile devices. Users with various backgrounds tend to have different preferences. If designers know users' preferences in a precise way, they can design products that fit users' needs. As a result, understanding users' preferences is the key to design successful products and service.

To sum up, the results of the study could help smart mobile device marketing personnel and designers to understand smart mobile device users systematically, from user behaviour to user preferences, and thus help to improve the user experience of smart mobile devices. The research not only focuses on the present situation in Hong Kong, but also explores means of communication worldwide through the prism of Hong Kong.

8.4 Limitations of the Study

Due to limited time and resources and the narrow research scope, this study has some limitations. This section discusses the limitations of the topic, sample, methodology and findings. It is hoped that further research can make up these limitations.

8.4.1 Research Topic and Sampling

This study has some weakness and some areas that need to be improved. The testing sample was not as large as expected, the interview and questionnaires sample could be larger. If time had been no issue, then it would have been interesting to see if the data gathered across a larger sample of users of smart mobile devices made any difference to the findings.

Some other target users in different classes (e.g., famers, workers, etc.) or special users (e.g., elderly people, people with visual disabilities, etc.) could be considered, thus making the research about smart communication more complete. The research was conducted in Hong Kong as a case study; however, analogous research in other countries and regions is expected to yield different results due to cultural and behavioural differences. For example, different findings may be obtained with North American, European and African populations, potentially indicating the influence of different cultural and social values on emoticon use. However, we believe that the sample used in this study clearly represents user profiles for smart communication in the future, and that the findings are thus sufficiently generalisable to direct the design of emoticons for the mobile communication service market. The variety of emoticon-user behaviour and preferences reported in this study provides concrete evidence of the importance of smart communication to everyday life.

Furthermore, some other directions relating to smart communication, such as the Internet of things (IoT) and smart homes have not been discussed in this study, but they are important aspects of the future of the smart communication lifestyle. How to use mobile smart devices to connect the world, and the interactive pattern between people and devices can be explored in future works.

8.4.2 Methodology

The study used a mixed research method. Focus group interviews comprised the major method used to examine smart communication in a lifestyle under transformation in Hong Kong, and questionnaires were used to collect opinions from different types of user in Hong Kong. Observation was an additional means of obtaining data. As the research focussed on the personal mobile device, observations and interviews have some limitations. Interviews rely on the interviewees' memory and observation can intrude into a potentially sensitive relationship and destroy the processes we were seeking to capture (Alaszewski, 2006). People cannot show their true personal life under the camera or observer's eyes, which is the most difficult problem of this study. Assuring the contribution of the study, this inadequacy is acceptable and tolerable.

This study used triangulation data, and this research design is suitable for answering the research questions, but other methods can also be used to assist and complement the data. For example, a user diary could be used to examine how smart mobile devices affect people's daily lives. Diaries can record detailed information about users and a less intrusive approach to observation as users act as self-observers (Alaszewski, 2006). Understanding real interactions among people, society, devices and services could aid the analysis of the data collected from participants.

8.4.3 Findings

Smart mobile devices are developing all the time, and during the period of study, new technology and mobile devices were invented, and more means of interaction generated. The observations and questionnaires used here only collect people's recent perspectives, which may transform over time. The findings are not generalisable across time, as the technology will become outmoded, but the main aim of this study was not to probe the transformation of technology, it was to focus on communication patterns and user behaviour. If time permits, a long-term study would be better able to collect more complete data and deepen the understanding of the real situation of smart mobile device usage.

In one sense, it is true that the effect of a technology is the result of the interactions among the exercise of agency by people, technological affordances and social-cultural contexts, but this is a very broad perspective. The study could use a more middle-range framework to guide analysis in the future.

8.5 Further Research

In the twenty-first century, two important trends have been sweeping the world. One is the financial and economic crisis, and the other is a new technology and industrial revolution. If the former means challenges, the latter means opportunity (Rifkin, 2011). New technology has accelerated the development of smart mobile devices and brought us a better user experience that is improving all the time.

Users' behaviour and preferences may differ between cultures (Siu, 2003). Therefore, further research is needed to compare the role of smart communication in Asian, European and American settings, where the information and communication technology available to users differs, resulting in different patterns of use of smart devices. Therefore, future researchers are encouraged to investigate a range of mobile communication service contexts to compare the various uses and ensure the global generalisability of the results. Cross-cultural design patterns for smart communication will be explored as more results are produced. Other related topics, such as the Internet of things, smart homes, big data and so on, also have some relationship with smart communication, but due to limitations of time and space, they are not much discussed here. Future research could explore these areas.

As more smart communication services are developed in the future, further research could also probe if a better means of communication exists that could fit different lifestyles. Further research should also explore other factors not measured in the current study.

All in all, Hong Kong youth have a strong attraction to digital products and mobile devices. Whether for work or personal life, the smartphone is a good assistant for managing time efficiently, and it has dramatically changed people's lifestyle. However, young people have developed an excessive dependence on their smart mobile devices,

and thus engage in less face-to-face communication. They indulge in a virtual world established through their smartphones while ignoring the real world. The new pattern of communication constantly evolves as lifestyles transform under the influence of technology and culture. As mentioned, all of these issues are worthy of further study, including comparative studies, in other locations to enrich our understanding of this very common daily life communication product – the smartphone.

Appendix 1

Questionnaire: A Survey about Hong Kong Young People's Use of Smart Mobile Devices

The key objective of this questionnaire was to understand users' status and behaviour when using smart mobile devices. As Question 14 is a ranking question and has 7 options, we present the summary statistics of this question in Panel B.

Panel A

Question	Options	Percentage
1. What kind of smart mobile devices do you have?	A. smartphone	98.4%
	B. tablet	61.3%
	C. e-reader	9.3%
	D. smart wearable device	9.0%
	E. other_____	0.8%
2. How long have you used your smartphone?	A. Less than 1 year	1.9%
	B. 1–2 years	5.3%
	C. 2–3 years	11.4%
	D. 3–5 years	42.4%
	E. More than 5 years	39%
3. How many hours a day do you use your smartphone?	A. Less than 1 hour	1.9%
	B. 1–3 hours	21.2%
	C. 3–5 hours	30.5%
	D. 5–8 hours	24.1%
	E. More than 8 hours	22.3%
4. How often do you change your smartphone?	A. Less than half a year	0%
	B. Half a year–1 year	6.9%
	C. 1–2 years	42.7%

		D. 2–3 years	39.3%
		E. 3–5 years	9.8%
		F. More than 5 years	1.3%
5.	How would you describe the role of your smart mobile device in your life?	A. Not a normal life without it	24.7%
		B. Uncomfortable without it	54.9%
		C. Dispensable	16.2%
		D. Happier without it	4.2%
6.	Do you think that the smart mobile device can bring you a sense of security?	A. Strongly agree	13.0%
		B. Agree	41.1%
		C. Neutral	31.6%
		D. Disagree	12.5%
		E. Strongly disagree	1.9%
7.	Do you think ‘mobility’ is the main advantage of the smart mobile device?	A. Strongly agree	26.0%
		B. Agree	54.1%
		C. Neutral	16.4%
		D. Disagree	2.9%
		E. Strongly disagree	0.5%
8.	Do you think that the smart mobile device can make your life and work more efficient?	A. Strongly agree	24.4%
		B. Agree	53.1%
		C. Neutral	16.4%
		D. Disagree	5.3%
		E. Strongly disagree	0.8%
9.	Do you think that the smart mobile device can help you to coordinate your life and work?	A. Strongly agree	14.1%
		B. Agree	49.9%
		C. Neutral	26.0%
		D. Disagree	5.8%
		E. Strongly disagree	1.6%
10.	Do you think that the smart mobile device can improve your sociability?	A. Strongly agree	19.9%
		B. Agree	49.9%
		C. Neutral	22.0%
		D. Disagree	6.6%
		E. Strongly disagree	1.6%
11.	Do you think that the smart mobile device can show your personality?	A. Strongly agree	2.7%
		B. Agree	23.6%
		C. Neutral	48.0%
		D. Disagree	22.0%

	E. Strongly disagree	3.7%
12. Do you think it is enjoyable to use smart mobile devices?	A. Strongly agree	8.2%
	B. Agree	56.2%
	C. Neutral	30.5%
	D. Disagree	4.2%
	E. Strongly disagree	0.8%
13. Do you think that people with smartphones are nearer to people far away but further away from people nearby?	A. Strongly agree	30.8%
	B. Agree	48.0%
	C. Neutral	13.5%
	D. Disagree	7.2%
	E. Strongly disagree	0.5%
14. What was your main reason for purchasing your smart mobile device? (Ranking question)	A. Appearance	See Panel B
	B. Price	
	C. Function	
	D. Design fit my taste	
	E. Others' opinion	
	F. Brand, a status symbol	
	G. Easy to use	
15. What do you think excessive dependence on the smart mobile device will cause?	A. Estrangement from people around you	68.2%
	B. Harm to health	58.4%
	C. Fragmentation of information	44.0%
	D. Feeling of anxiety	41.6%
16. Gender	A. Male	41.9%
	B. Female	58.1%
17. Age	A. 18–22	24.4%
	B. 23–26	29.2%
	C. 27–30	46.4%
18. Your occupation	A. Full-time student	36.9%
	B. Production staff	1.1%
	C. Salesman	6.4%
	D. Market/public relations officer	2.4%
	E. Customer service staff	
	F. Administrative/logistical staff	2.9%
	G. Human resources	3.2%
	H. Financial/auditing staff	1.9%

	I. Clerk	3.2%
	J. Technical/research staff	5.3%
	K. Management	7.7%
	L. Teacher	5.0%
	M. Counsellor	2.9%
	N. Professional (accountant, lawyer, architect, medical worker, journalist, etc.)	0.5% 10.1%
	O. Other	10.6%
19. Education level	A. Below secondary school	1.6%
	B. High school	5.0%
	C. Junior college	11.9%
	D. Undergraduate	59.7%
	E. Postgraduate	17.8%
	F. Doctorate and above	4.0%
20. Income	A. 0–10,000HKD	48.8%
	B. 10,001–20,000HKD	28.6%
	C. 20,001–30,000HKD	5.6%
	D. 30,001–50,000HKD	4.2%
	E. Above 50,000HKD	0.8%
	F. Refuse to answer	11.9%

Panel B

Options	Total Count of Option	Rank	Count of Rank	% of Rank
Appearance	321	1	83	25.9%
		2	69	21.5%
		3	79	24.6%
		4	45	14.0%
		5	33	10.3%
		6	8	2.5%
		7	4	1.2%

Price	307	1	65	21.2%
		2	80	26.1%
		3	49	16.0%
		4	44	14.3%
		5	38	12.4%
		6	15	4.9%
		7	16	5.2%
Function	352	1	139	39.5%
		2	92	26.1%
		3	71	20.2%
		4	36	10.2%
		5	10	2.8%
		6	2	0.6%
		7	2	0.6%
Design fit my taste	297	1	25	8.4%
		2	33	11.1%
		3	54	18.2%
		4	71	23.9%
		5	60	20.2%
		6	40	13.5%
		7	14	4.7%
Others' opinion	246	1	3	1.2%
		2	5	2.0%
		3	6	2.4%
		4	11	4.5%
		5	28	11.4%
		6	64	26.0%
		7	129	52.4%

Brand, a status symbol	265	1	21	7.9%
		2	23	8.7%
		3	16	6.0%
		4	31	11.7%
		5	38	14.3%
		6	79	29.8%
		7	57	21.5%
Easy to use	309	1	41	13.3%
		2	55	17.8%
		3	59	19.1%
		4	52	16.8%
		5	47	15.2%
		6	36	11.7%
		7	19	6.1%

Sample size = 377

Appendix 2

Questionnaire - Uses of Emoticons on Smart Mobile Devices

This key objective of the questionnaire was to understand users' statuses and behaviours when using emoticons on their smart mobile devices.

Questions	Options	Percentage
1. What kind of smartphone operating system are you using?	A. Apple-iOS	52.16%
	B. Google-Android	40.92%
	C. Microsoft-Windows	2.31%
	D. Nokia-Symbian	0.58%
	E. Others	4.03%
2. How long have you used your smartphone?	A. Less than one year	5.48%
	B. One-two years	15.58%
	C. Two-three years	26.8%
	D. Three-five years	30.55%
	E. More than five years	21.61%
3. How many hours a day do you use your smartphone?	A. Less	1.44%
	B. One-two hours	9.33%
	C. Two-three hours	18.44%
	D. Three-four hours	17.58%
	E. More than five hours	53.31%
4. What kind of social networking platforms do you use frequently?	A. WeChat	75.22%
	B. Whats App	1.15%
	C. Line	1.15%
	D. QQ	21.33%
	E. Viber	0.29%
	F. Others	0.86%
5. Which social networking platforms have emoticons that you like?	A. WeChat	52.45%
	B. Whats App	2.31%
	C. Line	13.54%
	D. QQ	25.36%
	E. Viber	0.58%
	F. Others	5.76%
6. Why do you like the emoticons of that	A. Design matching my taste	25.07%
	B. More choices about emoticon	34.87%

	social networking platform?	C. Update fast about emoticon	5.19%
		D. Easy to understand and recognize	34.87%
7.	Under what circumstances do you use the emoticon? (Multiple Choice)	A. Nothing to say	32.85%
		B. Auxiliary expression	67.72%
		C. Liven up atmosphere	68.59%
		D. Avoid embarrassment	26.51%
		E. Habitual expression	34.01%
8.	What kinds of emoticons do you use frequently? (Multiple Choice)	A. Default (e.g. )	71.76%
		B. Textual Characters (e.g.:-),T-T)	12.97%
		C. Funny stickers	43.52%
		D. Lovely stickers	34.87%
		E. Blessing stickers	9.8%
9.	Have you bought a chargeable emoticon?	A. Yes	7.78%
		B. No	92.22%
10.	(9 for YES) Why did you purchase the chargeable emoticon?	A. Because of favourite figures and brand design	59.26%
		B. Design much better	18.52%
		C. Can share distinctive emoticons with friends	22.22%
		D. Personal pursuit in high level	0%
10.	(9 for NO) Why did you not purchase the chargeable emoticon?	A. Free emoticons are enough	35.63%
		B. Design is not good	2.19%
		C. Do not like to spend money on virtual product	38.75%
		D. No habits	21.56%
		E. Others	1.88%
11.	Do you think that the emoticon can clearly reflect your personal moods in the communication?	A. Very agree	38.62%
		B. Agree	44.09%
		C. Neutral	15.27%
		D. Disagree	1.73%
		E. Very disagree	0.29%
12.	Do you think that	A. Very agree	43.8%

	the emoticon can bring more enjoyability to the communication?	B. Agree	46.4%
		C. Neutral	8.93%
		D. Disagree	0.58%
		E. Very disagree	0.29%
13.	Do you think that young people are more interested in the emoticon?	A. Very agree	31.99%
		B. Agree	42.65%
		C. Neutral	21.04%
		D. Disagree	4.03%
		E. Very disagree	0.29%
14.	What are the advantages of using emoticons? (Multiple Choice)	A. Improve efficiency of communication	35.16%
		B. Express intention more clearly	
		C. Liven up atmosphere	51.3%
		D. Create topic	74.93%
		E. Bring more joy	17.58%
			63.98%
15.	What are the disadvantages of using emoticons? (Multiple Choice)	A. Occupy memory and storage	38.04%
		B. Excessive consumption of mobile data traffic	44.67%
		C. Bring too much spam	21.04%
		D. Make communication more complicated	8.07%
		E. Cannot meet my needs due to undefined expression	34.01%
16.	What kinds of emoticons do you usually use? (Multiple Choice)	A. Hello	31.41%
		B. Goodbye	25.65%
		C. Nothing to say	33.72%
		D. Happy	78.39%
		E. Sad	31.99%
		F. Angry	24.21%
		G. Thank you	24.78%
		H. Sorry	11.82%
17.	Gender	A. Male	40.06%
		B. Female	59.94%
18.	Age	A. 18-22	37.46%
		B. 23-25	44.67%
		C. 27-30	17.87%

19. Your occupation	A. Full-time student	24.78%
	B. Production staff	1.44%
	C. Salesman	6.05%
	D. Market/public relations officer	4.32%
	E. Customer service staff	1.73%
	F. Administrative/logistical staff	5.76%
	G. Human resources	2.59%
	H. Financial/auditing staff	2.02%
	I. Clerk	3.17%
	J. Technical/research staff	10.95%
	K. Management	9.22%
	L. Teacher	5.19%
	M. Counselor	2.88%
	N. Professional (accountant, lawyer, architect, medical worker, journalist, etc.)	7.78%
	O. Other	12.1%
20. Education level	A. Primary school	0.86%
	B. Secondary school	0%
	C. High school	1.15%
	D. Technical secondary school	0.58%
	E. Junior college	8.36%
	F. Undergraduate	50.14%
	G. Postgraduate	30.55%
	H. Doctor	7.49%
	I. Above doctor	0.86%

Sample size = 347

Appendix 3

Variable Definition and Construction for Chapter 5 and 6

Variables	Definition
Usage_1	This variable equals 1 if the user in our sample has used smartphone for less than one year, and 0 otherwise.
Usage_2	This variable equals 1 if the user in our sample has used smartphone for one to two years, and 0 otherwise.
Usage_3	This variable equals 1 if the user in our sample has used smartphone for two to three years, and 0 otherwise.
Usage_4	This variable equals 1 if the user in our sample has used smartphone for three to five years, and 0 otherwise.
Usage_5	This variable equals 1 if the user in our sample has used smartphone for more than five years, and 0 otherwise.
DUsage_1	Daily Usage. This variable equals 1 if the user in our sample has used smartphone for less than one hour per day, and 0 otherwise.
DUsage_2	Daily Usage. This variable equals 1 if the user in our sample has used smartphone for one to three hours per day, and 0 otherwise.
DUsage_3	Daily Usage. This variable equals 1 if the user in our sample has used smartphone for three to five hours per day, and 0 otherwise.
DUsage_4	Daily Usage. This variable equals 1 if the user in our sample has used smartphone for five to eight hours per day, and 0 otherwise.
DUsage_5	Daily Usage. This variable equals 1 if the user in our sample has used smartphone for more than eight hours per day, and 0 otherwise.
Freq_1	This variable equals 1 if the user in our sample changes his/her smartphone less than half a year, and 0 otherwise.
Freq_2	This variable equals 1 if the user in our sample changes his/her smartphone every half to one year, and 0 otherwise.
Freq_3	This variable equals 1 if the user in our sample changes his/her smartphone every one to two years, and 0 otherwise.
Freq_4	This variable equals 1 if the user in our sample changes his/her smartphone every two to three years, and 0 otherwise.
Freq_5	This variable equals 1 if the user in our sample changes his/her smartphone every three to five years, and 0 otherwise.

Freq_6	This variable equals 1 if the user in our sample changes his/her smartphone every more than five years, and 0 otherwise.
Attachment_1	This variable equals 1 if the user in our sample selects “Not a normal life without it” when describing the role of smart mobile device in his/her life, and 0 otherwise.
Attachment_2	This variable equals 1 if the user in our sample selects “Uncomfortable without it” when describing the role of smart mobile device in his/her life, and 0 otherwise.
Attachment_3	This variable equals 1 if the user in our sample selects “Dispensable” when describing the role of smart mobile device in his/her life, and 0 otherwise.
Attachment_4	This variable equals 1 if the user in our sample selects “Happier without it” when describing the role of smart mobile device in his/her life, and 0 otherwise.
Gender_M	This variable equals 1 if the user in our sample is male, and 0 otherwise.
Gender_F	This variable equals 1 if the user in our sample is female, and 0 otherwise.
Age_1	This variable equals 1 if the user in our sample is aged between 18 and 22, and 0 otherwise.
Age_2	This variable equals 1 if the user in our sample is aged between 23 and 26, and 0 otherwise.
Age_3	This variable equals 1 if the user in our sample is aged between 26 and 30, and 0 otherwise.
Student_Y	This variable equals 1 if the user in our sample is a student, and 0 otherwise.
Education_1	This variable equals 1 if the below secondary school level of the user in our sample is high school, and 0 otherwise.
Education_2	This variable equals 1 if the highest education level of the user in our sample is high school, and 0 otherwise.
Education_3	This variable equals 1 if the highest education level of the user in our sample is junior college, and 0 otherwise.
Education_4	This variable equals 1 if the highest education level of the user in our sample is undergraduate, and 0 otherwise.
Education_5	This variable equals 1 if the highest education level of the user in our sample is postgraduate, and 0 otherwise.

Education_6	This variable equals 1 if the highest education level of the user in our sample is doctor or above, and 0 otherwise.
Income_1	This variable equals 1 if the user in our sample earns 0-10,000 HKD per month, and 0 otherwise.
Income_2	This variable equals 1 if the user in our sample earns 10,001-20,000 HKD per month, and 0 otherwise.
Income_3	This variable equals 1 if the user in our sample earns 20,001-30,000 HKD per month, and 0 otherwise.
Income_4	This variable equals 1 if the user in our sample earns 30,001-50,000 HKD per month, and 0 otherwise.
Income_5	This variable equals 1 if the user in our sample earns above 50,000 HKD per month, and 0 otherwise.

Appendix 4

Variable Definition and Construction for Uses of Emoticon on Smart Mobile Device

Variables	Definition
Hrs_of_Dailyuse	Category variable measuring the daily usage of smartphone based on hours, equal to 1, 2, 3, 4 and 5 if daily usage is below 1 hour, in 1-2 hours, 2-3 hours, 3-5 hours and more than 5 hours, respectively.
Yr_of_Use	Category variable measuring the usage of smartphone based on years, equal to 1, 2, 3, 4 and 5 if a user has used the smartphone for less than 1 year, 1-2 years, 2-3 years, 3-5 years and more than 5 years, respectively.
Gender	Indicator for gender, equal to 1 for male use of smartphone, and 0 otherwise
Age	Category variable measuring users' age, equal to 1, 2 and 3 if a user's age is in 18-25, 26-30 and 31-35 years, respectively.
Edu	Category variable measuring users' education level, equal to 0, 1, 2, 3, 4, 5, 6 and 7 if a user's education level is below secondary school, high school, technical secondary school, junior college, undergraduate, postgraduate, doctor or above doctor, respectively.
QQ, WhatsApp, WeChat	3 dummies indicating users' favourite social apps in using emoticons. QQ (WhatsApp, WeChat) equals 1 if users select QQ (WhatsApp, WeChat) as one of their favourite social apps in using emoticons, and 0 otherwise.
Char, Yellowface, Funny, Lovely, Blessing	5 dummies indicating users' frequency in using emoticons. Char (Yellowface, Funny, Lovely, Blessing) equals 1 if users select characters (default yellow-face emoticon, funny stickers, lovely stickers, blessing stickers) as one type of emoticons they use most frequently, and 0 otherwise.

REFERENCES

Agar, J. (2013). *Constant touch: A global history of the mobile phone*, Icon Books Ltd, Cambridge.

Agger, B. (2011). iTime: Labor and life in a smartphone era. *Time & Society*, 20(1): 119-136.

Alasuutari, P. (1995). *Researching culture: Qualitative method and cultural studies*. London: Sage.

Alaszewski, A. (2006). *Using diaries for social research*. London: SAGE

Alben, L. (1996). Quality of experience: Defining the criteria for effective interaction design. *Interactions*, 3(3), 11–15.

Aoki, K., & Edward J. D. (2003). An analysis of young people's use of and attitudes toward cell phones. *Telematics and Informatics*, 20(4): 349-364.

Apple Inc. (2013). *App store tops 40 billion downloads with almost half in 2012*. Retrieved from http://www.apple.com/pr/library/2013/01/07App-Store-Tops-40-Billion-Downloads-with-Almost-Half-in-2012.html

Arhippainen, L., &Tähti, M. (2003). Empirical evaluation of user experience in two adaptive mobile application prototypes. Proceedings of *the 2nd International Conference on Mobile and Ubiquitous Multimedia* (MUM2003), Norrköping, Sweden, 27–34.

Artacho, M. A., Ballester, A., & Alcantara, E. (2010). Analysis of the impact of slight changes in product formal attributes on user's emotions and configuration of an emotional space for successful design. *Journal of Engineering Design*, 6, 693-705.

Arminen, I., & Weilenmann, A. (2009). Mobile presence and intimacy—reshaping social actions in mobile contextual configuration. *Journal of Pragmatics*, 41(10): 1905-1923.

Balasubramanian, S., & Mahajan, V. (2001). The economic leverage of the virtual community. *International Journal of Electronic Commerce*, 5(3), 103–138.

Battarbee, K. (2003). Defining co-experience. In *Proceedings of the 2003 International Conference on Designing Pleasurable Products and Interfaces(DPPI 2003)*, Pittsburgh, PA, (pp.109-113).

Battarbee, K., & Koskinen, I. (2005). Co-experience: user experience as interaction. *CoDesign*, 1(1), 5-18.

Bavelas, J. B., & Chovil, N. (2000). Visible acts of meaning an integrated message model of language in face-to-face dialogue. *Journal of Language and social Psychology*, 19(2), 163-194

Bertel, T. F. (2013a). *Mobile communication in the age of smartphones*. Ph.D. dissertation. IT University of Copenhagen, Denmark.

Bertel, T. F. (2013b). It's like I trust it so much I don't really check where it is I'm going before I leave - informational uses of smartphones among Danish youth. *Mobile Media & Communication*, 1(3), 299–313.

Benyon, D., Turner, P., & Turner, S. (2005). *Designing interactive systems: People, activities, contexts, technologies*. Harlow, England: Addison-Wesley.

Blake, G. (1999). E-mail with feeling. *Research Technology Management*, 42(6), 12-13.

Blumberg S. J & Luke J. V. (2010). *Wireless Substitution: Early release of estimates from the National Health Interview Survey, January - June 2010.* Hyattsville, MD: National Center for Health Statistics. Retrieved from: http://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless201012.pdf

Billieux, J., Van der Linden, M., & Rochat, L. (2008). The role of impulsivity in actual and problematic use of the mobile phone. *Applied Cognitive Psychology*, 22(9), 1195-1210.

Boase, J. (2008). Personal networks and the personal communication system: Using multiple media to connect. *Information, Communication & Society*, 11(4), 490-508.

Boase, J., & Kobayashi, T. (2008). Kei-Tying teens: Using mobile phone e-mail to bond, bridge, and break with social ties—a study of Japanese adolescents. *International Journal of Human-Computer Studies*, 66(12), 930-943.

Bogdan, R., & Biklen, S. (2006). *Qualitative research in education: An introduction to theory and practice* (5th ed.). Boston, MA: Allyn and Bacon.

Bowman, S., & Willis, C. (2003). *We media: How audiences are shaping the future of news and information*. Reston, VA: The Media Center at the American Press Institute. Retrieved from http://www.hypergene.net/wemedia/download/we_media.pdf

Brown, J. S., & Duguid, P. (2002). *The social life of information*. Boston, MA: Harvard Business School Press.

Bryman, A. (2006). Integrating quantitative and qualitative research: how is it done?.*Qualitative Research,* 6(1), 97-113.

Buckingham, D. (2008). Introducing identity. In D. Buckingham (Ed.), *Youth, identity, and digital media* (pp. 1–22). Cambridge, Mass.: MIT Press.

Bukowski, W. M., & Newcomb, A. F. (1984). Stability and determinants of sociometric status and friendship choice: A longitudinal perspective. *Developmental Psychology*, 20(5), 941.

Burke, J. & Kirk, A. (2001). *Ethnographic methods*. Retrieved from http://www.otal.umd.edu/hci-rm/ethno.html.

Carroll, J. M. (2002). *HCI in the New Millennium*. Addison- Wesley, Harlow.

Carroll, J., Howard, S., Peck, J., & Murphy, J. (2002). A field study of perceptions and use of mobile telephones by 16 to 22 year olds. *Journal of Information Technology Theory and Practice*, 4(2), 49-61.

Castells, M., Fernandez-Ardevol, M., Qiu, J. L., & Sey, A. (2004). The mobile communication society: A cross-cultural analysis of available evidence on the social uses of wireless communication technology. Presentation to *International Workshop on Wireless Communication Policies and Prospects: A Global Perspective,* Annenberg School for Communication, University of Southern California, Los Angeles, 8-9 October.

Castells, M. (2009). *Communication power*. Oxford; New York: Oxford University Press.

Caplan, S. E. (2002). Problematic Internet use and psychosocial well-being: development of a theory-based cognitive–behavioral measurement instrument. *Computers in human behavior*, 18(5), 553-575.

Census and Statistics Department (2012). *2011 Population Census: Summary Results* (PDF) (Report). Retrieved from http://www.census2011.gov.hk/pdf/summary-results.pdf.

Census and Statistics Department (2015). Retrieved from http://www.censtatd.gov.hk/hkstat/hkif/index.jsp

Chasombat, P. (2014). *Social networking sites impacts on interpersonal communication skills and relationships.* Ph.D. dissertation, National Institute of Development Administration. Thailand.

Chekwa, E., & Daniel, A.(2014) Digital technology: Transforming lifestyles and business practices. *International Journal of the Academic Business World*, 8(2), 77-84.

Chen, X., & Siu, K. W. M. (2013). Smart mobile devices in lifestyles under transformation: A comparative study of smart communication among youth in Hong Kong and Beijing. In: *Proceedings of 5th International Conference*, CCD 2013, Part II. New York, NY: Springer-Verlag, 383–392.

Chen, X.,& Siu, K. W. M. **(**2016). Exploring user behaviour of emoticon use among Chinese youth. *Behaviour & Information Technology*,36(6), 637-649.

Chinese Academy of Telecommunications Industry Development (2015). *Yi dong hu lian wang fa zhan bai pi shu [Mobile internet development white paper]*.Retrieved fromhttp://www.ccidthinktank.com//uploads/soft/150421/INTERNET.pdf (in Chinese).

Christakis, N. A., & Fowler, J. H. (2009). *Connected: The surprising power of our social networks and how they shape our lives*. New York, NY: Little Brown

Chou, C., Condron, L., & Belland, J. C. (2005). A review of the research on Internet addiction. *Educational Psychology Review*, 17(4), 363-388.

Chu, D. (2010). In search of prosumption: Youth and the new media in Hong Kong. *First Monday*, 15(2-1).

Churches, O., Nicholls, M., Thiessen, M., Kohler, M., & Keage, H. (2014). Emoticons in mind: An event-related potential study. *Social neuroscience*, 9(2), 196-202.

Chun, H., Lee, H., & Kim, D. (2012). The integrated model of smartphone adoption: Hedonic and utilitarian value perceptions of smartphones among Korean college students. *Cyberpsychology, Behavior, and Social Networking*, 15(9), 473-479.

Cohen, A., Lemish, D., & Schejter, A. M. (2007). *The wonder phone in the land of miracles: Mobile telephony in Israel*. Cresskill, NJ: Hampton Press

Creswell, J. W. (2008). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research*. Upper Saddle River, NJ: Pearson/Merrill Education.

Creswell, J. W., & Clark, V. L. P. (2011). *Designing and conducting mixed methods research* (2nded.). Thousand Oaks, CA: Sage.

Crowley, D., & Heyer, D. (1998). *Communication in history: Technology, culture, society.* New York, NY: Longman.

Cyr, D., Hassanein, K., Head, M., & Ivanov, A. (2007). The role of social presence in establishing loyalty in e-service environments. *Interacting with computers*, 19(1), 43-56.

Daft, R., & Lengel, R. (1986). Organizational information requirements, media richness and structural design. *Management Science*, 32(5), 554-571

Davidsson, O., Peitz, J., & Björk, S. (2004). Game design patterns for mobile games. *Project report to Nokia Research Center*, Finland.

Derks, D., Fischer, A. H., & Bos, A. E. R. (2008). The role of emotion in computer mediated communication: A review. *Computers in Human Behavior*, 24,766–785.

Desouza, K. C., & Bhagwatwar, A. (2012). Citizen apps to solve complex urban problems. *Journal of Urban Technology*, 19(3), 107-136.

Denzin, N. K. (1989). The research act: A theoretical introduction to sociological methods (3rd ed.). Englewood Cliffs, NJ: Prentice Hall.

Denzin, N. K, & Lincoln, Y. S. (2000). Entering the field of qualitative research. In Denzin, N. K, & Lincoln, Y. S. (Eds.), *Handbook of qualitative research*. Thousand Oaks, CA: Sage.

Dennis, E. E., & Merrill, J. C. (2006). *Media debates: Great issues for the digital age*. Southbank, Australia: Thomson.

Dewey, J. (1934). *Art as Experience*, New York: Perigee

Dewey, J. (1925). *Experience and Nature*. LaSalle, Illinois: Open Court.

Duri, S., Cole, A., Munson, J., & Christensen, J. (2001). An approach to providing a seamless end-user experience for location-aware applications. *In Proceedings of the 1st international workshop on Mobile commerce*, Vol. 86 No.4 (pp. 20-25).

Enez Darcin, A., Kose, S., Noyan, C. O., Nurmedov, S., Yılmaz, O., & Dilbaz, N. (2016). Smartphone addiction and its relationship with social anxiety and loneliness. *Behaviour & Information Technology*, 35(7), 520-525.

Fallahkhair, S., Pemberton, L., & Griffiths, R. (2007). Development of a crossplatform ubiquitous language learning service via mobile phone and interactive television. *Journal of Computer Assisted Learning*, 23(4), 312-325.

Farquhar, C., & Das, R. (1999). Are focus group suitable for 'sensitive topics?' In Barbour, R. S. & Kitzinger, J. (Eds.). *Developing focus group research: Politics, theory and practice.* London: Sage, pp. 47-63.

Fang, I. (1997). *A history of mass communication: Six information revolutions*. Boston, MA: Focal Press.

Featherstone, M. (1987). Lifestyle and consumer culture. *Theory, Culture & Society*, 4(1), 55-70.

Featherstone, M. (2007). *Consumer culture and postmodernism*. London and Newbury Park, CA: Sage.

Fiske, J. (1990). *Introduction to communication sudies (2nd edition)*. New York: Routledge.

Forlizzi, J., & Ford, S. (2000). The building blocks of experience: an early framework for interaction designers. *Proceedings of Designing Interactive Systems (DIS2000)*, pp.419–423.

Forlizzi, J., & Battarbee, K. (2004). Understanding experience in interactive systems. In *Proceedings of the 5th Conference on Designing Interactive Systems: Processes, Practices, Methods, and Techniques*, pp. 261-268.

Forlizzi, J. (2007). How robotic products become social products: an ethnographic study of cleaning in the home. In *Proceedings of the ACM/IEEE international conference on Human-robot interaction*, pp. 129-136. ACM.

Fornäs, J. (1995). Youth, culture and modernity. In J. Fornäs & G. Bolin (Eds.), *Youth culture in late modernity* (pp. 1–11). London; Thousand Oaks, Calif.: Sage Publications.

Fortunati, L. (2001). The mobile phone: an identity on the move. *Personal and Ubiquitous Computing*, 5(2), 85-98.

Fortunati, L. (2005). Mediatization of the net and internetization of the mass media. *Gazette*, 67(1), 27-44.

Frissen, V. A. (2000). ICTs in the rush hour of life. *The Information Society*, 16(1), 65-75.

Fullwood, C., Orchard, L. J., & Floyd, S. A. (2013). Emoticon convergence in Internet chat rooms. *Social Semiotics*, 23(5), 648-662.

Garber, M. (2012).*Today, the emoticon turns 30 :-)*. Retrieved from http://www.theatlantic.com/technology/archive/2012/09/today-the-emoticon-turns-30/262571/

Garber, M. (2013). *How to tell a joke on the Internet.* Retrieved from http://www.theatlantic.com/magazine/archive/2013/05/how-to-tell-a-joke-on-the-internet/309293/

Gardiner, W. L. (2006). *Media: Past, present, and future*. Bethesda, MD: Academica Press.

Geminiano G., & Geminiano E. (2013). *The transformation of telephone to smartphones*. Retrieved from http://emilgen2011.hubpages.com/hub/The-Transformation-of-Telephone-to-Smartphones

Gergen, K. (2002). The challenge of the absent presence. In J. E. Katz & M. Aakhus (Eds.), *Perpetual Contact: Mobile Communication, Private Talk, Public Performance* (pp. 227–241). Oxford, UK: Oxford University Press.

Gillmor, D. (2004). *We the media: Grassroots journalism by the people, for the people*. USA: O'Reilly.

Gnanadesikan, A. (2011). *The writing revolution: Cuneiform to the internet*. Malden, MA: Wiley–Blackwell.

Goggin, G. (2006). *Cell Phone Culture: Mobile technology in everyday life*. New York, NY: Routledge.

Green, E., & Singleton, C. (2007). Mobile selves: Gender, ethnicity and mobile phones in the everyday lives of young Pakistani-British women and men. *Information, Community and Society*, 10(4), 506-526.

Green, S., & Harvey, P. (1999). Scaling place and networks: An ethnography of ICT "innovation" in Manchester. In *Internet and Ethnography Conference*, Hull UK, 13-14 December. 13-14.

Green, N. (2002). On the move: Technology, mobility, and the mediation of social time and space. *The Information Society*, 18(4), 281-292.

Green, N. (2003). Outwardly mobile: Young people and mobile technologies. In J. E. Katz (Ed.), *Machines that become us* (pp. 201-218). New Brunswick: Transaction Publishers.

Green, N., & Haddon, L. (2009). *Mobile communications: An introduction to new media*. New York, NY: Berg.

Guest, G., Namey, E. E., & Mitchell, M. L. (2012). *Collecting qualitative data: A field manual for applied research*. Thousand Oaks, CA: Sage.

Haddon, L. (2003). Domestication and mobile telephony. In J. E. Katz (Ed.). *Machines that become us: The social context of personal communication technology* (pp. 43-56). New Brunswick, NJ: Transaction Publishers.

Haddon, L. (2004). *Information and communication technologies in everyday life: A concise introduction and research guide*. New York, NY: Berg.

Hahn, H. P., & Kibora, L. (2008). The domestication of the mobile phone: oral society and new ICT in Burkina Faso. *The Journal of Modern African Studies*, 46(01), 87-109.

Halewood, N. & Kenny, C. (2007). *Young people and ICTs in developing countries*. World
Development Report: World Bank, Washington D.C.

Hanson, J. (2007). *24/7: How cell phones and the Internet change the way we live, work, and play*. New York, NY: Praeger.

Hassenzahl, M. (2003). The thing and I: Understanding the relationship between user and product. In Blythe, M. A., Overbeeke, K., Monk, A. F., & Wtight, P. C. (Eds.). *Funology: From usability to enjoyment*. Dordrecht, The Netherlands: Kluwer Academic Publishers.

Haythornthwaite, C., & Wellman, H. (2002). The Internet in everyday life: An introduction. In W. Barry & H. Caroline (Eds.). *The Internet in everyday life*. Malden, MA: Blackwell. pp. 3-41.

Holme, I. M., & Solvang, B. K. (1997). *Research methodology—On qualitative and quantitative methods*. 2nd edition, Studentlitteratur, Lund.

Homans, G. C., (1958). Social behavior as exchange. *American Journal of Sociology*, 63 (May): 597-606.

Höök, K. (2009): Mobile Life – Innovation in the wild. *INTERACT '09 Proceedings ofthe 12th IFIP TC 13 International Conference on Human-Computer Interaction*: Part I

Huang, A. H., Yen, D. C., & Zhang, X. (2008). Exploring the potential effects of emoticons. *Information & Management*, 45(7), 466-473.

HuffingtonPost, (2013) 50 Things you didn't know your iPhone could do. Retrieved from http://www.huffingtonpost.com/2013/12/06/iphone-hidden-features_n_4398563.html

Humphreys, L. (2010). Mobile social networks and urban public space. *New Media & Society*, 12(5): 763-778.

Hurlen, I. G. H. (2013). *The smart-life: A qualitative study on smartphone use and integration*. Master dissertation, University of Oslo, Norway.

Igarashi, T., Motoyoshi, T., Takai, J., & Yoshida, T. (2008). No mobile, no life: Self-perception and text-message dependency among Japanese high school students. *Computers in Human Behavior*, 24, 2311–2324.

Information Services Department. (2004). *Hong Kong: The facts. Telecommunications*. Hong Kong: Hong Kong Special Administrative Region Government.

Ipsos MediaCT (2013). *Our Mobile Planet: Hong Kong.* Retrieved fromhttp://services.google.com/fh/files/misc/omp-2013-hk-local.pdf

Ito, M., &Okabe, D. (2005). Intimate connections: Contextualizing Japanese youth and mobile messaging. In R. Harper, P. Leysia, & A. Taylor (Eds.), *The inside text: Social, cultural and design perspectives on SMS* (pp.127–146). Dordrecht, The Netherlands: Springer.

Ito, M. (2001). Mobile phones, Japanese youth, and the re-placement of social contact. In *Proceedings of Annual Meeting for the Society for the Social Studies*. Cambridge, MA.

Ishii, K. (2003). Diffusion, policy, and use of broadband in Japan. *Trends in Communication*, 11: 45-61.

Ishii, K. (2006). Implications of mobility: The uses of personal communication media in everyday life. *Journal of Communication*, 56(2): 346-365.

Ishii, K., & Wu, C. I. (2006). A comparative study of media cultures among Taiwanese and Japanese youth. *Telematics and Informatics*, 23(2), 95-116.

Janelle, D. G. & Gillespie, A. (2004). Space–time constructs for linking information and communication technologies with issues in sustainable transportation. T*ransport Reviews*, 24(6), pp. 665-677.

Jensen, M. (2007). Defining lifestyle. *Environmental Sciences*, 4(2), 63-73.

Johansson T. & Miegel F. (1992). *Do the right thing. Lifestyles and identity in contemporary youth culture.* Stockholm: Almqvist & Wiksell.

Kam, L. (Ed.) (2010). *Hong Kong culture: Word and image*. Hong Kong: Hong Kong University Press.

Karapanos E., Zimmerman J., Forlizzi J. & Martens J. (2009). User experience over time: An initial framework. In: *Proceedings of the 27th international conference on human factors in computing systems*. ACM, New York, pp. 729–738

Karim, N. S. A. & Oyefolahan, I. O.(2009). Mobile phone appropriation: Exploring differences in terms of age, gender and occupation. In: Proceedings of *the 6th*

International Conference on Information Technology and Applications. Hanoi:IEEE.

Karnowski, V., & Jandura, O. (2014). When lifestyle becomes behavior: A closer look at the situational context of mobile communication. *Telematics and Informatics*, 31, pp. 184-193.

Kasesniemi, E. L., & Rautiainen, P. (2002).Mobile culture of children and teenagers in Finland. InJ. E. Katz., &M. Aakhus (Eds.), *Perpetual contact: Mobile communication, private talk, public performance*(pp.170-192).Cambridge, UK: Cambridge University Press.

Katz, J. E., & Aakhus, M. (Eds.). (2002). *Perpetual contact: Mobile communication, private talk, public performance.* Cambridge University Press.

Katz, J. E., & Rice, R. E. (2002). *Social consequences of Internet use: Access, involvement, and interaction.* Cambridge, MA: MIT press.

Katz, J. E. (2006). *Magic in the air: Mobile communication and the transformation of social life*. New Brunswick, NJ: Transaction Publishers.

Kayastha, N., Niyato, D., Wang, P., & Hossain, E. (2011). Applications, architectures, and protocol design issues for mobile social networks: A survey. *Proceedings of the IEEE*, 99(12), 2130-2158.

Kim, K., Proctor, R. W., & Salvendy, G. (2012). The relation between usability and product success in cell phones. *Behaviour & Information Technology*, 31(10), 969-982.

Kim, H.-W., Chan, H. C., & Gupta, S. (2007). Value-based adoption of mobile internet: an empirical investigation. *Decision Support Systems*, 43(1), 111-126

Kishi, M. (2008). Perceptions and use of electronic media: Testing the relationship between organizational interpretation differences and media richness. *Information & Management*, 45(5), 281-287.

Kissling, E. A. (1996). That's just a basic teen-age rule: Girls' Linguistic strategies for managing the menstrual communication taboo. *Journal of Applied Communication Research*, 24(4), 292-309.

Kitzinger, J. (1994). The methodology of focus groups: The importance of interaction between research participants. *Sociology of Health & Illness*, 16(1), 103-121.

Koskinen, I. K. (2007). *Mobile multimedia in action*. New Brunswick, NJ: Transaction Publishers.

Koskinen, I. K. (2008). Mobile multimedia: Uses and social consequences. In J. E. Katz (Ed.), *Handbook of mobile communication studies* (pp. 241–255). Cambridge, MA: MIT Press.

Kuniavsky, M. (2007). User experience and HCI. In A.Sears & J. A. Jacko (Eds.), *The human-computer interaction handbook: Fundamentals, evolving technologies, and emerging applications (2nd ed.).* New York: Lawrence Erlbaum Associates.

Lacohée, H., Wakeford, N. & Pearson, I. (2003). A social history of the mobile telephone with a view of its future. *BT Technology Journal*, 21, 203-211.

Lam, W.H.K. & Bell, M.G.H., (2003). *Advanced modelling for transit operations and service planning*. Pergamon, Oxford.

Larivière, B., Joosten, H., Malthouse, E. C., Van Birgelen, M., Aksoy, P., Kunz, W. H., & Huang, M.-H. (2013). Value fusion: The blending of consumer and firm value in the distinct context of mobile technologies and social media. *Journal of Service Management*, 24(3), 268-293.

Larsen, J., Urry, J., & Axhausen, K. (2008). Coordinating face-to-face meetings in mobile network societies. *Information, Communication & Society*, 11(5), 640-658.

Law, P. L., & Peng, Y. (2008). Mobile networks: Migrant workers in southern China. In J. E. Katz (Ed.), *Handbook of mobile communication studies* (pp. 55–64). Cambridge, MA: MIT Press.

Lazer, W. (1963) Lifestyle concepts and marketing, in S. Greysser (Ed.). *Toward Scientific Marketing* (pp. 243–252). Chicago, IL: American Marketing Association.

Ledbetter, A. M., & Larson, K. A. (2008). Nonverbal cues in e-mail supportive communication: Associations with sender sex, recipient sex, and support satisfaction. Information, *Communication & Society*, 11(8), 1089-1110.

Lee, I., Choi, B., Kim, J., Hong, S. J., & Tam, K. Y. (2004). Cross-cultural comparison for cultural aspects of mobile Internet: Focusing on Korea and Hong Kong. *Proceedings of the Tenth Americas Conference on Information Systems,* New York, NY

Lee, R. & Anderson, J. (2008). The future of the Internet III. Retrieved from http://www.pewinternet.org/2008/12/14/scenario-1-the-evolution-of-mobile-internet-communications/

Lee, S.Y. (2014). Examining the factors that influence early adopters' smartphone adoption: The case of college students. *Telematics and Informatics*, 31(2), 308-318.

Lenhart, A., Purcell, K., Smith, A., & Zickuhr, K. (2010a). *Social media & mobile internet use among teens and young adults*. Washington, DC: Pew Internet & American Life Project.

Lenhart, A., Ling, R., Campbell, S., & Purcell, K. (2010b). *Teens and mobile phones*. Retrieved from https://pewinternet.org/reports/2010/ teens-and-mobile-phones.aspx

Leung, L. (1998). Lifestyles and the use of new media technology in urban China. *Telecommunications Policy*, 22(9), 781-790.

Leung, L. (2002). Loneliness, self-disclosure, and ICQ ("I Seek You") use. *Cyberpsychology & Behavior*, 5(3), 241-251.

Leung, L., & Wei, R. (2000). More than just talk on the move: Uses and gratifications of the cellular phone. *Journalism & Mass Communication Quarterly*, 77(2), 308-320.

Levinson, P. (2004). *Cellphone: the story of the world's most mobile medium and how it has transformed everything*. New York, NY: Palgrave Macmillan.

Li, Y. Z., Chen, X., Liu, G. Z., & Siu, K. W. M. (2013). Identifying design opportunity through group innovation: Extended thought of the workshop focusing on smart communication lifestyle. In J. Cai, T. Lockwood, C. S. Wang, G. Y. L. Tong & J. K. Liu (Eds.), *2013 Tsinghua International Design Management Symposium Proceedings* (pp. 37-43). Beijing: Beijing Institute of Technology Press.

Licoppe, C. (2004). 'Connected' presence: the emergence of a new repertoire for managing social relationships in a changing communication technoscape. *Environment and planning D: Society and space*, 22(1), 135-156.

Licoppe, C., & Smoreda, Z. (2005). Are social networks technologically embedded?:How networks are changing today with changes in communication technology. *Social Networks*, 27(4), 317-335.

Lie, M., &Sørensen, K.H. (Eds.).(1996). *Making technology our own: Domesticating technology into everyday life*. Scandinavian University Press, Oslo.

Lilley, R. (Ed.). (1998). *Staging Hong Kong: Gender and performance in transition*. Hawaii: University of Hawaii Press.

Lin, C.C. (2013). Convergence of new and old media: new media representation in traditional news. *Chinese Journal of Communication*, 6(2), 183-201.

Lin, C. J., Lee, T. T., Lin, C., Huang, Y. C., & Chiu, J. M., (2013). Establishing interaction specifications for online-to-offline (O2O) service systems. *Proceedings of the Institute of Industrial Engineers Asian Conference 2013*. Singapore: Springer, 1137-1145.

Ling, R., & Scott W. C. (2009). *The reconstruction of space and time: Mobile communication practices*. New Jersey, NJ: Transaction Books.

Ling, R. (2004). *The mobile connection: The cell phone's impact on society*. San Francisco, CA: Morgan Kaufmann.

Ling, R. (2007). Children, youth and mobile communication. *Journal of Children and Media*, 1(1), 60 – 67.

Ling, R. & Bertel T. (2013).Mobile culture among children and adolescents." In D.Lemish (Ed.), *The Routledge handbook of children, adolescents and media* (pp.127–133). New York, NY: Routledge.

Ling, R., Bertel, T. F., & Sundsøy, P. R. (2012). The socio-demographics of texting: An analysis of traffic data. *New Media & Society*, 14(2), 281–298.

Ling, R., & Haddon L. (2003). Mobile telephony, mobility, and the coordination of everyday life. In J. E. Katz (Ed.),*Machines that become us: The social context of personal communication technology* (pp. 245-265).New Brunswick, NJ: Transaction Publishers.

Ling, R., & Yttri, B. (1999). Nobody sits at home and waits for the telephone to ring: Micro and hyper-coordination through the use of the mobile telephone. *Telenor Forskning og Utvikling, FoU Rapport*, 30(99).

Ling, R., &Yttri B. (2002). Hyper-coordination via mobile phones in Norway. In J. E. Katz& M. Aakhus (Eds.), *Perpetual contact: Mobile communication, private talk, public performance* (pp.139-169). Cambridge: Cambridge University Press.

Ling, R. (2012). *Taken for grantedness: The embedding of mobile communication into society*.Cambridge, MA: MIT Press.

Livingstone, S. (2009). *Children and the Internet: great expectations, challenging realities.* Cambridge; Malden, MA: Polity.

Loos, E., Haddon, L., & Mante-Meijer, E. A. (2012). Generational use of new media. Burlington, VT: Ashgate.

Loras, S. (2014). *Facebook remains top engagement platform in Hong Kong*. Retrieved from http://www.clickz.com/clickz/news/2361746/facebook-remains-top-engagement-platform-in-hong-kong.

Lu, X., Chen, Z., Uji, M., Nagata, T., Katoh, T., & Kitamura, T. (2013). Use of mobile phone text message and personality among Japanese university students. *Psychology Behavioral Science*, 2(5), 192-195.

Mackiewicz, J. (2003). Which rules for online writing are worth following?: A study of eight rules in eleven handbooks. *IEEE Transactions of Professional Communication*, 46(2), 129-138.

Malikhao, P., & Servaes, J. (2011). The media use of American youngsters in the age of narcissism: Surviving in a 24/7 media shock and awe–distracted by everything. *Telematics and Informatics*, 28(2), 66-76.

Markus, M. L. (1987). Toward a 'critical mass' theory of interactive media. *Communication Research*, 14(5), 491–511

Meeker, M. (2013). 2013 Internet Trends. Retrievedfrom http://www.kpcb.com/insights/2013-internet-trends

McCarthy, J., & Wright, P. (2004). Technology as experience. *Interactions*, 11(5), 42-43.

McDonagh, D., Denton, H., & Chapman, J. (2009). Design and emotion. *Journal of Engineering Design*, 5, 433-435.

Mohan, A. (2014). Consumer behaviour towards smartphone industry in Indian market. Ph.D. dissertation, Dublin Business School. Ireland.

Moran, T. P. (2010). *Introduction to the history of communication: Evolutions & revolutions*. New York, NY: Peter Lang.

Mozur, P. (2013). *Number of WeChat app users triple*. Retrieved from http://blogs.wsj.com/digits/2013/08/14/number-of-wechat-app-users-triple/

Mutchler, L. A., Shim, J. P., & Ormond, D. (2011). Exploratory study on users' behavior: Smartphone usage. *Proceedings of the 17th Annual Americas Conference on Information Systems*, Detroit, MI, pp. 1–9.

Neuberger, C., & Nuerbergk, C. (2010). Competition, complementarity or integration? The relationship between professional and participatory media. *Journalism Practice*, 4(3), 319–332.

Neuman, W. L. (2005). *Social research methods: Quantitative and qualitative approaches*. Boston, MA: Allyn and bacon.

Niccolai J.& Gohring N. (2010). *A brief history of palm*, Retrieved from http://www.pcworld.com/article/195199/article.html

Norman, D. A. (2004). *Emotional Design: Why we love (or hate) everyday things*. New York, NY: Basic Books.

OFCA (Office of the Communications Authority), (2013). Retrieved from http://www.ofca.gov.hk/en/media_focus/data_statistics/key_stat/index.html

OFCA(Office of the Communications Authority), (2015). Retrieved from http://www.ofca.gov.hk/en/media_focus/data_statistics/key_stat/index.html

Osgerby, B. (2004). *Youth media*. New York, NY: Routledge.

Otondo, R., Scotter, J., Allen, D., & Palvia, P. (2008). The complexity of richness: Media, message, and communication outcomes. *Information & Management*, 45(1), 21-30.

Palen, L., Salzman, M. & Youngs, E. (2001). Discovery and integration of mobile communications in everyday life. *Personal and ubiquitous computing*, 5(2), 109-122.

Palfrey, J. (2008). *Child safety &online technologies: Final report of the internet safety technical task force to the multi-state working group on social networking of state attorneysgeneral of the United States*. Cambridge, MA: Berkman Center for Internet & Society at Harvard University. Retrieved fromhttp://cyber.law.harvard.edu/pubrelease/isttf/

Park, B. W., & Lee, K. C. (2011). The effect of users' characteristics and experiential factors on the compulsive usage of the smartphone. In *Ubiquitous computing and multimedia applications* (pp. 438-446). Springer Berlin Heidelberg.

Park, J., Han, S. H., Kim, H. K., Oh, S., & Moon, H. (2013a). Modeling user experience: A case study on a mobile device. *International Journal of Industrial Ergonomics*, 43(2), 187-196.

Park, J., Han, S. H., Kim, H. K., Cho, Y., & Park, W. (2013b). Developing elements of user experience for mobile phones and services: survey, interview, and observation approaches. *Human Factors and Ergonomics in Manufacturing & Service Industries*, 23(4), 279-293.

Park, W. K. (2005). Mobile phone addiction. In R. Ling & P. E. Pedersen (Eds.)*Mobile communications: Re-negotiation of the social sphere*(pp. 253–72). London, UK: Springer-Verlag.

Peter, J.P. & Olson, J.C. (1994) *Understanding consumer behavior*. Burr Ridge,IL: Irwin.

Petrič, G., Petrovčič, A., & Vehovar, V. (2011). Social uses of interpersonal communication technologies in a complex media environment. *European Journal of Communication*, 26(2), 116-132.

Persaud, A., & Azhar. I. (2012). "Innovative mobile marketing via smartphones: Are consumers ready?" *Marketing Intelligence & Planning*, 30(4), 418– 443.

Pew Research Center. (2015). *The smartphone difference*. Retrieved from http://www.pewinternet.org/2015/04/01/us-smartphone-use-in-2015.

Phellas, C. N., Bloch, A., & Seale, C. (2011). Structured methods: interviews,questionnaires and observation. In C. Seal (Eds.). *Researching society and culture*, 3rd edition.Sage publications, UK.

Phillips, A. (2010). Old sources: New bottles. In N. Fenton (Ed.), *New media, old news: Journalism & democracy in the digital age* (pp. 87–101). Thousand Oaks: Sage.

Plummer, J. T. (1974). The concept and application of life style segmentation. *The Journal of Marketing*, 33-37.

Preece, J., & Maloney-Krichmar, D. (2003). Online communities: focusing on sociability and usability. In J. Jacko & A. Sears (Eds.), *The human-computer interaction handbook: Fundamentals, evolving technologies and emerging applications* (pp. 596–620). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Prensky, M. (2001). Digital natives, Digital immigrants. *On the Horizon, 9*(5).

Raymond, E. S. (1994). *The new hacker's dictionary* (2nd ed.). Cambridge, CA: The MIT Press.

Reed, B. (2010). *A brief history of Smartphone's*, Retrieved from http://www.networkworld.com/slideshows/2010/061510-smartphone-history.html#slide1

Relieu, M., Zouinar, M., & La Valle, N. (2007). At home with video cameras. *Home Cultures*, 4(1), 45-68.

Rezabek, L. L., & Cochenour, J. J. (1998). Visual cues in computer-mediated communication: Supplementing text with emoticons. *Journal of Visual Literacy*, 18, 201–215.

Rheingold, H. (2002). *Smart mobs: The next social revolution: Transforming cultures and communities in the age of instant access*. Cambridge: Howard Rheingold.

Rice, R. E. & Hagen, I. (2010). Young adults' perpetual contact, social connection, and social control through the Internet and mobile phones. *Communication yearbook*, 34 (2010), 2-39.

Rifkin, J. (2011). *The third industrial revolution: how lateral power is transforming energy, the economy, and the world.* New York: Palgrave Macmillan.

Russell J. (2013). *Stickers: From Japanese craze to global mobile messaging phenomenon*. Retrieved from http://thenextweb.com/asia/2013/07/12/stickers/?fromcat=all

Ryu, S., Kwon Park, S., Oh, D., Sihn, G., Han, K. & Hwang, S. (2005). Research activities on next-generation mobile communications and services in Korea. *Communications Magazine, IEEE*, 43(9), 122-131.

Sarcevic, A., Palen, L., White, J., Starbird, K., Bagdouri, M., & Anderson, K. (2012). Beacons of hope in decentralized coordination: Learning from on-the-ground medical twitterers during the 2010 Haiti earthquake. In *Proceedings of the ACM 2012 conference on computer supported cooperative work* (pp. 47-56).

Sarwar, M., & Soomro, T. R. (2013). Impact of smartphone's on society. *European Journal of Scientific Research*, 98 (21), 216-226.

Serenko, A., Turel, O., & Giles, P. (2009). Integrating technology addiction and adoption: an empirical investigation of online auction websites. *AMCIS 2009 Proceedings*,395.

Small, G. & Vorgan G. (2008). *iBrain: Surviving the technology Alteration of the Modern Mind*. New York, NY: Harper Collins

Schrøder, K. C., Drotner, K., Kline, S., & Murray, C. (2003). *Researching audiences*. Edward Arnold Publishers Ltd, London.

Schroeder, R. (2010). Mobile phones and the inexorable advance of multimodal connectedness. *New Media & Society*, 12(1), 75-90.

Schuurman, D., Courtois, C., & De Marez, L. (2011). New media adoption and usage among Flemish youngsters. *Telematics and Informatics*, 28(2), 77-85.

Shannon, C. E., & Weaver, W. (1949). *The mathematical theory of communication*, Illinois: University of Illinois Press.

Short, J.A., Williams, E., & Christie, B. (1976). *The social psychology of telecommunications*. London: WILEY.

Silverman, D. (2006). *Interpreting qualitative data: Methods for analysing talk, text and interaction* (3rd edition). London: Sage.

Silverstone, R., & Haddon, L. (1996). Design and the domestication of information and communication technologies: Technical change and everyday life. In R. Mansell & R. Silverstone (Eds.), *Communication by design: Politics of information and communication technologies*. (pp. 44-74). Oxford: Oxford University Press.

Silverstone, R., Hirsch, E., & Morley, D. (1992). Information and communication technologies and the moral economy of the household. In R. Silverstone & E. Hirsch (Eds.), *Consuming Technologies* (pp. 15–31). London: Routledge.

Siu, K. W. M. (1999). The escalator: A conveyor of Hong Kong's culture. *Human Relations*, 52(5), 665-681.

Siu, K. W. M. (2003). Users' creative responses and designers' roles. *Design Issues*, 19(2), 64-73.

Siu, K. W. M.,& Zhao, T. J. (2013). City spaces and human relations in Hong Kong's mass transit railway: From circulation to everyday life. *Journal of Human Behavior in the Social Environment*, 23(5), 675-688.

Smith, A. (2013). *Smartphone ownership 2013: Pew Internet*. Retrieved from http://www.pewinternet.org/2013/06/05/smartphone-ownership-2013/

Smith, A. (2015). *U.S. smartphone use in 2015*. Retrieved from http://www.pewinternet.org/2015/04/01/us-smartphone-use-in-2015/

Sperber, D., & Wilson, D. (1986). *Relevance: Communication and cognition*. London: Blackwell.

Spiliotopoulos, T., & Oakley, I. (2013). Understanding motivations for Facebook use: Usage metrics, network structure, and privacy. Paper presented at the *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*.

Srivastava,L. (2005). Mobile phones and the evolution of social behaviour, *Behaviour & Information Technology*, 24(2), 111-129.

Stald, G. (2008). Mobile identity: Youth, identity, and mobile communication media. In *Youth, identity, and digital media*, In D. Buckingham (Ed.), Youth, identity, and digital media (pp. 143–164). Cambridge, MA: The MIT Press.

Stewart, J. K. (2003). The social consumption of ICTs: insights from research on the appropriation and consumption of new ICTs in the domestic environment. *Cognition Technology and Work*, 5, 4-14.

Summers, N. (2013). *IDC: Smartphone shipments to overtake feature phones worldwide in 2013*. Retrieved from http://thenextweb.com/insider/2013/03/04/idc-smartphone-shipments-to-overtake-feature-phones-worldwide-in-2013/

Swallow, D., Blythe, M., & Wright, P. (2005). Grounding experience: relating theory and method to evaluate the user experience of smartphones. In *Proceedings of the 2005 annual conference on European association of cognitive ergonomics*, 91-98. University of Athens.

Tai, S. H., & Tam, J. L. (1996). A comparative study of Chinese consumers in Asianmarkets-A lifestyle analysis. *Journal of International consumer marketing*, 9(1), 25-42.

Tapscott, D. (1996). *The digital economy: Promise and peril in the age of networked intelligence(Vol. 1)*.New York, NY: McGraw-Hill.

Tessa, S. (2012) *What's the future of communication? Let's ask the experts.* Retrieved from http://thenextweb.com/media/2012/07/15/whats-the-future-of-communication-lets-ask-the-experts/

The Economist (2009).*The Apparatgeist calls.* Retrieved from http://www.economist.com/node/15172850

Thulin, E., & Vilhelmson B. (2009). Mobile phones: transforming the everyday social communication practice of urban youth. In *The reconstruction of space and time: mobile communication practices*, edited by Ling, Rich, and Scott W. Campbell, 137-158. New Jersey, NJ: Transaction Books.

Tossell, C. C., Kortum, P., Shepard, C., Barg-Walkow, L. H., Rahmati, A., & Zhong, L. (2012). A longitudinal study of emoticon use in text messaging from smartphones. *Computers in Human Behavior*, 28(2), 659-663.

Tong, C., Tak, W. I. W., & Wong, A. (2015). The impact of knowledge sharing on the relationship between organizational culture and job satisfaction: the perception of information communication and technology (ICT) practitioners in Hong Kong. *International Journal of Human Resource Studies*, 5(1), 19-47.

Tseng, H., Liu, L., & Hsu, S. (2012). *FEATURE: 'Heads-down Tribe' Sparks Worry among Doctors and Parents.* Retrieved from http://www.taipeitimes.com/News/taiwan/archives/2012/07/27/2003538766

Turel, O., & Serenko, A. (2011). Developing a (bad) habit: Antecedents and adverse consequences of social networking website use habit. In *AMCIS 2011 Proceedings*.

Turkle, S. (2011). *Alone together: Why we expect more from technology and less from each other*. New York, NY: Basic Books.

Turkle, S. (2015). *Reclaiming conversation: The power of talk in a digital age.* New York, NY: Penguin Press.

Utz, S. (2007). Media use in long-distance friendships. *Information, Communication & Society*, 10(5), 694-713.

Van Teijlingen, E., & Hundley, V. (2002). The importance of pilot studies. *Nursing Standard*, 16(40), 33-36.

Vargo, S. L., & Lusch, R. F. (2004). Evolving to a new dominant logic for marketing. *Journal of Marketing*, 1-17.

Veal, A. J. (1993). The concept of lifestyle: a review. *Leisure Studies*, 12(4), 233-252.

Verkasalo, H. (2010). Analysis of smartphone user behavior. In *Mobile Business and 2010 Ninth Global Mobility Roundtable* (ICMB-GMR), 258-263, IEEE.

Vyncke, P. (2002). Lifestyle segmentation from attitudes, interests and opinions, to values, aesthetic styles, life visions and media preferences. *European journal of communication*, 17(4), 445-463.

Wajcman, J., Bittman, M., &Brown, J.E. (2008). Families without Borders: Mobile Phones,Connectedness and Work-Home Divisions. *Sociology*, 42(4), 635–652.

Watts, D. J. (2004). *Six degrees: The science of a connected age*. London: Heinemann.

Wang, D., & Law, F. Y. T. (2007). Impacts of information and communication technologies (ICT) on time use and travel behavior: A structural equations analysis. *Transportation*, 34(4), 513-527

Walsh, S. P., White, K. M., & Young, R. M. (2009). The phone connection: A qualitative exploration of how belongingness and social identification relate to mobile phone use amongst Australian youth. *Journal of Community & Applied Social Psychology*, 19(3), 225-240.

Walsh, S. P., White, K. M., & Young, R. M. (2010). Needing to connect: The effect of self and others on young people's involvement with their mobile phones. *Australian Journal of Psychology*, 62(4), 194-203.

Webster, F. (2002) *Theories of the information society*, 2nd edition. London: Routledge.

Wei, R. (2006). Lifestyles and new media: Adoption and use of wireless communication technologies in China. *New Media & Society*, 8(6), 991-1008.

Westlund, O., Gomez-Barroso, J. L., Compano, R., & Feijóo, C. (2011). Exploring the logic of mobile search. *Behaviour & Information Technology*, 30(5), 691-703.

Wikipedia. (2016a). *'Blackberry'*. Retrieved from http://en.wikipedia.org/wiki/BlackBerry

Wikipedia. (2016b). *'History of communication'*. Retrieved from https://en.wikipedia.org/wiki/History_of_communication

Wikipedia. (2016c). *'IBM personal computer'*. Retrieved from https://en.wikipedia.org/wiki/IBM_Personal_Computer

Wimmer, R. D.,& Dominick, J. R. (2006). *Mass media research: an introduction*. Belmont, CA: Thomson/Wadsworth.

Wolf, A. (2000). Emotional expression online: Gender differences in emoticon use. *CyberPsychology & Behavior*, 3(5), 827-833.

Woollaston, V. (2013). *How often do you check your phone? The average person does it 110 times a day.* Retrieved from http://www.dailymail.co.uk/sciencetech/article-2449632/How-check-phone-The-average-person-does-110-times-DAY-6-seconds-evening.html

World Population Review (2016). Retrieved from http://worldpopulationreview.com/countries/japan-population/

Yan, X. (2001). The impact of the regulatory framework on fixed-mobile interconnection settlements: the case of China and Hong Kong. *Telecommunications Policy*, 25(7), 515-532.

Zablocki, B. D., & Kanter, R. M. (1976). The differentiation of life-styles. *Annual Review of Sociology*, 269-298.

Zeisel, J. (1981). *Inquiry by design: Tools for environment-behavior research*. London: Cambridge University Press.

Zeng, H., Liu, Y., & Tao, X. J. (2014). *Yi dong de di guo.*[Nation of mobile]. Zhejiang: Zhejiang University Press(in Chinese).

Ziv, N. D. & Mulloth, B., (2006). An exploration on mobile social networking. In *Proceedings of International Conference on Mobile Business*. Mobile Business, Copenhagen, 21-21.